

Kindergarten

Deleted language is in **red**. Added language is in **blue**.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Counting and Cardinality (CC)			Counting and Cardinality (CC)		
A. Know number names and the counting sequence.	K.CC.A.1	Count to 100 by ones, fives, and tens. Count backward from 10.	A. Know number names and the counting sequence.	K.CC.A.1	Count to 100 by ones, fives, and tens. Count backward from 10.
	K.CC.A.2	Count forward beginning from a given number within the known sequence (instead of having to begin at 1).		K.CC.A.2	Count forward by ones beginning from any given number within the known sequence (instead of having to begin at 1).
	K.CC.A.3	Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20		K.CC.A.3	Write numbers from 0 to 20. Represent a quantity of objects with a written number 0-20.
				K.CC.A.4	Recognize, describe, extend, and create patterns and explain a simple rule for a pattern using concrete materials. Analyze the structure of the repeating pattern by identifying the unit (core) of the pattern.
B. Count to tell the number of objects.	K.CC.B.4	Understand the relationship between numbers and quantities; connect counting to cardinality.	B. Count to tell the number of objects.	K.CC.B.5	Understand the relationship between numbers and quantities; connect counting to cardinality.
	K.CC.B.4a	When counting objects, say the number names in the standard order, using one-to-one correspondence.		K.CC.B.5a	When counting objects 1-20, say the number names in the standard order, using one-to-one correspondence.
	K.CC.B.4b	Recognize that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.		K.CC.B.5b	Recognize that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
	K.CC.B.4c	Recognize that each successive number name refers to a quantity that is one greater.		K.CC.B.5c	Recognize that each successive number name refers to a quantity that is one greater and each previous number is one less.
	K.CC.B.5	Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, a circle, or as many as 10 things in a scattered configuration. Given a number from 1-20, count out that many objects		K.CC.B.6	Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, a circle, or as many as 10 things in a scattered configuration. Given a number from 1-20, count out that many objects.

C. Compare numbers.	K.CC.C.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.	C. Compare numbers.	K.CC.C.7	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.
	K.CC.C.7	Compare two given numbers up to 10, when written as numerals, using the terms greater than, less than, or equal to.		K.CC.C.8	Compare two given numbers up to 10, when written as numerals, using the terms <i>greater than</i> , <i>less than</i> , or <i>equal to</i> . (Students need not use comparison symbols here.)
Operations and Algebraic Thinking (OA)			Operations and Algebraic Thinking (OA)		
A. Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. (See Table 1-Addition and Subtraction Situations)	K.OA.A.1	Represent addition and subtraction with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations.	A. Represent and solve problems involving addition and subtraction. (See Table 1-Addition and Subtraction Situations)	K.OA.A.1	Represent addition and subtraction with objects, fingers, drawings, acting out situations, verbal explanations, expressions, or equations.
	K.OA.A.2	Add and subtract within 10 to solve contextual problems using objects or drawings to represent the problem.		K.OA.A.2	Add and subtract within 10 to solve contextual problems with result/total unknown involving situations of add to, take from, and put together/take apart. Use objects, drawings, or equations to represent the problem.
	K.OA.A.3	Decompose numbers less than or equal to 10 into addend pairs in more than one way (e.g., $5 = 2 + 3$ and $5 = 4 + 1$) by using objects or drawings. Record each decomposition using a drawing or writing an equation.		K.OA.A.3	Decompose numbers less than or equal to 10 into addend pairs in more than one way (e.g., $5 = 2 + 3$ and $5 = 4 + 1$) by using objects or drawings. Record each decomposition using a drawing or writing an equation.
	K.OA.A.4	Find the number that makes 10, when added to any given number, from 1 to 9 using objects or drawings. Record the answer using a drawing or writing an equation.		K.OA.A.4	Find the number that makes 10, when added to any given number, from 1 to 9 using objects or drawings. Record the answer using a drawing or writing an equation.
	K.OA.5	Fluently add and subtract within 10 using mental strategies.		K.OA.A.5	Use mental strategies flexibly to develop fluency in addition and subtraction within 10.
Number and Operations in Base Ten (NBT)			Number and Operations in Base Ten (NBT)		
A. Work with numbers 11 - 19 to gain foundations for place value.	K.NBT.A.1	Compose and decompose numbers from 11 to 19 into ten ones and some more ones by using objects or drawings. Record the composition or decomposition using a drawing or by writing an equation.	A. Work with numbers 11-19 to gain foundations for place value.	K.NBT.A.1	Compose and decompose numbers from 11 to 19 into a group of ten ones and some more ones by using objects or drawings (e.g., 18 equals 10 + 8). Record the composition or decomposition using a drawing or by writing an equation.
Measurement and Data (MD)			Measurement and Data (MD)		
A. Describe and compare	K.MD.A.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	A. Describe and compare	K.MD.A.1	Describe the measurable attributes of an object, such as length (long/short), height (tall/short), or weight (heavy/light).

measurable attributes.	K.MD.A.2	Directly compare two objects with a measurable attribute in common, to see which object has more of/less of the attribute, and describe the difference . For example, directly compare the heights of two children and describe one child as taller/shorter	measurable attributes.	K.MD.A.2	Directly compare two objects with a measurable attribute in common, to describe which object has more of/less of the attribute. For example, directly compare the heights of two children and describe one child as taller/shorter.
B. Work with money.	K.MD.B.3	Identify the penny, nickel, dime, and quarter and recognize the value of each.	B. Work with money.	K.MD.B.3	Identify the penny, nickel, dime, and quarter based on their attributes (size and color) and recognize the value of each.
C. Classify objects and count the number of objects in each category.	K.MD.C.4	Sort a collection of objects into a given category, with 10 or less in each category. Compare the categories by group size.	C. Classify objects and count the number of objects in each category.	K.MD.C.4	Sort a collection of objects into a given category, with 10 or fewer in each category. Compare the categories by group size.
Geometry (G)			Geometry (G)		
A. Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).	K.G.A.1	Describe objects in the environment using names of shapes. Describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, between, and next to.	A. Identify and describe shapes and solids.	K.G.A.1	Describe objects in the environment using names of shapes and solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, between, and next to.
	K.G.A.2	Correctly name shapes regardless of their orientations or overall size.		K.G.A.2	Correctly name shapes and solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) regardless of their orientations or overall size.
	K.G.A.3	Identify shapes as two-dimensional or three-dimensional.		K.G.A.3	Identify shapes/ solids (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) as two-dimensional or three-dimensional.
B. Analyze, compare, create, and compose shapes.	K.G.B.4	Describe similarities and differences between two- and three-dimensional shapes, in different sizes and orientations.	B. Analyze, compare, create, and compose shapes.	K.G.B.4	Describe similarities and differences between two- and three-dimensional shapes/solids, in different sizes and orientations.
	K.G.B.5	Model shapes in the world by building and drawing shapes.		K.G.B.5	Model shapes/ solids in the world by building or drawing them.
	K.G.B.6	Compose larger shapes using simple shapes and identify smaller shapes within a larger shape.		K.G.B.6	Compose a figure using simple shapes/ solids and identify smaller shapes/ solids within the figure.

Grade 1

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TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Operations and Algebraic Thinking (OA)			Operations and Algebraic Thinking (OA)		
A. Represent and solve problems involving addition and subtraction.	1.OA.A.1	Add and subtract within 20 to solve contextual problems, with unknowns in all positions, involving situations of add to, take from, put together/take apart, and compare. Use objects, drawings, and equations with a symbol for the unknown number to represent the problem. (See Table 1 - Addition and Subtraction Situations)	A. Represent and solve problems involving addition and subtraction.	1.OA.A.1	Add and subtract within 20 to solve contextual problems, with unknowns in all positions, involving situations of add to, take from, put together/take apart, and compare. Use objects, drawings, and equations with a symbol for the unknown number to represent the problem. NOTE: While start unknown situations may be introduced in first grade, they are not expected to be mastered until second grade. (See Table 1- Addition and Subtraction Situations)
	1.OA.A.2	Add three whole numbers whose sum is within 20 to solve contextual problems using objects, drawings, and equations with a symbol for the unknown number to represent the problem.		1.OA.A.2	Add three whole numbers whose sum is within 20 to solve contextual problems using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
B. Understand and apply properties of operations and the relationship between addition and subtraction. (See Table 3- Properties of Operations)	1.OA.B.3	Apply properties of operations (additive identity, commutative, and associative) as strategies to add and subtract. (Students need not use formal terms for these properties.)	B. Understand and apply properties of operations and the relationship between addition and subtraction.	1.OA.B.3	Apply properties of operations (additive identity, commutative, and associative) as strategies to add and subtract. (Students need not use formal terms for these properties.) (See Table 3-Properties of Operations)
	1.OA.B.4	Understand subtraction as an unknown-addend problem. For example, to solve $10 - 8 = \underline{\quad}$, a student can use $8 + \underline{\quad} = 10$.		1.OA.B.4	Understand the relationship between addition and subtraction by representing subtraction as an unknown-addend problem. For example, to solve $10 - 8 = \underline{\quad}$, a student can use $8 + \underline{\quad} = 10$. (See Table 3-Properties of Operations)
C. Add and subtract within 20.	1.OA.C.5	Add and subtract within 20 using strategies such as counting on, counting back, making 10, using fact families and related known facts, and composing/ decomposing numbers with an emphasis on making ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$ or adding $6 + 7$ by creating the known equivalent $6 + 4 + 3 = 10 + 3 = 13$).	C. Add and subtract within 20.	1.OA.C.5	Add and subtract within 20 using strategies such as counting on, counting back, making 10, related known facts, and composing/decomposing numbers with an emphasis on making ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$ or adding $6 + 7$ by creating the known equivalent $6 + 4 + 3 = 10 + 3 = 13$ OR $6 + 6 + 1 = 12 + 1$).
	1.OA.C.6	Fluently add and subtract within 20 using mental strategies. By the end of 1 st grade, know from memory all sums up to 10.		1.OA.C.6	Use mental strategies flexibly and efficiently to develop fluency in addition and subtraction within 20. By the end of grade 1, know all sums and differences up to 10.
D. Work with addition and subtraction equations.	1.OA.D.7	Understand the meaning of the equal sign (e.g., $6 = 6$; $5 + 2 = 4 + 3$; $7 = 8 - 1$). Determine if equations involving addition and subtraction are true or false	D. Work with addition and subtraction equations.	1.OA.D.7	Understand the meaning of the equal sign (e.g., $6 = 6$; $5 + 2 = 4 + 3$; $7 = 8 - 1$). Determine if equations involving addition and subtraction are true or false.
	1.OA.D.8	Determine the unknown whole number in an addition or subtraction equation, with the unknown in any position (e.g., $8 + ? = 11$, $5 = ? - 3$, $6 + 6 = ?$).		1.OA.D.8	Determine the unknown whole number in an addition or subtraction equation with sums/differences within 20, with the unknown in any position (e.g., $8 + ? = 11$, $5 = ? - 3$, $6 + 6 = ?$). (See Table 3-Properties of Operations)

Number and Operations in Base Ten (NBT)			Number and Operations in Base Ten (NBT)		
A. Extend the counting sequence.	1.NBT.A.1	Count to 120, starting at any number. Read and write numerals to 120 and represent a number of objects with a written numeral. Count backward from 20.	A. Extend the counting sequence.	1.NBT.A.1	Count to 120, by ones, twos, and fives starting at any multiple of that number . Count backward from 20. Read and write numbers to 120 and represent a quantity of objects with a written number.
				1.NBT.A.2	Recognize, describe, extend, and create patterns when counting by ones, twos, fives, and tens and use those patterns to predict the next number in the counting sequence up to 120 through counting or building with concrete materials. <i>For example: 1, 3, 5, ...; 2, 4, 6, ...; 5, 10, 15, ...; etc.</i>
B. Understand place value.	1.NBT.B.2	Know that the digits of a two-digit number represent groups of tens and ones (e.g., 39 can be represented as 39 ones, 2 tens and 19 ones, or 3 tens and 9 ones).	B. Understand place value.	1.NBT.B.3	Know that the digits of a two-digit number represent groups of tens and ones (e.g., 39 can be represented as 39 ones, 2 tens and 19 ones, or 3 tens and 9 ones).
	1.NBT.B.3	Compare two two-digit numbers based on the meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.		1.NBT.B.4	Compare two two-digit numbers based on the meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.
C. Use place value understanding and properties of operations to add and subtract.	1.NBT.C.4	Add a two-digit number to a one-digit number and a two-digit number to a multiple of ten (within 100). Use concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.	C. Use place value understanding and properties of operations to add and subtract.	1.NBT.C.5	Add a two-digit number to a one-digit number and a two-digit number to a multiple of ten (within 100). Use concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.
	1.NBT.C.5	Mentally find 10 more or 10 less than a given two-digit number without having to count by ones and explain the reasoning used.		1.NBT.C.6	Mentally find 10 more or 10 less than a given two-digit number without having to count by ones and explain the reasoning used.
	1.NBT.C.6	Subtract multiples of 10 from multiples of 10 in the range 10-90 using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.		1.NBT.C.7	Subtract multiples of 10 from any number in the range of 10-99 using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
Measurement and Data (MD)			Measurement and Data (MD)		
A. Measure lengths indirectly and by iterating length units.	1.MD.A.1	Order three objects by length. Compare the lengths of two objects indirectly by using a third object. <i>For example, to compare indirectly the heights of Bill and Susan: if Bill is taller than mother and mother is taller than Susan, then Bill is taller than Susan.</i>	A. Measure lengths indirectly and by iterating length units.	1.MD.A.1	Order three objects by length. Compare the lengths of two objects indirectly by using a third object. <i>For example, to compare indirectly the heights of Bill and Susan: if Bill is taller than mother and mother is taller than Susan, then Bill is taller than Susan.</i>
	1.MD.A.2	Measure the length of an object using non-standard units and express this length as a whole number of units.		1.MD.A.2	Measure the length of an object using non-standard units (paper clips, cubes, etc.) and express this length as a whole number of units.
B. Work with time and money.	1.MD.B.3	Tell and write time in hours and half-hours using analog and digital clocks.	B. Work with time and money.	1.MD.B.3	Recognize a clock as a measurement tool. Tell and write time in hours and half-hours using analog and digital clocks.
	1.MD.B.4	Count the value of a set of like coins less than one dollar using the € symbol only.		1.MD.B.4	Count the value of a set of like coins less than one dollar using the € symbol only.

C. Represent and interpret data.	1.MD.C.5	Organize, represent, and interpret data with up to three categories. Ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	C. Represent and interpret data.	1.MD.C.5	Organize, represent, and interpret data with up to three categories using pictographs, bar graphs, and tally charts. Ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
Geometry (G)			Geometry (G)		
A.Reason about shapes and their attributes.	1.G.A.1	Distinguish between attributes that define a shape (<i>e.g., number of sides and vertices</i>) versus attributes that do not define the shape (<i>e.g., color, orientation, overall size</i>) ; build and draw two-dimensional shapes to possess defining attributes	A. Reason about shapes/solids and their attributes.	1.G.A.1	Distinguish between attributes that define a shape (<i>e.g., number of sides and vertices</i>) versus attributes that do not define the shape (<i>e.g., color, orientation, overall size</i>) ; build and draw two-dimensional shapes to possess defining attributes.
	1.G.A.2	Create a composite shape and use the composite shape to make new shapes by using two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, rectangular prisms, cones, and cylinders).		1.G.A.2	Create a composite figure and use the composite figure to make new figures by using two-dimensional shapes (rectangles, squares, hexagons, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional solids (cubes, spheres, rectangular prisms, cones, and cylinders).
	1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that partitioning into more equal shares creates smaller shares.		1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of, the shares. Understand for these examples that partitioning into more equal shares creates smaller shares.

Grade 2

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TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Operations and Algebraic Thinking (OA)			Operations and Algebraic Thinking (OA)		
A. Represent and solve problems involving addition and subtraction. (See Table 1- Addition and Subtraction Situations)	2.OA.A.1	Add and subtract within 100 to solve one- and two-step contextual problems, with unknowns in all positions, involving situations of add to, take from, put together/take apart, and compare. Use objects, drawings, and equations with a symbol for the unknown number to represent the problem.	A. Represent and solve problems involving addition and subtraction.	2.OA.A.1	Add and subtract within 100 to solve one- and two-step contextual problems, with unknowns in all positions, involving situations of add to, take from, put together/take apart, and compare. Use objects, drawings, and equations with a symbol for the unknown number to represent the problem. (See Table 1 - Addition and Subtraction Situations)
B. Add and subtract within 30.	2.OA.B.2	Fluently add and subtract within 30 using mental strategies. By the end of 2nd grade, know from memory all sums of two one-digit numbers and related subtraction facts.	B. Add and subtract within 30.	2.OA.B.2	Fluently add and subtract within 30 using mental strategies. By the end of 2nd grade, know all sums of two one-digit numbers and related subtraction facts.
C. Work with equal groups of objects to gain foundations for multiplication.	2.OA.C.3	Determine whether a group of objects (up to 20) has an odd or even number of members by pairing objects or counting them by 2s. Write an equation to express an even number as a sum of two equal addends.	C. Work with equal groups of objects to gain foundations for multiplication.	2.OA.C.3	Determine whether a group of objects (up to 20) has an odd or even number of members by pairing objects or counting them by 2s. Write an equation to express an even number as a sum of two equal addends.
	2.OA.C.4	Use repeated addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.		2.OA.C.4	Use repeated addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. <i>For example, a 3 by 4 array can be expressed as $3 + 3 + 3 = 12$ or $4 + 4 + 4 = 12$.</i>
			D. Solve problems involving addition and subtraction and identify and explain patterns in arithmetic.	2.OA.D.1	Identify arithmetic patterns in an addition or hundreds chart and explain them using properties of operations. For example, analyze patterns in the addition chart and observe an alternating pattern of even and odd numbers (because each time we move to the right one box or down one box, we are adding one more to our sum: $(2 + 3) + 1 = 2 + (3 + 1) = 2 + 4$ which uses the associative property of addition). (See Table 3 - Properties of Operations)
Number and Operations in Base Ten (NBT)			Number and Operations in Base Ten (NBT)		
	2.NBT.A.1	Know that the three digits of a three-digit number represent amounts of hundreds, tens, and ones (e.g., 706 can be represented in multiple ways as 7 hundreds, 0 tens, and 6 ones; 706 ones; or 70 tens and 6 ones).		2.NBT.A.1	Know that the three digits of a three-digit number represent amounts of hundreds, tens, and ones (e.g., 706 can be represented in multiple ways as 7 hundreds, 0 tens, and 6 ones; 706 ones; or 70 tens and 6 ones).

A. Understand place value.	2.NBT.A.2	Count within 1000. Skip-count within 1000 by 5s, 10s, and 100s, starting from any number in its skip counting sequence.	A. Understand place value.	2.NBT.A.2	Recognize, describe, extend, and create patterns when counting by ones, twos, fives, tens, and hundreds and use those patterns to predict the next number in the counting sequence up to 1000 through counting. <i>For example: 111, 113, 115, ...; 82, 84, 86, ...; 370, 380, 390....; 100, 200, 300,...; etc.</i>
	2.NBT.A.3	Read and write numbers to 1000 using standard form, word form, and expanded form.		2.NBT.A.3	Read and write numbers to 1000 using standard form, word form, and expanded form. <i>For example, write 234 as 200 + 30 + 4.</i>
	2.NBT.A.4	Compare two three-digit numbers based on the meanings of the digits in each place and use the symbols >, =, and < to show the relationship.		2.NBT.A.4	Compare two three-digit numbers based on the meanings of the digits in each place and use the symbols >, =, and < to show the relationship.
B. Use place value understanding and properties of operations to add and subtract. (See Table 3- Properties of Operations)	2.NBT.B.5	Fluently add and subtract within 100 using properties of operations, strategies based on place value, and/or the relationship between addition and subtraction.	B. Use place value understanding and properties of operations to add and subtract. (See Table 3- Properties of Operations)	2.NBT.B.5	Fluently add and subtract within 100 using properties of operations, strategies based on place value, and/or the relationship between addition and subtraction.
	2.NBT.B.6	Add up to four two-digit numbers using properties of operations and strategies based on place value.		2.NBT.B.6	Add up to four two-digit numbers using properties of operations and strategies based on place value.
	2.NBT.B.7	Add and subtract within 1000 using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used.		2.NBT.B.7	Add and subtract within 1000 using concrete models, drawings, strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to explain the reasoning used. (Explanations may include words, drawing, or objects.)
	2.NBT.B.8	Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.		2.NBT.B.8	Mentally add or subtract 10 or 100 to/from any given number within 1000.
	2.NBT.B.9	Explain why addition and subtraction strategies work using properties of operations and place value. (Explanations may include words, drawing, or objects.)			
Measurement and Data (MD)			Measurement and Data (MD)		
A. Measure and estimate lengths in standard units.	2.MD.A.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	A. Measure and estimate lengths in standard units.	2.MD.A.1	Measure the length of an object in whole number units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
	2.MD.A.2	Measure the length of an object using two different units of measure and describe how the two measurements relate to the size of the unit chosen.		2.MD.A.2	Measure the length of an object using two different whole number units of measure and describe how the two measurements relate to the size of the unit chosen.
	2.MD.A.3	Estimate lengths using units of inches, feet, yards, centimeters, and meters.		2.MD.A.3	Estimate lengths using whole number units of inches, feet, yards, centimeters, and meters.
	2.MD.A.4	Measure to determine how much longer one object is than another and express the difference in terms of a standard unit of length.		2.MD.A.4	Measure, using whole number lengths, to determine how much longer one object is than another and express the difference in terms of a standard unit of length.

B. Relate addition and subtraction to length.	2.MD.B.5	Add and subtract within 100 to solve contextual problems involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown to represent the problem.	B. Relate addition and subtraction to length.	2.MD.B.5	Add and subtract within 100 to solve contextual problems, with the unknown in any position , involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown to represent the problem. (See Table 1 - Addition and Subtraction Situations)
	2.MD.B.6	Represent whole numbers as lengths from 0 on a number line and know that the points corresponding to the numbers on the number line are equally spaced. Use a number line to represent whole number sums and differences of lengths within 100.		2.MD.B.6	Represent whole numbers as lengths from 0 on a number line and know that the points corresponding to the numbers on the number line are equally spaced. Use a number line to represent whole number sums and differences of lengths within 100.
C. Work with time and money.	2.MD.C.7	Tell and write time in quarter hours and to the nearest five minutes (in a.m. and p.m.) using analog and digital clocks.	C. Work with time and money.	2.MD.C.7	Tell and write time in quarter hours and to the nearest five minutes (in a.m. and p.m.) using analog and digital clocks.
	2.MD.C.8	Solve contextual problems involving dollar bills , quarters, dimes, nickels, and pennies using ¢ and \$ symbols appropriately.		2.MD.C.8	Solve contextual problems involving amounts less than one dollar including quarters, dimes, nickels, and pennies using the ¢ symbol appropriately. Solve contextual problems involving whole number dollar amounts up to \$100 using the \$ symbol appropriately.
D. Represent and interpret data.	2.MD.D.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	D. Represent and interpret data.	2.MD.D.9	Given a set of data, create a line plot , where the horizontal scale is marked off in whole-number units.
	2.MD.D.10	Draw a pictograph and a bar graph (with intervals of one) to represent a data set with up to four categories. Solve addition and subtraction problems related to the data in a graph.		2.MD.D.10	Draw a pictograph (with a key of values of 1, 2, 5, or 10) and a bar graph (with intervals of one) to represent a data set with up to four categories. Solve addition and subtraction problems related to the data in a graph.
Geometry (G)			Geometry (G)		
A. Reason about shapes and their attributes.	2.G.A.1	Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. Draw two-dimensional shapes having specified attributes (as determined directly or visually, not by measuring), such as a given number of angles or a given number of sides of equal length.	A. Reason about shapes and their attributes.	2.G.A.1	Identify triangles, quadrilaterals, pentagons, and hexagons. Draw two-dimensional shapes having specified attributes (as determined directly or visually, not by measuring), such as a given number of angles/vertices or a given number of sides of equal length.
	2.G.A.2	Partition a rectangle into rows and columns of same-sized squares and find the total number of squares.		2.G.A.2	Partition a rectangle into rows and columns of same-sized squares and find the total number of squares.
	2.G.A.3	Partition circles and rectangles into two, three, and four equal shares, describe the shares using the words halves, thirds, fourths, half of, a third of, and a fourth of, and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.		2.G.A.3	Partition circles and rectangles into two, three, and four equal shares. Describe the shares using the words halves, thirds, fourths, half of, a third of, and a fourth of, and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

Grade 3

Deleted language is in red. Added language is in blue.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Operations and Algebraic Thinking (OA)			Operations and Algebraic Thinking (OA)		
A. Represent and solve problems involving multiplication and division.	3.OA.A.1	Interpret the factors and products in whole number multiplication equations (e.g., 4×7 is 4 groups of 7 objects with a total of 28 objects or 4 strings measuring 7 inches each with a total of 28 inches.)	A. Represent and solve problems involving multiplication and division.	3.OA.A.1	Interpret the factors and products in whole number multiplication equations (e.g., 4×7 is 4 groups of 7 objects with a total of 28 objects or 4 strings measuring 7 inches each with a total length of 28 inches).
	3.OA.A.2	Interpret the dividend, divisor, and quotient in whole number division equations (e.g., $28 \div 7$ can be interpreted as 28 objects divided into 7 equal groups with 4 objects in each group or 28 objects divided so there are 7 objects in each of the 4 equal groups).		3.OA.A.2	Interpret the dividend, divisor, and quotient in whole number division equations (e.g., $28 \div 7$ can be interpreted as 28 objects divided into 7 equal groups with 4 objects in each group or 28 objects divided so there are 7 objects in each of the 4 equal groups).
	3.OA.A.3	Multiply and divide within 100 to solve contextual problems, with unknowns in all positions, in situations involving equal groups, arrays, and measurement quantities using strategies based on place value, the properties of operations, and the relationship between multiplication and division (e.g., contexts including computations such as $3 \times ? = 24$, $6 \times 16 = ?$, $? \div 8 = 3$, or $96 \div 6 = ?$) (See Table 2 - Multiplication and Division Situations).		3.OA.A.3	Multiply and divide within 100 to solve contextual problems, with the unknown in any positions, in situations involving equal groups, arrays/area, and measurement quantities using strategies based on place value, the properties of operations, and the relationship between multiplication and division (e.g., contexts including computations such as $3 \times ? = 24$, $6 \times 16 = ?$, $? \div 8 = 3$, or $96 \div 6 = ?$). (See Table 2 - Multiplication and Division Situations).
	3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers within 100. For example, determine the unknown number that makes the equation true in each of the equations: $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$		3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers within 100. For example, determine the unknown number that makes the equation true in each of the equations: $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$.

B. Understand properties of multiplication and the relationship between multiplication and division.	3.OA.B.5	Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) <i>Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known (Commutative property of multiplication). $3 \times 5 \times 2$ can be solved by $(3 \times 5) \times 2$ or $3 \times (5 \times 2)$ (Associative property of multiplication). One way to find 8×7 is by using $8 \times (5 + 2) = (8 \times 5) + (8 \times 2)$. By knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, then $8 \times 7 = 40 + 16 = 56$ (Distributive property of multiplication over addition).</i>	B. Understand properties of multiplication and the relationship between multiplication and division. (See Table 3 - Properties of Operations)	3.OA.B.5	Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) <i>Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known (commutative property of multiplication). $3 \times 5 \times 2$ can be solved by $(3 \times 5) \times 2$ or $3 \times (5 \times 2)$ (associative property of multiplication). One way to find 8×7 is by using $8 \times (5 + 2) = (8 \times 5) + (8 \times 2)$. By knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, then $8 \times 7 = 40 + 16 = 56$ (distributive property of multiplication over addition).</i>
	3.OA.B.6	Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.		3.OA.B.6	Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.
C. Multiply and divide within 100.	3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of 3 rd grade, know from memory all products of two one-digit numbers and related division facts.	C. Multiply and divide within 100.	3.OA.C.7	Fluently multiply and divide within 100, using strategies such as the properties of operations or the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$). By the end of 3 rd grade, know all products of two one-digit numbers and related division facts.
D. Solve problems involving the four operations and identify and explain patterns in arithmetic.	3.OA.D.8	Solve two-step contextual problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations).	D. Solve problems involving the four operations and identify and explain patterns in arithmetic.	3.OA.D.8	Solve two-step contextual problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations).
	3.OA.D.9	Identify arithmetic patterns (including patterns in the addition and multiplication tables) and explain them using properties of operations. For example, analyze patterns in the multiplication table and observe that 4 times a number is always even (because $4 \times 6 = (2 \times 2) \times 6 = 2 \times (2 \times 6)$, which uses the associative property of multiplication) (See Table 3 - Properties of Operations).		3.OA.D.9	Identify patterns in a multiplication chart and explain them using properties of operations . For example, in the multiplication chart, observe that 4 times a number is always even (because $4 \times 6 = (2 \times 2) \times 6 = 2 \times (2 \times 6)$, which uses the associative property of multiplication) or, for example, observe that 6 times 7 is one more group of 7 than 5 times 7 (because $6 \times 7 = (5 + 1) \times 7 = (5 \times 7) + (1 \times 7)$, which uses the distributive property of multiplication over addition). (See Table 3 - Properties of Operations)
Number and Operations in Base Ten (NBT)			Number and Operations in Base Ten (NBT)		
	3.NBT.A.1	Round whole numbers to the nearest 10 or 100 using understanding of place value.		3.NBT.A.1	Round whole numbers to the nearest 10 or 100 using understanding of place value and use a number line to explain how the number was rounded .

A. Use place value understanding and properties of operations to perform multi-digit arithmetic.	3.NBT.A.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	A. Use place value understanding and properties of operations to perform multi-digit arithmetic.	3.NBT.A.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
	3.NBT.A.3	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.		3.NBT.A.3	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.
				3.NBT.A.4	Read and write multi-digit whole numbers (less than or equal to 100,000) using standard form, word form, and expanded form (e.g., 23,456 can be written as $20,000 + 3,000 + 400 + 50 + 6$).
Number and Operations - Fractions (NF)			Number and Operations - Fractions (NF)		
A. Develop understanding of fractions as numbers.	3.NF.A.1	Understand a fraction, $1/b$, as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction a/b as the quantity formed by a parts of size $1/b$. For example, $3/4$ represents a quantity formed by 3 parts of size $1/4$.	A. Develop understanding of fractions as numbers.	3.NF.A.1	Understand a unit fraction, $1/b$, as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a non-unit fraction, n/b , as the quantity formed by n parts of size $1/b$. For example, $3/4$ represents a quantity formed by 3 parts of size $1/4$.
	3.NF.A.2	Understand a fraction as a number on the number line. Represent fractions on a number line.		3.NF.A.2	Understand a fraction as a number on the number line. Represent fractions on a number line.
	3.NF.A.2.A	Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint locates the number $1/b$ on the number line. For example, on a number line from 0 to 1, students can partition it into 4 equal parts and recognize that each part represents a length of $1/4$ and the first part has an endpoint at $1/4$ on the number line.		3.NF.A.2.A	Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint locates the number $1/b$ on the number line. For example, on a number line from 0 to 1, students can partition it into 4 equal parts and recognize that each part represents a length of $1/4$ and the first part has an endpoint at $1/4$ on the number line.
	3.NF.A.2.B	Represent a fraction $1/b$ on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size $1/b$ and that its endpoint locates the number a/b on the number line. For example, $5/3$ is the distance from 0 when there are 5 iterations of $1/3$.		3.NF.A.2.B	Represent a fraction n/b on a number line diagram by marking off n lengths $1/b$ from 0. Recognize that the resulting interval has size n/b and that its endpoint locates the number n/b on the number line. For example, $5/3$ is the distance from 0 when there are 5 iterations of $1/3$.
	3.NF.A.3	Explain equivalence of fractions and compare fractions by reasoning about their size.		3.NF.A.3	Explain equivalence of fractions and compare fractions by reasoning about their size.

	3.NF.A.3.A	Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line.		3.NF.A.3.A	Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line.
	3.NF.A.3.B	Recognize and generate simple equivalent fractions (e.g., $1/2 = 2/4$, $4/6 = 2/3$) and explain why the fractions are equivalent using a visual fraction model.		3.NF.A.3.B	Recognize and generate simple equivalent fractions (e.g., $1/2 = 2/4$, $4/6 = 2/3$) and explain why the fractions are equivalent using a visual fraction model.
	3.NF.A.3.C	Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. <i>For example, express 3 in the form $3 = 3/1$; recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point on a number line diagram.</i>		3.NF.A.3.C	Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. <i>For example, express 3 in the form $3 = 3/1$; recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point on a number line diagram.</i>
	3.NF.A.3.D	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.		3.NF.A.3.D	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.
Measurement and Data (MD)			Measurement and Data (MD)		
A. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	3.MD.A.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve contextual problems involving addition and subtraction of time intervals in minutes. <i>For example, students may use a number line to determine the difference between the start time and the end time of lunch.</i>	A. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	3.MD.A.1	Solve contextual problems in time and money.
				3.MD.A.1.A	Tell and write time to the nearest minute and measure time intervals in minutes. Solve contextual problems involving addition and subtraction of time intervals in minutes.
				3.MD.A.1.B	Solve one-step contextual problems involving amounts less than one dollar including quarters, dimes, nickels, and pennies using the ¢ symbol appropriately. Solve contextual problems involving whole number dollar amounts up to \$1000 using the \$ symbol appropriately.
	3.MD.A.2	Measure the mass of objects and liquid volume using standard units of grams (g), kilograms (kg), milliliters (ml), and liters (l). Estimate the mass of objects and liquid volume using benchmarks. <i>For example, a large paper clip is about one gram, so a box of about 100 large clips is about 100 grams.</i>		3.MD.A.2	Measure the mass of objects and liquid volume using standard units of grams (g), kilograms (kg), milliliters (ml), and liters (l). Estimate the mass of objects and liquid volume using benchmarks. <i>For example, a large paper clip is about one gram, so a box of about 100 large clips is about 100 grams.</i>

B. Represent and interpret data.	3.MD.B.3	Draw a scaled pictograph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled graphs.	B. Represent and interpret data.	3.MD.B.3	Draw a pictograph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in graphs.
	3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units: whole numbers, halves, or quarters.		3.MD.B.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units: whole numbers, halves, or quarters.
C. Geometric measurement: Understand and apply concepts of area and relate area to multiplication and to addition.	3.MD.C.5	Recognize that plane figures have an area and understand concepts of area measurement.	C. Geometric measurement: understand and apply concepts of area and relate area to multiplication and to addition.	3.MD.C.5	Recognize that plane figures have an area and understand concepts of area measurement.
	3.MD.C.5.A	Understand that a square with side length 1 unit, called "a unit square," is said to have "one square unit" of area and can be used to measure area.		3.MD.C.5.A	Understand that a square with side length 1 unit, called "a unit square," is said to have "one square unit" of area and can be used to measure area.
	3.MD.C.5.B	Understand that a plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.		3.MD.C.5.B	Understand that a plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
	3.MD.C.6	Measure areas by counting unit squares (square centimeters, square meters, square inches, square feet, and improvised units).		3.MD.C.6	Measure areas by counting unit squares (square centimeters, square meters, square inches, square feet, and improvised units).
	3.MD.C.7	Relate area of rectangles to the operations of multiplication and addition.		3.MD.C.7	Relate area of rectangles to the operations of multiplication and addition.
	3.MD.C.7.A	Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.		3.MD.C.7.A	Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.
	3.MD.C.7.B	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.		3.MD.C.7.B	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.

	3.MD.C.7.C	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. <i>For example, in a rectangle with dimensions 4 by 6, students can decompose the rectangle into 4×3 and 4×3 to find the total area of 4×6. (See Table 3 - Properties of Operations)</i>		3.MD.C.7.C	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $(b + c)$ is the sum of $(a \times b)$ and $(a \times c)$. Use area models to represent the distributive property in mathematical reasoning. <i>For example, in a rectangle with dimensions 4 by 6, students can decompose the rectangle into 4×3 and 4×3 to find the total area of 4×6. (See Table 3 - Properties of Operations)</i>
	3.MD.C.7.D	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.	D. Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	3.MD.C.4.D	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.
D. Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	3.MD.D.8	Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exploring rectangles with the same perimeter and different areas or with the same area and different perimeters.		3.MD.D.8	Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exploring rectangles with the same perimeter and different areas or with the same area and different perimeters.
Geometry (G)			Geometry (G)		
A. Reason about shapes and their attributes.	3.G.A.1	Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories.	A. Reason about shapes and their attributes.	3.G.A.1	Understand that shapes in different categories may share attributes and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals and recognize examples of quadrilaterals that do not belong to any of these subcategories.
	3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. <i>For example, partition a shape into 4 parts with equal area and describe the area of each part as $1/4$ of the area of the shape.</i>		3.G.A.2	Partition shapes into parts with equal areas. <i>Recognize that equal shares of identical wholes need not have the same shape.</i> Express the area of each part as a unit fraction of the whole.
	3.G.A.3	Determine if a figure is a polygon		3.G.A.3	Determine if a figure is a polygon.

Grade 4

Deleted language is in **red**. Added language is in **blue**.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Operations and Algebraic Thinking (OA)			Operations and Algebraic Thinking (OA)		
A. Use the four operations with whole numbers to solve problems. (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations)	4.OA.A.1	Interpret a multiplication equation as a comparison (e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal statements of multiplicative comparisons as multiplication equations.	A. Use the four operations with whole numbers to solve problems. (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations)	4.OA.A.1	Interpret a multiplication equation as a comparison (e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal/written statements of multiplicative comparisons as multiplication equations.
	4.OA.A.2	Multiply or divide to solve contextual problems involving multiplicative comparison, and distinguish multiplicative comparison from additive comparison. <i>For example, school A has 300 students and school B has 600 students: to say that school B has two times as many students is an example of multiplicative comparison; to say that school B has 300 more students is an example of additive comparison.</i>		4.OA.A.2	Multiply or divide to solve contextual problems involving multiplicative comparison, and distinguish multiplicative comparison from additive comparison. <i>For example, school A has 300 students and school B has 600 students: to say that school B has two times as many students is an example of multiplicative comparison; to say that school B has 300 more students is an example of additive comparison.</i>
	4.OA.A.3	Solve multi-step contextual problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.		4.OA.A.3	Solve multi-step contextual problems (posed with whole numbers and having whole-number answers using the four operations) including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity.
B. Gain familiarity with factors and multiples.	4.OA.B.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	B. Gain familiarity with factors and multiples.	4.OA.B.4	Find factor pairs for whole numbers in the range 1–100 using models. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number is prime or composite and whether the given number is a multiple of a given one-digit number.

C. Generate and analyze patterns.	4.OA.C.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.	C. Generate and analyze patterns.	4.OA.C.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.
Number and Operations in Base Ten (NBT)			Number and Operations in Base Ten (NBT)		
A. Generalize place value understanding for multidigit whole numbers.	4.NBT.A.1	Recognize that in a multi-digit whole number (less than or equal to 1,000,000), a digit in one place represents 10 times as much as it represents in the place to its right. For example, recognize that 7 in 700 is 10 times bigger than the 7 in 70 because $700 \div 70 = 10$ and $70 \times 10 = 700$.	A. Generalize place value understanding for multi- digit whole numbers.	4.NBT.A.1	Recognize that in a multi-digit whole number (less than or equal to 1,000,000), a digit in one place represents 10 times as much as it represents in the place to its right. <i>For example, recognize that 7 in 700 is 10 times bigger than the 7 in 70 because $700 \div 70 = 10$ and $70 \times 10 = 700$.</i>
	4.NBT.A.2	Read and write multi-digit whole numbers (less than or equal to 1,000,000) using standard form, word form, and expanded form (e.g. the expanded form of 4256 is written as $4 \times 1000 + 2 \times 100 + 5 \times 10 + 6 \times 1$). Compare two multidigit numbers based on meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.		4.NBT.A.2	Read and write multi-digit whole numbers (less than or equal to 1,000,000) using standard form, word form, and expanded notation (e.g. the expanded notation of 4256 is written as $(4 \times 1000) + (2 \times 100) + (5 \times 10) + (6 \times 1)$). Compare two multi-digit numbers based on meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.
	4.NBT.A.3	Round multi-digit whole numbers to any place (up to and including the hundred-thousand place) using understanding of place value.		4.NBT.A.3	Round multi-digit whole numbers to any place (up to and including the hundred-thousand place) using understanding of place value and use a number line to explain how the number was rounded.
B. Use place value understanding and properties of operations to perform multi-	4.NBT.B.4	Fluently add and subtract within 1,000,000 using appropriate strategies and algorithms.	B. Use place value understanding and properties of operations to perform multi-digit arithmetic.	4.NBT.B.4	Fluently add and subtract within 1,000,000 using efficient strategies and algorithms.
	4.NBT.B.5	Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.		4.NBT.B.5	Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

single-digit arithmetic. (See Table 3 - Properties of Operations)	4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	(See Table 3 - Properties of Operations)	4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Number and Operations - Fractions (NF)			Number and Operations - Fractions (NF)		
Limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.			Limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.		
A. Extend understanding of fraction equivalence and comparison.	4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction $(a \times n)/(b \times n)$ or $(a \div n)/(b \div n)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fraction themselves are the same size. Use this principle to recognize and generate equivalent fractions. <i>For example, $3/4 = (3 \times 2)/(4 \times 2) = 6/8$.</i>	A. Extend understanding of fraction equivalence and comparison.	4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction $(a \times n)/(b \times n)$ or $(a \div n)/(b \div n)$ using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. <i>For example, $3/4 = (3 \times 2)/(4 \times 2) = 6/8$.</i>
	4.NF.A.2	Compare two fractions with different numerators and different denominators by creating common denominators or common numerators or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.		4.NF.A.2	Compare two fractions with different numerators and different denominators by creating common denominators or common numerators or by comparing to a benchmark such as 0 or $1/2$ or 1. Recognize that comparisons are valid only when the two fractions refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.
B. Build fractions from unit fractions by applying	4.NF.B.3	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. <i>For example, $4/5 = 1/5 + 1/5 + 1/5 + 1/5$.</i>	B. Build fractions from unit fractions by applying and extending	4.NF.B.3	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. <i>For example, $4/5 = 1/5 + 1/5 + 1/5 + 1/5$.</i>
	4.NF.B.3.a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.		4.NF.B.3.a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
	4.NF.B.3.b	Decompose a fraction into a sum of fractions with the same denominator in more than one way (e.g., $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$), recording each decomposition by an equation. Justify decompositions by using a visual fraction model.		4.NF.B.3.b	Decompose a fraction into a sum of fractions with the same denominator in more than one way (e.g., $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$) recording each decomposition by an equation. Justify decompositions using a visual fraction model.
	4.NF.B.3.c	Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction.		4.NF.B.3.c	Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction.

and extending previous understandings of operations on whole numbers. (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations for whole number situations that can be applied for fractions.)	4.NF.B.3.d	Solve contextual problems involving addition and subtraction of fractions referring to the same whole and having like denominators.	previous understandings of operations on whole numbers. (See Table 1 - Addition and Subtraction Situations and Table 2 - Multiplication and Division Situations for whole number situations that can be applied for fractions.)	4.NF.B.3d	Solve contextual problems involving addition and subtraction of fractions referring to the same whole and having like denominators.
	4.NF.B.4	Apply and extend previous understandings of multiplication as repeated addition to multiply a whole number by a fraction.		4.NF.B.4	Apply and extend understanding of multiplication as repeated addition to multiply a whole number by a fraction.
	4.NF.B.4.a	Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.		4.NF.B.4a	Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times 1/4$, recording the conclusion by the equation $5/4 = 5 \times 1/4$.
	4.NF.B.4.b	Understand a multiple of a/b as a multiple of $1/b$ and use this understanding to multiply a whole number by a fraction. For example, use a visual fraction model to express $3 \times 2/5$ as $6 \times 1/5$, recognizing this product as $6/5$. (In general $n \times a/b = (n \times a)/b = (n \times a) \times 1/b$.)		4.NF.B.4b	Understand a multiple of a/b as a multiple of $1/b$ and use this understanding to multiply a whole number by a fraction. For example, use a visual fraction model to express $3 \times 2/5$ as $6 \times 1/5$, recognizing this product as $6/5$. (In general, $n \times a/b = (n \times a)/b = (n \times a) \times 1/b$.)
	4.NF.B.4.c	Solve contextual problems involving multiplication of a whole number by a fraction (e.g., by using visual fraction models and equations to represent the problem). For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 4 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?		4.NF.B.4c	Solve contextual problems involving multiplication of a whole number by a fraction (e.g., by using visual fraction models and equations to represent the problem). For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 4 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?
C. Understand decimal notation for fractions and compare decimal fractions.	4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express, $3/10$ as $30/100$ and add $3/10 + 4/100 = 34/100$.	C. Understand decimal notation for fractions and compare decimal fractions.	4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
	4.NF.C.6	Read and write decimal notation for fractions with denominators 10 or 100. Locate these decimals on a number line.		4.NF.C.6	Read and write decimal notation for fractions with denominators 10 or 100. Locate these decimals on a number line.
	4.NF.C.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.		4.NF.C.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Use the symbols $>$, $=$, or $<$ to show the relationship and justify the conclusions.
Measurement and Data (MD)			Measurement and Data (MD)		

A. Estimate and solve problems involving measurement.	4.MD.A.1	Measure and estimate to determine relative sizes of measurement units within a single system of measurement involving length, liquid volume, and mass/weight of objects using customary and metric units.	A. Estimate and solve problems involving measurement.	4.MD.A.1	Measure and estimate to determine relative sizes of measurement units within a single system of measurement involving length, liquid volume, and mass/weight of objects using customary and metric units.
	4.MD.A.2	Solve one- or two-step real-world problems involving whole number measurements with all four operations within a single system of measurement including problems involving simple fractions.		4.MD.A.2	Solve one- or two-step real-world problems involving whole number measurements (including length, liquid volume, mass/weight, time, and money) with all four operations within a single system of measurement. (Contexts need not include conversions.)
	4.MD.A.3	Know and apply the area and perimeter formulas for rectangles in realworld and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i>		4.MD.A.3	Know and apply the area and perimeter formulas for rectangles in real- world and mathematical contexts. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i>
B. Represent and interpret data.	4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>	B. Represent and interpret data.	4.MD.B.4	Make a line plot to display a data set of measurements in fractions of the same unit ($\frac{1}{2}$ or $\frac{1}{4}$ or $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>
C. Geometric measurement: understand concepts of angle and measure angles.	4.MD.C.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.	C. Geometric measurement: understand concepts of angle and measure angles.	4.MD.C.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint; and understand concepts of angle measurement.
	4.MD.C.5a	Understand that an angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle.		4.MD.C.5a	Understand that an angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle.
	4.MD.C.5b	Understand that an angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles. An angle that turns through n one-degree angles is said to have an angle measure of n degrees and represents a fractional portion of the circle.		4.MD.C.5b	Understand that an angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles. An angle that turns through n one-degree angles is said to have an angle measure of n degrees and represents a fractional portion of the circle.
	4.MD.C.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.		4.MD.C.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

	4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems (e.g., by using an equation with a symbol for the unknown angle measure).		4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (e.g., by using an equation with a symbol for the unknown angle measure) .
Geometry (G)			Geometry (G)		
A. Draw and identify lines and angles and classify shapes by properties of their lines and angles.	4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), and perpendicular and parallel lines. Identify these in two dimensional figures.	A. Draw and identify lines and angles and classify shapes by properties of their lines and angles.	4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse, straight, reflex), and perpendicular and parallel lines. Identify these in two- dimensional figures.
	4.G.A.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Recognize right triangles as a category and identify right triangles.		4.G.A.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Classify triangles based on the measure of the angles as right, acute, or obtuse.
	4.G.A.3	Recognize and draw lines of symmetry for two-dimensional figures.		4.G.A.3	Recognize and draw lines of symmetry for two-dimensional figures.

Grade 5

Deleted language is in **red**. Added language is in **blue**.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Operations and Algebraic Thinking (OA)			Operations and Algebraic Thinking (OA)		
A. Write and interpret numerical expressions.	5.OA.A.1	Use parentheses and/or brackets in numerical expressions and evaluate expressions having these symbols using the conventional order (Order of Operations).	A. Write and interpret numerical expressions.G3:14	5.OA.A.1	Use parentheses and/or brackets in numerical expressions involving whole numbers and evaluate expressions having these symbols using the conventional order by applying the Order of Operations. (When applying the order of operations, the evaluation of exponents need not be included.)
	5.OA.A.2	Write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them. <i>For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$. Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$, without having to calculate the indicated sum or product.</i>		5.OA.A.2	Write numerical expressions that record calculations with numbers and interpret numerical expressions without evaluating them. <i>For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$. Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$, without having to calculate the indicated sum or product.</i>
B. Analyze patterns and relationships.	5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. <i>For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences.</i>	B. Analyze patterns and relationships.	5.OA.B.3	Generate two numerical patterns using two given rules. <i>For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences.</i>
	5.OA.B.3.a	Identify relationships between corresponding terms in two numerical patterns. For example, observe that the terms in one sequence are twice the corresponding terms in the other sequence.		5.OA.B.3.a	Identify relationships between corresponding terms in two numerical patterns.
	5.OA.B.3.b	Form ordered pairs consisting of corresponding terms from two numerical patterns and graph the ordered pairs on a coordinate plane.		5.OA.B.3.b	Form ordered pairs (limited to first quadrant) consisting of corresponding terms from two numerical patterns and graph the ordered pairs on a coordinate plane.
Number and Operations in Base Ten (NBT)			Number and Operations in Base Ten (NBT)		
	5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.		5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

A. Understand the place value system.	5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	A. Understand the place value system.	5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
	5.NBT.A.3	Read and write decimals to thousandths using standard form, word form, and expanded form (e.g., the expanded form of 347.392 is written as $3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$). Compare two decimals to thousandths based on meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.		5.NBT.A.3	Read and write decimals to thousandths using standard form, word form, and expanded notation (e.g., the expanded notation of 347.392 is written as $(3 \times 100) + (4 \times 10) + (7 \times 1) + (3 \times (1/10)) + (9 \times (1/100)) + (2 \times (1/1000))$). Compare two decimals to thousandths based on meanings of the digits in each place and use the symbols $>$, $=$, and $<$ to show the relationship.
	5.NBT.A.4	Round decimals to the nearest hundredth, tenth, or whole number using understanding of place value.		5.NBT.A.4	Round decimals to the nearest hundredth, tenth, or whole number using understanding of place value, and use a number line to explain how the number was rounded.
B. Perform operations with multi-digit whole numbers and with decimals to hundredths. (See Table 3-- Properties of Operations)	5.NBT.B.5	Fluently multiply multi-digit whole numbers (up to three-digit by four-digit factors) using appropriate strategies and algorithms.	B. Perform operations with multi-digit whole numbers and with decimals to hundredths. (See Table 3 - Properties of Operations)	5.NBT.B.5	Fluently multiply multi-digit whole numbers (up to three-digit by four-digit factors) using efficient strategies and algorithms.
	5.NBT.B.6	Find whole-number quotients and remainders of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.		5.NBT.B.6	Find whole-number quotients and remainders of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
	5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations; assess the reasonableness of answers using estimation strategies. (Limit division problems so that either the dividend or the divisor is a whole number.)		5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations. Assess the reasonableness of answers using estimation strategies. (Limit multiplication problems so that the product does not exceed thousandths. Limit division problems so that either the dividend or the divisor is a whole number.)
Number and Operations - Fractions (NF)			Number and Operations-Fractions (NF)		

A. Use equivalent fractions as a strategy to add and subtract fractions. <i>(See Table 1- Addition and Subtraction Situations for whole number situations that can be applied to fractions.)</i>	5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general $a/b + c/d = (ad + bc)/bd$.)</i>	A. Use equivalent fractions as a strategy to add and subtract fractions. <i>(See Table 1 - Addition and Subtraction Situations for whole number situations that can be applied to fractions)</i>	5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$ or $3/5 + 7/10 = 6/10 + 7/10 = 13/10$.</i>
	5.NF.A.2	Solve contextual problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i>		5.NF.A.2	Solve contextual problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.</i>
	5.NF.B.3	Interpret a fraction as division of the Numerator by the denominator ($a/b = a \div b$). For example, $3/4 = 3 \div 4$ so when 3 wholes are shared equally among 4 people, each person has a share of size $3/4$. Solve contextual problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem. <i>For example, if 8 people want to share 49 sheets of construction paper equally, how many sheets will each person receive? Between what two whole numbers does your answer lie?</i>		5.NF.B.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). For example, $3/4 = 3 \div 4$ so when 3 wholes are shared equally among 4 people, each person has a share of size $3/4$. Solve contextual problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem. <i>For example, if 8 people want to share 49 sheets of construction paper equally, how many sheets will each person receive? Between what two whole numbers does your answer lie?</i>
	5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number or a fraction by a fraction.		5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number or a fraction by a fraction.
	5.NF.B.4a	Interpret the product $a/b \times q$ as $a \times (q \div b)$ (partition the quantity q into b equal parts and then multiply by a). Interpret the product $a/b \times q$ as $(a \times q) \div b$ (multiply a times the quantity q then partition the product into b equal parts). <i>For example, use a visual fraction model or write a story context to show that $2/3 \times 6$ can be interpreted as $2 \times (6 \div 3)$ or $(2 \times 6) \div 3$. Do the same with $2/3 \times 4/5 = 8/15$. (In general, $a/b \times c/d = ac/bd$.)</i>		5.NF.B.4.a	Interpret the product $a/b \times q$ as $a \times (q \div b)$ (partition the quantity q into b equal parts and then multiply by a). Interpret the product $a/b \times q$ as $(a \times q) \div b$ (multiply a times the quantity q and then partition the product into b equal parts). <i>For example, use a visual fraction model or write a story context to show that $2/3 \times 6$ can be interpreted as $2 \times (6 \div 3)$ or $(2 \times 6) \div 3$. Do the same with $2/3 \times 4/5 = 8/15$. (In general, $a/b \times c/d = ac/bd$.)</i>

B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions. <i>(See Table 2 - Multiplication and Division Situations for whole number situations that can be applied to fractions)</i>	5.NF.B.4b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.	B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions. <i>(See Table 2 - Multiplication and Division Situations for whole number situations that can be applied to fractions)</i>	5.NF.B.4.b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.
	5.NF.B.5	Interpret multiplication as scaling (resizing).		5.NF.B.5	Interpret multiplication as scaling (resizing).
	5.NF.B.5a	Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. <i>For example, know if the product will be greater than, less than, or equal to the factors.</i>		5.NF.B.5.a	Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. <i>For example, know if the product will be greater than, less than, or equal to the factors.</i>
	5.NF.B.5b	Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explain why multiplying a given number by a fraction less than 1 results in a product less than the given number; and relate the principle of fraction equivalence $a/b = (a \times n)/(b \times n)$ to the effect of multiplying a/b by 1.		5.NF.B.5.b	Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explain why multiplying a given number by a fraction between 0 and 1 results in a product less than the given number; and relate the principle of fraction equivalence $a/b = (a \times n)/(b \times n)$ to the effect of multiplying a/b by 1.
	5.NF.B.6	Solve real-world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent the problem.		5.NF.B.6	Solve real-world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent the problem.
	5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.		5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
	5.NF.B.7a	Interpret division of a unit fraction by a non-zero whole number and compute such quotients. <i>For example, use visual models and the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.</i>		5.NF.B.7.a	Interpret division of a unit fraction by a non-zero whole number and compute such quotients. <i>For example, use visual models and the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$. In other words, when thirds are partitioned into 4 equal groups, they become twelfths.</i>
	5.NF.B.7b	Interpret division of a whole number by a unit fraction and compute such quotients. <i>For example, use visual models and the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.</i>		5.NF.B.7.b	Interpret division of a whole number by a unit fraction and compute such quotients. <i>For example, use visual models and the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$ (i.e., there are 20 groups of $1/5$ inside 4 wholes and connect this to $? \times (1/5) = 4$).</i>

	5.NF.B.7c	Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$ cup servings are in 2 cups of raisins?</i>		5.NF.B.7.c	Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions and non-unit fractions by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$ cup servings are in 2 cups of raisins?</i>
Measurement and Data (MD)			Measurement and Data (MD)		
A. Convert like measurement units within a given measurement system from a larger unit to a smaller unit.	5.MD.A.1	Convert customary and metric measurement units within a single system by expressing measurements of a larger unit in terms of a smaller unit. Use these conversions to solve multi-step real-world problems involving distances, intervals of time, liquid volumes, masses of objects, and money (including problems involving simple fractions or decimals). <i>For example, 3.6 liters and 4.1 liters can be combined as 7.7 liters or 7700 milliliters</i>	A. Convert like measurement units within a given measurement system from a larger unit to a smaller unit.	5.MD.1.A	Convert customary and metric measurement units within a single system by expressing measurements of a larger unit in terms of a smaller unit. Use these conversions to solve multi-step real-world problems involving distances, intervals of time, liquid volumes, masses of objects, and money (including problems involving simple fractions or decimals). <i>For example, 3.6 liters and 4.1 liters can be combined as 7.7 liters or 7700 milliliters.</i>
B. Represent and interpret data.	5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally</i>	B. Represent and interpret data.	5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i>
C. Geometric measurement:	5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.		5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
	5.MD.C.3a	Understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume and can be used to measure volume.		5.MD.C.3.a	Understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume and can be used to measure volume.
	5.MD.C.3b	Understand that a solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.		5.MD.C.3.b	Understand that a solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
	5.MD.C.4	Measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.		5.MD.C.4	Measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.
	5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume of right rectangular prisms.	C. Geometric measurement:	5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume of right rectangular prisms.

understand concepts of volume and relate volume to multiplication and to addition.	5.MD.C.5a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent whole-number products of three factors as volumes (<i>e.g., to represent the associative property of multiplication</i>).	understand concepts of volume and relate volume to multiplication and to addition.	5.MD.C.5.a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent whole-number products of three factors as volumes (<i>e.g., to represent the associative property of multiplication</i>).
	5.MD.C.5b	Know and apply the formulas $V = l \times w \times h$ and $V = B \times h$ (where B represents the area of the base) for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real-world and mathematical problems.		5.MD.C.5.b	Know and apply the formulas $V = l \times w \times h$ and $V = B \times h$ (where B represents the area of the base) for rectangular prisms with whole number edge lengths in the context of solving real-world and mathematical problems.
	5.MD.C.5c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.		5.MD.C.5.c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.
Geometry (G)			Geometry (G)		
A. Graph points on the coordinate plane to solve real-world and mathematical problems.	5.G.A.1	Graph ordered pairs and label points using the first quadrant of the coordinate plane. Understand in the ordered pair that the first number indicates the horizontal distance traveled along the x-axis from the origin and the second number indicates the vertical distance traveled along the y-axis, with the convention that the names of the two axes and the coordinates correspond (<i>e.g., x-axis and x-coordinate, y-axis and y-coordinate</i>).	A. Graph points on the coordinate plane to solve real-world and mathematical problems.	5.G.A.1	Graph ordered pairs and label points using the first quadrant of the coordinate plane. Understand in the ordered pair that the first number indicates the horizontal distance traveled along the x-axis from the origin and the second number indicates the vertical distance traveled along the y-axis, with the convention that the names of the two axes and the coordinates correspond (<i>e.g., x-axis and x-coordinate, y-axis and y-coordinate</i>).
	5.G.A.2	Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.		5.G.A.2	Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.
B. Classify twodimensional figures into categories based on their properties.	5.G.B.3	Classify two-dimensional figures in a hierarchy based on properties. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. <i>For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</i>	B. Classify two-dimensional figures into categories based on their properties.	5.G.B.3	Classify two-dimensional figures in a hierarchy based on properties. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. <i>For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.</i>

Grade 6

Deleted language is in red. Added language is in blue.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster	Revised TN Standards code	Revised TN Standard
Ratios and Proportional Relationships (RP)			Ratios and Proportional Relationships (RP)		
A. Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>For example, the ratio of wings to beaks in a bird house at the zoo was 2:1, because for every 2 wings there was 1 beak. Another example could be for every vote candidate A received, candidate C received nearly three votes</i>	A. Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>Make a distinction between ratios and fractions. For example, the ratio of wings to beaks in a bird house at the zoo was 2:1, because for every 2 wings there was 1 beak. Another example could be for every vote candidate A received, candidate C received nearly three votes.</i>
	6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$. Use rate language in the context of a ratio relationship. <i>For example, this recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ cup of flour for each cup of sugar. Also, we paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.</i> (Expectations for unit rates in 6th grade are limited to non-complex fractions).		6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$. Use rate language in the context of a ratio relationship. <i>For example, this recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ cup of flour for each cup of sugar. Also, we paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.</i> (Expectations for unit rates in 6th grade are limited to non-complex fractions).
	6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).		6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).
	6.RP.A.3.a	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.		6.RP.A.3.a	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
	6.RP.A.3.b	Solve unit rate problems including those involving unit pricing and constant speed. <i>For example, if a runner ran 10 miles in 90 minutes, running at that speed, how long will it take him to run 6 miles? How fast is he running in miles per hour?</i>		6.RP.A.3.b	Solve unit rate problems including those involving unit pricing and constant speed. <i>For example, if a runner ran 10 miles in 90 minutes, running at that speed, how long will it take him to run 6 miles? How fast is he running in miles per hour?</i>
	6.RP.A.3.c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percent.		6.RP.A.3.c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percent.

	6.RP.A.3.d	Use ratio reasoning to convert customary and metric measurement units (within the same system); manipulate and transform units appropriately when multiplying or dividing quantities.		6.RP.A.3.d	Use ratio reasoning to convert customary and metric measurement units (within the same system); manipulate and transform units appropriately when multiplying or dividing quantities.
The Number System (NS)			The Number System (NS)		
A. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	6.NS.A.1	Interpret and compute quotients of fractions, and solve contextual problems involving division of fractions by fractions (e.g., using visual fraction models and equations to represent the problem is suggested). <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ times $8/9$ is $2/3$ ($(a/b) \div (c/d) = ad/bc$.)</i> Further example: How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?	A. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	6.NS.A.1	Interpret and compute quotients of fractions, and solve real-world and mathematical problems involving division of fractions by fractions (e.g., connecting visual fraction models and equations to represent the problem is suggested). <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ times $8/9$ is $2/3$ ($(a/b) \div (c/d) = ad/bc$.)</i> Further example: How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?
B. Compute fluently with multi-digit numbers and find common factors and multiples.	6.NS.B.2	Fluently divide multi-digit numbers using a standard algorithm.	B. Compute fluently with multi-digit numbers and find common factors and multiples.	6.NS.B.2	Fluently divide multi-digit numbers using a standard algorithm.
	6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using a standard algorithm for each operation.		6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using a standard algorithm and making connections to previous conceptual work with each operation.
	6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. <i>For example, express $36 + 8$ as $4(9 + 2)$.</i>		6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. <i>For example, express $36 + 8$ as $4(9 + 2)$.</i>
	6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in realworld contexts, explaining the meaning of 0 in each situation.		6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., <i>temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge</i>) ; use positive and negative numbers to represent quantities in real- world contexts, explaining the meaning of 0 in each situation as well as describing situations in which opposite quantities can combine to make 0.

C. Apply and extend previous understandings of numbers to the system of rational numbers.	6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
	6.NS.C.6.a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself. <i>For example, $-(-3) = 3$, and that 0 is its own opposite.</i>
	6.NS.C.6.b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
	6.NS.C.6.c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
	6.NS.C.7	Understand ordering and absolute value of rational numbers
	6.NS.C.7.a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.</i>
	6.NS.C.7.b	Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i>
	6.NS.C.7.c	Understand the absolute value of a rational number as its distance from 0 on the number line and distinguish comparisons of absolute value from statements about order in a real-world context. <i>For example, an account balance of -24 dollars represents a greater debt than an account balance -14 dollars because -24 is located to the left of -14 on the number line</i>

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6.NS.C.7.c	Understand the absolute value of a rational number as its distance from 0 on the number line and distinguish comparisons of absolute value from statements about order in a real-world context. <i>For example, an account balance of -24 dollars represents a greater debt than an account balance -14 dollars because -24 is located to the left of -14 on the number line.</i>

	6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.		6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
Expressions and Equations (EE)			Expressions and Equations (EE)		
A. Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.		6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
	6.EE.A.2	Write, read, and evaluate expressions in which variables stand for numbers.		6.EE.A.2	Write, read, and evaluate expressions in which variables stand for numbers.
	6.EE.A.2.a	Write expressions that record operations with numbers and with variables. <i>For example, express the calculation "Subtract y from 5" as $5 - y$.</i>		6.EE.A.2.a	Write expressions that record operations with numbers and with variables. <i>For example, express the calculation "Subtract y from 5" as $5 - y$.</i>
	6.EE.A.2.b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.</i>		6.EE.A.2.b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.</i>
	6.EE.A.2.c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations)	A. Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.A.2.c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
	6.EE.A.3	Apply the properties of operations (including, but not limited to, commutative, associative, and distributive properties) to generate equivalent expressions. The distributive property is prominent here. <i>For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.</i>		6.EE.A.3	Apply the properties of operations (including, but not limited to, commutative, associative, and distributive properties) to generate equivalent expressions. (The distributive property of multiplication over addition is prominent here. Negative coefficients are not an expectation at this grade level.) <i>For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.</i>

	6.EE.A.4	Identify when expressions are equivalent (i.e., when the expressions name the same number regardless of which value is substituted into them). <i>For example, the expression $5b + 3b$ is equivalent to $(5 + 3)b$, which is equivalent to $8b$.</i>		6.EE.A.4	Identify when expressions are equivalent (i.e., when the expressions name the same number regardless of which value is substituted into them). <i>For example, the expression $5b + 3b$ is equivalent to $(5 + 3)b$, which is equivalent to $8b$.</i>
B. Reason about and solve one-variable equations and inequalities.	6.EE.B.5	Understand solving an equation or inequality is carried out by determining if any of the values from a given set make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	B. Reason about and solve one-variable equations and inequalities.	6.EE.B.5	Understand that a solution to an equation or inequality is the value(s) that makes that statement true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
	6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.		6.EE.B.6	Use variables to represent numbers and write expressions when solving real-world and mathematical problems; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
	6.EE.B.7	Solve real-world and mathematical problems by writing and solving onestep equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all nonnegative rational numbers.		6.EE.B.7	Solve real-world and mathematical problems by writing and solving one- step equations of the form $x + p = q$, $px = q$, $x - p = q$, and $x/p = q$ for cases in which p, q, and x are all nonnegative rational numbers and $p \neq 0$. (Complex fractions are not an expectation at this grade level.)
	6.EE.B.8	Interpret and write an inequality of the form $x > c$ or $x < c$ which represents a condition or constraint in a real-world or mathematical problem. Recognize that inequalities have infinitely many solutions; represent solutions of inequalities on number line diagrams.		6.EE.B.8	Interpret and write an inequality of the form $x > c$, $x < c$, $x \leq c$, or $x \geq c$ which represents a condition or constraint in a real-world or mathematical problem. Recognize that inequalities have infinitely many solutions; represent solutions of inequalities on number line diagrams.
C. Represent and analyze quantitative relationships between dependent and independent variables.	6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another. <i>For example, Susan is putting money in her savings account by depositing a set amount each week (50). Represent her savings account balance with respect to the number of weekly deposits ($s = 50w$, illustrating the relationship between balance amount s and number of weeks w).</i>	C. Represent and analyze quantitative relationships between dependent and independent variables.	6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another. <i>For example, Susan is putting money in her savings account by depositing a set amount each week (\$50). Represent her savings account balance with respect to the number of weekly deposits ($s = 50w$, illustrating the relationship between balance amount s and number of weeks w).</i>
	6.EE.C.9.a	Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.		6.EE.C.9.a	Write an equation in the form of $y = px$ where y, p, and x are all non-negative and $p \neq 0$, to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.
	6.EE.C.9.b	Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.		6.EE.C.9.b	Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
Geometry (G)			Geometry (G)		

A. Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; know and apply these techniques in the context of solving real-world and mathematical problems.	A. Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; know and apply these techniques in the context of solving real-world and mathematical problems.
	6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Know and apply the formulas $V = lwh$ and $V = Bh$ where B is the area of the base to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.		6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ where B is the area of the base to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
	6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side that joins two vertices (vertical or horizontal segments only). Know and apply these techniques in the context of solving real-world and mathematical problems.		6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side that joins two vertices (vertical or horizontal segments only). Apply these techniques in the context of solving real-world and mathematical problems.
	6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.		6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
Statistics and Probability (SP)			Statistics and Probability (SP)		
A. Develop understanding of statistical variability.	6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.</i>	A. Develop understanding of statistical variability.	6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.</i>
	6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center (mean, median, mode), spread (range), and overall shape.		6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its measures of center (mean, median, mode), measures of variation (range only), and overall shape.
	6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.		6.SP.A.3	Recognize that a measure of center (mean, median, mode) for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
	6.SP.B.4	Display a single set of numerical data using dot plots (line plots), box plots, pie charts and stem plots.		6.SP.B.4	Display a single set of numerical data using dot plots (line plots), box plots, pie charts and stem plots.
	6.SP.B.5	Summarize numerical data sets in relation to their context		6.SP.B.5	Summarize numerical data sets in relation to their context.
	6.SP.B.5.a	Report the number of observations.		6.SP.B.5.a	Report the number of observations.

B. Summarize and describe distributions.	6.SP.B.5.b	Describe the nature of the attribute under investigation, including how it was measured and its units of measurement.	B. Summarize and describe distributions.	6.SP.B.5.b	Describe the nature of the attribute under investigation, including how it was measured and its units of measurement.
	6.SP.B.5.c	Give quantitative measures of center (median and/or mean) and variability (range) as well as describing any overall pattern with reference to the context in which the data were gathered.		6.SP.B.5.c	Give quantitative measures of center (median and/or mean) and variability (range) as well as describing any overall pattern with reference to the context in which the data were gathered.
	6.SP.B.5.d	Relate the choice of measures of center to the shape of the data distribution and the context in which the data were gathered.		6.SP.B.5.d	Relate the choice of measures of center to the shape of the data distribution and the context in which the data were gathered.

Grade 7

Deleted language is in **red**. Added language is in **blue**.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
Ratios and Proportional Relationships (RP)			Ratios and Proportional Relationships (RP)		
A. Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. <i>For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.</i>	A. Analyze proportional relationships and use them to solve real-world and mathematical problems.	7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. <i>For example, if a person walks $\frac{1}{2}$ mile in each 15 minutes, compute the unit rate as the complex fraction $(\frac{1}{2}) / (\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.</i>
	7.RP.A.2	Recognize and represent proportional relationships between quantities.		7.RP.A.2	Recognize and represent proportional relationships between quantities.
	7.RP.A.2.A	Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).		7.RP.A.2.a	Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).
	7.RP.A.2.B	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships		7.RP.A.2.b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
	7.RP.A.2.C	Represent proportional relationships by equations. <i>For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.</i>		7.RP.A.2.c	<i>Use the concept of equality to represent proportional relationships with equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.</i>
	7.RP.A.2.D	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.		7.RP.A.2.d	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.
	7.RP.A.3	Use proportional relationships to solve multi-step ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i>		7.RP.A.3	Use proportional relationships to solve multi-step ratio and percent problems. <i>Examples: batting averages, recipes, simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error, etc.</i>
The Number System (NS)			The Number System (NS)		
	7.NS.A.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.		7.NS.A.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	7.NS.A.1.a	Describe situations in which opposite quantities combine to make 0.	A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.		
	7.NS.A.1.b	Understand $p + q$ as the number located a distance $ q $ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.		7.NS.A.1.a	Understand $p + q$ as the number located a distance $ q $ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
	7.NS.A.1.c	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.		7.NS.A.1.b	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
	7.NS.A.1.d	Apply properties of operations as strategies to add and subtract rational numbers.		7.NS.A.1.c	Apply properties of operations as strategies to add and subtract rational numbers.
	7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.		7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
	7.NS.A.2.a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.		7.NS.A.2.a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
	7.NS.A.2.b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.		7.NS.A.2.b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
	7.NS.A.2.c	Apply properties of operations as strategies to multiply and divide rational numbers.		7.NS.A.2.c	Apply properties of operations as strategies to multiply and divide rational numbers.
	7.NS.A.2.d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats		7.NS.A.2.d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates or eventually repeats.
	7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)		7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
Expressions and Equations (EE)			Expressions and Equations (EE)		
	7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.		7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

A. Use properties of operations to generate equivalent expressions.	7.EE.A.2	Understand that rewriting an expression in different forms in a contextual problem can provide multiple ways of interpreting the problem and how the quantities in it are related. <i>For example, shoes are on sale at a 25% discount. How is the discounted price P related to the original cost C of the shoes? $C - .25C = P$. In other words, P is 75% of the original cost for $C - .25C$ can be written as $.75C$.</i>	A. Use properties of operations to generate equivalent expressions.	7.EE.A.2	Rewrite and connect equivalent expressions in different forms in a contextual problem to provide multiple ways of interpreting the problem and investigating how the quantities in it are related. <i>For example, shoes are on sale at a 25% discount. How is the discounted price P related to the original cost C of the shoes? $C - 0.25C = P$. In other words, P is 75% of the original cost since $C - 0.25C$ can be written as $0.75C$.</i>
	7.EE.B.3	Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers presented in any form (whole numbers, fractions, and decimals).		7.EE.B.3	Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers presented in any form (whole numbers, fractions, and decimals).
B. Solve real-life and mathematical problems using numerical and algebraic expressions and equations and inequalities.	7.EE.B.3.a	Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.	B. Solve real-world and mathematical problems using numerical and algebraic expressions and equations and inequalities.	7.EE.B.3.a	Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.
	7.EE.B.3.b	Assess the reasonableness of answers using mental computation and estimation strategies.		7.EE.B.3.b	Assess the reasonableness of answers using mental computation and estimation strategies.
	7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.		7.EE.B.4	Use variables to represent quantities in a real-world and mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
	7.EE.B.4.a	Solve contextual problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i>		7.EE.B.4.a	Solve real-world and mathematical problems leading to equations of the form $px + q = r$ and $p(x + q) = r$ where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i>
	7.EE.B.4.b	Solve contextual problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality on a number line and interpret it in the context of the problem. <i>For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.</i> (Note that inequalities using $>$, $<$, $\leq$, $\geq$ are included in this standard).		7.EE.B.4.b	Solve real-world and mathematical problems leading to inequalities of the form $px + q > r$, $px + q < r$, $px + q \geq r$, and $px + q \leq r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality on a number line and interpret it in the context of the problem. <i>For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.</i>
Geometry			Geometry		

A. Draw, construct, and describe geometrical figures and describe the relationships between them.	7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	A. Draw, construct, and describe geometrical figures and describe the relationships between them.	7.G.A.1	Solve problems involving scale drawings of congruent and similar geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
	7.G.A.2	Draw geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.		7.G.A.2	Draw triangles with given conditions: three angle measures or three side measures. Notice when the conditions determine a unique triangle, more than one triangle, or no triangle.
B. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	7.G.B.3	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	B. Solve real-world and mathematical problems involving angle measure, area, surface area, and volume.	7.G.B.3	Know the formulas for the area and circumference of a circle and use them to solve problems. Explore the relationships between the radius, the circumference, and the area of a circle, and the number π .
	7.G.B.4	Know and use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.		7.G.B.4	Know and use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
	7.G.B.5	Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.		7.G.B.5	Solve real-world and mathematical problems involving area of two-dimensional figures composed of triangles, quadrilaterals, and polygons, and volume and surface area of three-dimensional objects composed of cubes and right prisms.
Statistics and Probability (SP)			Statistics and Probability (SP)		
A. Use random sampling to draw inferences about a population.	7.SP.A.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	A. Use random sampling to draw inferences about a population.	7.SP.A.1	Explore how statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
	4.SP.A.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.		7.SP.A.2	Collect and use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

B. Draw informal comparative inferences about two populations	7.SP.B.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. <i>For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team; on a dot plot or box plot, the separation between the two distributions of heights is noticeable.</i>	B. Draw informal comparative inferences about two populations.	7.SP.B.3	Informally compare the measures of center (mean, median, mode) of two numerical data distributions with similar variabilities. <i>For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team; on a dot plot or box plot, the separation between the two distributions of heights is noticeable.</i>
	7.SP.B.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, decide whether the words in a chapter of a 7th grade science book are generally longer than the words in a chapter of a 4th grade science book.</i>		7.SP.B.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, decide whether the words in a chapter of a 7th grade science book are generally longer than the words in a chapter of a 4th grade science book.</i>
C. Investigate chance processes and develop, use, and evaluate probability models.	7.SP.C.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. <i>A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.</i>	C. Investigate chance processes and develop, use, and evaluate probability models.	7.SP.C.5	Recognize that the probability of a chance event is a number between 0 and 1 and interpret the likelihood of the event occurring.
				7.SP.C.6	Calculate theoretical and experimental probability of simple events.
	7.SP.C.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>		7.SP.C.6.a	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
				7.SP.C.6.b	Calculate the theoretical probability of a simple event.
				7.SP.C.6.c	Compare theoretical probabilities to experimental probabilities; explain any possible sources of discrepancy. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>
	7.SP.C.7	Develop a probability model and use it to find probabilities of events. <i>Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.</i>		7.SP.C.7	Develop a probability model and use it to find experimental or theoretical probabilities of events.

	7.SP.C.7.a	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i>		7.SP.C.7.a	Use a uniform probability model, with equal probability assigned to all outcomes, to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i>
	7.SP.C.7.b	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i>		7.SP.C.7.b	Develop a probability model, including non-uniform models , by observing frequencies in data generated from a chance process. Use the model to estimate the probabilities of events. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i>
D. Summarize and describe numerical data sets.	7.SP.D.8	Summarize numerical data sets in relation to their context.	D. Summarize and describe numerical data sets.	7.SP.D.8	Summarize a numerical data set in relation to its context.
	7.SP.D.8.a	Give quantitative measures of center (median and/or mean) and variability (range and/or interquartile range), as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.		7.SP.D.8.a	Give quantitative measures of center (median and/or mean) and variability (range and/or interquartile range), as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
	7.SP.D.8.b	Know and relate the choice of measures of center (median and/or mean) and variability (range and/or interquartile range) to the shape of the data distribution and the context in which the data were gathered.		7.SP.D.8.b	Relate and understand the choice of measures of center (median and/or mean) and variability (range and/or interquartile range) to the shape of the data distribution and the context in which the data were gathered.

Grade 8

Deleted language is in red. Added language is in blue.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard
The Number System (NS)			The Number System (NS)		
A. Know that there are numbers that are not rational, and approximate them by rational numbers.	8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually or terminates, and convert a decimal expansion which repeats eventually or terminates into a rational number.	A. Know that there are numbers that are not rational, and approximate them by rational numbers.	8.NS.A.1	Know that real numbers that are not rational are called irrational (e.g., π , $\sqrt{2}$, etc.). Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually or terminates, and convert a decimal expansion which repeats eventually or terminates into a rational number.
	8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers locating them approximately on a number line diagram. Estimate the value of irrational expressions such as π^2 . For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.		8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers by locating them approximately on a number line diagram. Estimate the value of irrational expressions (such as π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
Expressions and Equations (EE)			Expressions and Equations (EE)		
A. Work with radicals and integer exponents.	8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	A. Work with radicals and integer exponents.	8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^5 = 3^{-3} = 1/3^3 = 1/27$.
	8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.		8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.
	8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 , and determine that the world population is more than 20 times larger.		8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 , and determine that the world population is more than 20 times larger.
	8.EE.A.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.		8.EE.A.4	Using technology, solve real-world problems with numbers expressed in decimal and scientific notation. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading).
B. Understand the connections between proportional	8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	B. Understand the connections between proportional	8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

relationships, lines, and linear equations.	8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; know and derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .	relationships, lines, and linear equations.	8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; know and apply the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .
C. Analyze and solve linear equations and systems of two linear equations.	8.EE.C.7	Solve linear equations in one variable.	C. Analyze and solve linear equations, linear inequalities, and systems of two linear equations.	8.EE.C.7	Solve linear equations in one variable.
	8.EE.C.7.a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).		8.EE.C.7.a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
	8.EE.C.7.b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.		8.EE.C.7.b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.
	8.EE.C.8	Analyze and solve systems of two linear equations.		8.EE.C.8	Analyze and solve systems of two linear equations <i>graphically</i> .
	8.EE.C.8.a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.		8.EE.C.8.a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
	8.EE.C.8.b	Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.		8.EE.C.8.b	Estimate solutions by graphing a system of two linear equations in two variables. Identify solutions by inspecting graphs.
	8.EE.C.8.c	Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.		8.EE.C.9	By graphing on the coordinate plane or by analyzing a given graph, determine the solution set of a linear inequality in one or two variables.
Functions (F)			Functions (F)		
A. Define, evaluate, and compare functions.	8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in 8th grade.)	A. Define, evaluate, and compare functions.	8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in 8th grade.)
	8.F.A.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and another linear function represented by an algebraic expression, determine which function has the greater rate of change.		8.F.A.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and another linear function represented by an algebraic expression, determine which function has the greater rate of change.

	8.F.A.3	Know and interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</i>		8.F.A.3	Know and interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</i>
B. Use functions to model relationships between quantities.	8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.	B. Use functions to model relationships between quantities.	8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.
	8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.		8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
Geometry (G)			Geometry (G)		
A. Understand and describe the effects of transformations on two-dimensional figures and use informal arguments to establish facts about angles.	8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:	A. Understand and describe the effects of transformations on two-dimensional figures and use informal arguments to establish facts about angles.	8.G.A.1	Describe the effect of translations, rotations, reflections, and dilations on two-dimensional figures using coordinates.
	8.G.A.1.a	Lines are taken to lines, and line segments to line segments of the same length.		8.G.A.1.a	Verify informally that lines are taken to lines, and determine when line segments are taken to line segments of the same length.
	8.G.A.1.b	Angles are taken to angles of the same measure.		8.G.A.1.b	Verify informally that angles are taken to angles of the same measure.
	8.G.A.1.c	Parallel lines are taken to parallel lines.		8.G.A.1.c	Verify informally that parallel lines are taken to parallel lines.
	8.G.A.2	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.		8.G.A.1.d	Make connections between dilations and scale factors.
	8.G.A.3	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>		8.G.A.2	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.
B. Understand and apply the Pythagorean Theorem	8.G.B.4	Explain a proof of the Pythagorean Theorem and its converse.	B. Understand and apply the Pythagorean Theorem.	8.G.B.3	Explain a model of the Pythagorean Theorem and its converse.
	8.G.B.5	Know and apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.		8.G.B.4	Know and apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
	8.G.B.6	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.		8.G.B.5	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	8.G.C.7	Know and understand the formulas for the volumes of cones, cylinders, and spheres, and use them to solve real-world and mathematical problems.	C. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	8.G.C.6	Apply the formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.
Statistics and Probability (SP)			Statistics and Probability (SP)		
A. Investigate patterns of association in bivariate data.	8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	A. Investigate patterns of association in bivariate data.	8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
	8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.		8.SP.A.2	Know that straight lines are widely used to model linear relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.
	8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>		8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercepts. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>
B. Investigate chance processes and develop, use, and evaluate probability models	8.SP.B.4	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. <i>For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.</i>	B. Investigate chance processes and develop, use, and evaluate probability models.	8.SP.B.4	Find probabilities of and represent sample spaces for compound events using organized lists, tables, tree diagrams, and simulation.
				8.SP.B.4.a	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
				8.SP.4.b	Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

Algebra One

Deleted language is in red. Added language is in blue.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Scope and Clarifications	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard	Scope and Clarifications
Number and Quantity				Number and Quantity			
Quantities* (NQ)				Quantities* (NQ)			
A. Reason quantitatively and use units to understand problems.	A1.N.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Reason quantitatively and use units to understand problems.	A1.N.Q.A.1	Use units as a way to understand real-world problems.*	Apply this standard to any real-world problems studied within the scope of this course.
					A1.N.Q.A.1.a	Choose and interpret the scale and the origin in graphs and data displays.*	
					A1.N.Q.A.1.b	Use appropriate quantities in formulas, converting units as necessary.*	
	A1.N.Q.A.2	Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.	Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous information; choosing appropriate units; etc. There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.N.Q.A.1.c	Define and justify appropriate quantities within a context for the purpose of modeling.*	
	A1.N.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.N.Q.A.1.d	Choose an appropriate level of accuracy when reporting quantities.*	
Algebra				Algebra			
Seeing Structure in Expressions (A.SSE)				Seeing Structure in Expressions (A.SSE)			
A. Interpret the structure of expressions.	A1.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context. ★	For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P . There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Interpret the structure of expressions.	A1.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.*	For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .
	A1.A.SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.			A1.A.SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.	For example, one truck can transport A cubic feet, and a second truck can transport B cubic feet. The first truck makes x trips to a job site, while the second makes y trips. Interpret the expression $Ax + By$ in terms of the context.
	A1.A.SSE.A.1.b	Interpret complicated expressions by viewing one or more of their parts as a single entity.			A1.A.SSE.A.1.b	Interpret complicated expressions by viewing one or more of their parts as a single entity.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	A1.A.SSE.A.2	Use the structure of an expression to identify ways to rewrite it.	For example, recognize $53^2 - 47^2$ as a difference of squares and see an opportunity to rewrite it in the easier-to-evaluate form $(53 + 47)(53 - 47)$. See an opportunity to rewrite $a^2 + 9a + 14$ as $(a + 7)(a + 2)$. Tasks are limited to numerical expressions and polynomial expressions in one variable		A1.SSE.A.2	Use the structure of an algebraic expression to identify ways to rewrite it.	There are no assessment limits for this standard. The entire standard is assessed in this course.
B. Write expressions in equivalent forms to solve	A1.SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★	For A1.A.SSE.B.3c: For example, the growth of bacteria can be modeled by either $f(t) = 3(t+2)$ or $g(t) = 9(3t)$ because the expression $3(t+2)$ can be rewritten as $(3t)(32) = 9(3t)$. i) Tasks have a real-world context. As described in the standard, there is an interplay between the mathematical structure of the expression and				
	A1.SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.					
	A1.SSE.B.3.b	Complete the square in a quadratic expression in the form $Ax^2 + Bx + C$ to reveal the maximum or minimum value of the function it defines.					

problems.	A1.SSE.B.3.c	Use the properties of exponents to rewrite exponential expressions.	Structure of the expression and the structure of the situation such that choosing and producing an equivalent form of the expression reveals something about the situation. ii) Tasks are limited to exponential expressions with integer exponents.				
Arithmetic with Polynomials and Rational Expressions (A.APR)				Arithmetic with Polynomials and Rational Expressions (A.APR)			
A. Perform arithmetic operations on polynomials.	A1.A.APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Perform arithmetic operations on polynomials.	A1.A.APR.A.1	Add, subtract, and multiply polynomials. Use these operations to demonstrate that polynomials form a closed system that adhere to the same properties of operations as the integers.	There are no assessment limits for this standard. The entire standard is assessed in this course.
B. Understand the relationship between zeros and factors of polynomials.	A1.A.APR.B.2	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	Graphing is limited to linear and quadratic polynomials.				
Creating Equations★ (A.CED)				Creating Equations★ (A.CED)			
A. Create equations that describe numbers or relationships.	A1.CED.A.1	Create equations and inequalities in one variable and use them to solve problems.	Tasks are limited to linear, quadratic, or exponential equations with integer exponents.	A. Create equations that describe numbers or relationships.	A1.CED.A.1	Create equations and inequalities in one variable and use them to solve problems.*	Tasks are limited to linear, quadratic, and absolute value equations and inequalities.
	A1.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.CED.A.2	Create equations in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.*	Tasks are limited to linear, quadratic, and absolute value equations and inequalities.
	A1.CED.A.3	Represent constraints by equations or inequalities and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.	For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.CED.A.3	Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.*	For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. There are no assessment limits for this standard. The entire standard is assessed in this course.
	A1.CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	i) Tasks are limited to linear, quadratic, and exponential equations with integer exponents. ii) Tasks have a real-world context.		A1.CED.A.4	Rearrange formulas to isolate a quantity of interest using algebraic reasoning.	Tasks are limited to formulas involving linear, quadratic, and absolute value expressions. For example, rearrange the formula for the perimeter of a rectangle to isolate the length or width.
Reasoning with Equations and Inequalities (A.REI)				Reasoning with Equations and Inequalities (A.REI)			
A. Understand solving equations as a process of reasoning and explain the reasoning.	A1.A.REI.A.1	Explain each step in solving an equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Tasks are limited to linear, quadratic, and absolute value equations with integer exponents.	A. Understand solving equations as a process of reasoning and explain the reasoning.	A1.A.REI.A.1	Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.	Tasks are limited to linear, quadratic, and absolute value equations.
B. Solve equations and inequalities in one variable.	A1.A.REI.B.2	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	There are no assessment limits for this standard. The entire standard is assessed in this course.	B. Solve equations and inequalities in one variable.	A1.A.REI.B.2	Solve linear and absolute value equations and inequalities in one variable	Equations and inequalities should include integer, rational, and/or irrational coefficients. If coefficients are irrational, rationalization of a denominator is not required. Tasks may or may not have a real-world context.
					A1.A.REI.B.2a	Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically.	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A1.A.REI.B.2b	Solve absolute value equations and inequalities in one variable. Represent solutions algebraically and graphically.	

	A1.A.REI.B.3	Solve quadratic equations and inequalities in one variable.	For A1.A.REI.B.3b: Tasks do not require students to write solutions for quadratic equations that have roots with nonzero imaginary parts. However, tasks can require the student to recognize cases in which a quadratic equation has no real solutions. Note: solving a quadratic equation by factoring relies on the connection between zeros and factors of polynomials. This is formally assessed in Algebra II	one variable.	A1.A.REI.B.3	Solve quadratic equations and inequalities in one variable.	Tasks may or may not have a real-world context.
	A1.A.REI.B.3a	Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.					
	A1.A.REI.B.3b	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.			A1.A.REI.B.3a	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has nonreal complex solutions.	
					A1.A.REI.B.3b	Solve quadratic inequalities using the graph of the related quadratic equation.	
C. Solve systems of equations.	A1.A.REI.C.4	Write and solve a system of linear equations in context.	Solve systems both algebraically and graphically. Systems are limited to at most two equations in two variables.	C. Solve systems of equations.	A1.A.REI.C.4	Write and solve a system of linear equations in real-world context.*	Systems are limited to at most two equations in two unknowns.
D. Represent and solve equations and inequalities graphically.	A1.A.REI.D.5	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	There are no assessment limits for this standard. The entire standard is assessed in this course.	D. Represent and solve equations and inequalities graphically.	A1.A.REI.D.5	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	There are no assessment limits for this standard. The entire standard is assessed in this course.
	A1.A.REI.D.6	Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. ★	Include cases where $f(x)$ and/or $g(x)$ are linear, quadratic, absolute value, and exponential functions. For example, $f(x) = 3x + 5$ and $g(x) = x^2 + 1$. Exponential functions are limited to domains in the integers.		A1.A.REI.D.6	Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$. Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.*	Include cases where $f(x)$ and/or $g(x)$ are linear, quadratic, absolute value, and exponential functions. For example, $f(x) = 3x + 5$ and $g(x) = x^2 + 1$. When finding solutions approximately, students may be expected to produce graphs of functions that are linear, quadratic, exponential, or absolute value, but may be given graphs of other function types. Exponential functions are limited to domains in the integers.
	A1.A.REI.D.7	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.A.REI.D.7	Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	There are no assessment limits for this standard. The entire standard is assessed in this course.
Functions				Functions	Interpreting Functions (F.IF)		
Interpreting Functions (F.IF)				Interpreting Functions (F.IF)			
A. Understand the concept of function and use function notation.	A1.F.IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Understand the concept of function and use function notation.	A1.F.IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	A1.F.IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.F.IF.A.2	Use function notation.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A1.F.IF.A.2a	Use function notation to evaluate functions for inputs in their domains, including functions of two variables.	Use function notation with various functions of two variables. See functions as defined symbolically (e.g., $f(a,b) = 3ab - a$ or a newly defined symbol like $a \% b = 3ab - a$).
					A1.F.IF.A.2b	Interpret statements that use function notation in terms of a context.	

				A1.F.IF.A.3	Understand geometric formulas as functions.	Limit to linear functions. For example, see geometric formulas such as interior angle sum, perimeter of a square, and circumference of a circle as linear functions.
B. Interpret functions that arise in applications in terms of the context.	A1.F.IF.B.3	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. i) Tasks have a real-world context. ii) Tasks are limited to linear functions, quadratic functions, absolute value functions, and exponential functions with domains in the integers.	A1.F.IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. Tasks are limited to linear functions, absolute value functions, quadratic functions, and exponential functions with integer exponents
	A1.F.IF.B.4	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★	For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. <i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>	A1.F.IF.B.5	Relate the domain of a function to its graph and, where applicable, to the context of the function it models. *	For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. Tasks are limited to linear functions, piecewise functions (including step and absolute value functions), quadratic functions, and exponential functions with integer exponents.
	A1.F.IF.B.5	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★	i) Tasks have a real-world context. ii) Tasks are limited to linear functions, quadratic functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.	A1.F.IF.B.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.*	Tasks are limited to linear functions, piecewise functions (including step and absolute value functions), quadratic functions, and exponential functions with integer exponents.
C. Analyze functions using different representations.	A1.F.IF.C.6	Graph functions expressed symbolically and show key features of the graph, by hand and using technology.	Tasks in A1.F.IF.C.6b are limited to piecewise, step and absolute value functions.	A1.F.IF.C.7	Graph functions expressed algebraically and show key features of the graph by hand and using technology.	Function types are limited to linear functions, quadratic functions, absolute value functions, and exponential functions with integer exponents.
	A1.F.IF.C.6a	Graph linear and quadratic functions and show intercepts, maxima, and minima.				
	A1.F.IF.C.6b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.				
	A1.F.IF.C.7	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A1.F.IF.C.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
	A1.F.IF.C.7a	Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.		A1.F.IF.C.8a	Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context.	
	A1.F.IF.C.8	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	i) Tasks have a real-world context. ii) Tasks are limited to linear functions, quadratic functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.	A1.F.IF.C.9	Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.	Functions may or may not have a real-world context. Function types are limited to linear functions, quadratic functions, absolute value functions, and exponential functions with integer

					A1.F.IF.C.9a	Compare properties of two different functions. Functions may be of different types and/or represented in different ways.	Compare properties of two different functions. Functions may be of different types and/or represented in different ways.
					A1.F.IF.C.9b	Compare properties of the same function on two different intervals or represented in two different ways.	
Building Functions (F.BF)				Building Functions (F.BF)			
A. Build a function that models a relationship between two quantities.	A1.F.BF.A.1	Write a function that describes a relationship between two quantities.★	i) Tasks have a real-world context. i) Tasks are limited to linear functions, quadratic functions, and exponential functions with domains in the integers.	A. Build a function that models a relationship between two quantities.	A1.F.BF.A.1	Build a function that describes a relationship between two quantities.*	Tasks are limited to linear and exponential relationships. For example, create a function from a visual pattern and describe how each component of their function relates to characteristics of figures in the pattern.
	A1.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.			A1.F.BF.A.1a	Determine steps for calculation, a recursive process, or an explicit expression from a context.	
B. Build new functions from existing functions.	A1.F.BF.B.2	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	i) Identifying the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, and $f(x+k)$ for specific values of k (both positive and negative) is limited to linear, quadratic, and absolute value functions. ii) $f(kx)$ will not be included in Algebra 1. It is addressed in Algebra 2. iii) Experimenting with cases and illustrating an explanation of the effects on the graph using technology is limited to linear functions, quadratic functions, absolute value, and exponential functions with domains in the integers. iv) Tasks do not involve recognizing even and odd functions.	B. Build new functions from existing functions.	A1.F.BF.B.2	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given graphs.	Experiment with cases and illustrate an explanation of the effects on the graph using technology. Tasks are limited to - absolute value and quadratic functions.
Linear, Quadratic, and Exponential Models★ (F.LE)				Linear, Quadratic, and Exponential Models★ (F.LE)			
A. Construct and compare linear, quadratic, and exponential models and solve problems.	A1.F.LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Construct and compare linear, quadratic, and exponential models and solve problems.	A1.F.LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	A1.F.LE.A.1a	Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.			A1.F.LE.A.1a	Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.	
	A1.F.LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.			A1.F.LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	
	A1.F.LE.A.1c	Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.			A1.F.LE.A.1c	Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.	
	A1.F.LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Tasks are limited to constructing linear and exponential functions in simple context (not multi-step).		A1.F.LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	Tasks are limited to constructing linear and exponential functions in simple context (not multi-step).
	A1.F.LE.A.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	There are no assessment limits for this standard. The entire standard is assessed in this course.				

B. Interpret expressions for functions in terms of the situation they model.	A1.F.LE.B.4	Interpret the parameters in a linear or exponential function in terms of a context.	For example, the total cost of an electrician who charges 35 dollars for a house call and 50 dollars per hour would be expressed as the function $y = 50x + 35$. If the rate were raised to 65 dollars per hour, describe how the function would change. i) Tasks have a real-world context. ii) Exponential functions are limited to those with domains in the integers.	B. Interpret expressions for functions in terms of the situation they model.	A1.F.LE.B.3	Interpret the parameters in a linear or exponential function in terms of a context.*	For example, the total cost of an electrician who charges 35 dollars for a house call and 50 dollars per hour would be expressed as the function $y = 50x + 35$. If the rate were raised to 65 dollars per hour, describe how the function would change. For example, a population is modeled by a function $y = 30000(1.04)^x$. Interpret the value 30000 as the initial population and 1.04 as a 4% increase per year.		
Statistics and Probability				Statistics and Probability					
Interpreting Categorical and Quantitative Data (S.ID)				Interpreting Categorical and Quantitative Data (S.ID)					
A. Summarize, represent, and interpret data on a single count or measurement variable.	A1.S.ID.A.1	Represent single or multiple data sets with dot plots, histograms, stem plots (stem and leaf), and box plots.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Summarize, represent, and interpret data on a single count or measurement variable.	A1.S.ID.A.1	Use measures of center to solve real-world and mathematical problems.*	Measures of center should include mean (including weighted averages), median, and mode. For example, a course has 6 tests during the semester. If your average after the first 5 tests is 85, what must you score on the 6th test to have at least an 87 semester average?		
	A1.S.ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	There are no assessment limits for this standard. The entire standard is assessed in this course.				A1.S.ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (mean, median, and/or mode) and spread (range, interquartile range) of two or more different data sets.*	Students may be given a numerical data set or a visual and/or verbal depiction of a data set. Shapes of distribution are limited to: uniform, symmetric, right skewed, and left skewed.
	A1.S.ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	There are no assessment limits for this standard. The entire standard is assessed in this course.				A1.S.ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points.*	Students may be given a numerical data set or a visual and/or verbal depiction of the data set.
	A1.S.ID.B.4	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Emphasize linear models, quadratic models, and exponential models with domains in the integers. For A1.S.ID.B.4a: i) Tasks have a real-world context. ii) Exponential functions are limited to those with domains in the integers.				B. Summarize, represent, and interpret data on two categorical and quantitative variables.	A1.S.ID.B.4	Represent data from two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.*
A1.S.ID.B.4a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context.								
A1.S.ID.B.4b	Fit a linear function for a scatter plot that suggests a linear association.								
C. Interpret linear models.	A1.S.ID.C.5	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	There are no assessment limits for this standard. The entire standard is assessed in this course.	C. Interpret linear models.	A1.S.ID.C.5	Interpret the rate of change and the constant term of a linear model in the context of data.*	There are no assessment limits for this standard. The entire standard is assessed in this course.		
	A1.S.ID.C.6	Use technology to compute and interpret the correlation coefficient of a linear fit.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.S.ID.C.6	Use technology to compute the correlation coefficient of a linear model; interpret the correlation coefficient in the context of the data.*	There are no assessment limits for this standard. The entire standard is assessed in this course.		
	A1.S.ID.C.7	Distinguish between correlation and causation.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A1.S.ID.C.7	Explain the differences between correlation and causation. Recognize situations where an additional factor may be impacting correlated data.*	There are no assessment limits for this standard. The entire standard is assessed in this course.		

Geometry							
Deleted language is in red. Added language is in blue.							
New standards are highlighted in yellow.							
Deleted standards are highlighted in red.							
TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Scope and Clarifications	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard	Scope and Clarifications
				Number and Quantity			
				Quantities* (N.Q)			
				A. Reason quantitatively and use units to solve problems.	G.N.Q.A.1	Use units as a way to understand real-world problems.*	Apply this standard to any real-world problems studied within the scope of this course.
					G.N.Q.A.1a	Use appropriate quantities in formulas, converting units as necessary.	
					G.N.Q.A.1b	Define and justify appropriate quantities within a context for the purpose of modeling.	
G.N.Q.A.1c	Choose an appropriate level of accuracy when reporting quantities.						
Geometry				Geometry			
Congruence (G.CO)				Congruence (G.CO)			
A. Experiment with transformations in the plane.	G.CO.A.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Experiment with transformations in the plane.	G.CO.A.1	Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.	For example, a translation will preserve both distances and angle measures associated with a figure, a compression based around a point preserves angle measures but not distances, and a horizontal stretch does not preserve either except in the cases of a vertical line, ray, or line segment.
	G.CO.A.2	Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch).	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	G.CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry the shape onto itself.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	G.CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	G.CO.A.5	Given a geometric figure and a rigid motion, draw the image of the figure in multiple ways, including technology. Specify a sequence of rigid motions that will carry a given figure onto another.	Rigid motions include rotations, reflections, and translations. There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Understand congruence in terms of rigid motions.	G.CO.B.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.	B. Understand congruence in terms of rigid motions.	G.CO.B.5	Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	G.CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.		G.CO.B.6	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	G.CO.B.8	Explain how the criteria for triangle congruence (ASA, SAS, AAS, and SSS) follow from the definition of congruence in terms of rigid motions.	There are no assessment limits for this standard. The entire standard is assessed in this course.		G.CO.B.7	Explain how the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) follow from the definition of congruence in terms of rigid motions.	There are no assessment limits for this standard. The entire standard is assessed in this course.

C. Prove geometric theorems.	G.CO.C.9	Prove theorems about lines and angles.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	C. Use geometric theorems to justify relationships.	G.CO.C.8	Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures.	"Justification" may take a variety of forms. Theorems include but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
	G.CO.C.10	Prove theorems about triangles.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.		G.CO.C.9	Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures.	"Justification" may take a variety of forms. Theorems include but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
	G.CO.C.11	Prove theorems about parallelograms.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.		G.CO.C.10	Use definitions and theorems about parallelograms to solve problems and to justify relationships in geometric figures.	"Justification" may take a variety of forms. Theorems may include, but are not limited to: opposite sides of a parallelogram are congruent, opposite angles of a parallelogram are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.
D. Make geometric constructions.	G.CO.D.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	Constructions include but are not limited to: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; constructing a line parallel to a given line through a point not on the line, and constructing the following objects inscribed in a circle: an equilateral triangle, square, and a regular hexagon.	D. Perform geometric constructions.	G.CO.D.11	Perform formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	Constructions are limited to: bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
					G.CO.D.12	Use geometric constructions to solve geometric problems in context, by hand and using technology.*	For example, find the point equidistant from three given points by constructing two perpendicular bisectors and locating their point of intersection.
Similarity, Right Triangles, and Trigonometry (G.SRT)					Similarity, Right Triangles, and Trigonometry (G.SRT)		
	G.SRT.A.1	Verify informally the properties of dilations given by a center and a scale factor.	Properties include but are not limited to: a dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center of the dilation unchanged; the dilation of a line segment is longer or shorter in the ratio given by the scale factor.	A. Understand similarity in terms of dilations.	G.SRT.A.1	Use properties of dilations given by a center and a scale factor to solve problems and to justify relationships in geometric figures.	There are no assessment limits for this standard. The entire standard is assessed in this course.

A. Understand similarity in terms of similarity transformations	G.SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	There are no assessment limits for this standard. The entire standard is assessed in this course.	ot similarity transformations.	G.SRT.A.2	Define similarity in terms of transformations. Use transformations to determine whether two figures are similar.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	G.SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Prove theorems involving similarity.	G.SRT.B.4	Prove theorems about similar triangles.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.				
	G.SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	There are no assessment limits for this standard. The entire standard is assessed in this course.	B. Use similarity to solve problems and justify relationships	G.SRT.B.3	Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	"Justification" may take a variety of forms. For example, tasks could include, but are not limited to: a line parallel to one side of a triangle divides the other two proportionally, and conversely; finding the area of a kite by partitioning it into two congruent triangles and finding the area of one triangle.
C. Define trigonometric ratios and solve problems involving triangles.	G.SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	There are no assessment limits for this standard. The entire standard is assessed in this course.	C. Define trigonometric ratios and solve problems involving triangles.	G.SRT.C.4	Use side ratios in right triangles to define trigonometric ratios.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	G.SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	G.SRT.C.8	Solve triangles. ★ a. Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. b. Know and use the Law of Sines and Law of Cosines to solve problems in real life situations. Recognize when it is appropriate to use each.	Ambiguous cases will not be included in assessment.		G.SRT.C.5	Solve triangles.* a. Know and use the Pythagorean Theorem and trigonometric ratios (sine, cosine, tangent, and their inverses) to solve right triangles in a real-world context. b. Know and use relationships within special right triangles to solve problems in a real-world context. c. Use the Law of Sines and Law of Cosines to solve non-right triangles in a real-world context.	For part C: exclude ambiguous cases.
Circles (G.C)				Circles* (G.C)			
	G.C.A.1	Recognize that all circles are similar.	There are no assessment limits for this standard. The entire standard is assessed in this course.				

A. Understand and apply theorems about circles.	G.C.A.2	Identify and describe relationships among inscribed angles, radii, and chords.	Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle, and properties of angles for a quadrilateral inscribed in a circle.				
	G.C.A.3	Construct the incenter and circumcenter of a triangle and use their properties to solve problems in context.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Find areas of sectors of circles.	G.C.B.4	Know the formula and find the area of a sector of a circle in a real-world context.	For example, use proportional relationships on d angles measured in degrees or radians. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Find areas of sectors of circles.	G.C.A.1	Use proportional relationships between the area of a circle and the area of a sector within the circle to solve problems in a real-world context.*	Angles are measured in degrees.
Expressing Geometric Properties with Equations (G.GPE)				Expressing Geometric Properties with Equations (G.GPE)			
A. Translate between the geometric description and the equation for a circle.	G.GPE.A.1	Know and write the equation of a circle of given center and radius using the Pythagorean Theorem.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Use coordinates to prove simple geometric theorems algebraically.	G.GPE.B.2	Use coordinates to prove simple geometric theorems algebraically.	For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, 3)$ lies on the circle centered at the origin and containing the point $(0, 2)$. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Use coordinates to solve problems and justify simple geometric theorems algebraically.	G.GPE.A.1	Use coordinates to justify geometric relationships algebraically and to solve problems.	Examples include but are not limited to: determine whether four points in the coordinate plane are the vertices of a rectangle, trapezoid, rhombus, square, or parallelogram; determine whether three points in the coordinate plane are the vertices of a scalene, isosceles, equilateral, or right triangle; determine the median of a triangle using the midpoint formula; given the coordinates of the center of a circle and a point on the circle, find the area and/or circumference of the circle.
	G.GPE.B.3	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.	For example, find the equation of a line parallel or perpendicular to a given line that passes through a given point. There are no assessment limits for this standard. The entire standard is assessed in this course.		G.GPE.A.2	Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.	For example, justify why two lines are parallel, perpendicular, or neither. Create parallel and perpendicular lines to solve problems in context (e.g., given three noncollinear points in the plane, find the coordinates of a fourth point so that the four points are the vertices of a rectangle).
	G.GPE.B.4	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	G.GPE.B.5	Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles.★	For example, use the distance formula. There are no assessment limits for this standard. The entire standard is assessed in this course.				
					G.GPE.A.3	Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane.	For example, compute the radius of a circle given a center and a point on the circle, perimeters of polygons, and areas of triangles and quadrilaterals. Finding the area of a triangle is limited to cases when the triangle is either right or contains a side that is horizontal or vertical.

Geometric Measurement and Dimension (G.GMD)				Geometric Measurement and Dimension (G.GMD)			
A. Explain volume and surface area formulas and use them to solve problems.	G.GMD.A.1	Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.	Informal arguments may include but are not limited to using the dissection argument, applying Cavalieri's principle, and constructing informal limit arguments. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Explain volume and surface area formulas and use them to solve problems.	G.GMD.A.1	Understand and explain the formulas for the volume and surface area of a cylinder, cone, prism, and pyramid.	Informal arguments are limited to dissection. Memorizing formulas is not required.
	G.GMD.A.2	Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.★	There are no assessment limits for this standard. The entire standard is assessed in this course.		G.GMD.A.2	Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
Modeling with Geometry★ (G.MG)				Modeling with Geometry* (G.MG)			
A. Apply geometric concepts in modeling situations.	G.MG.A.1	Use geometric shapes, their measures, and their properties to describe objects.★	For example, modeling a tree trunk or a human torso as a cylinder. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Apply geometric concepts in modeling situations.	G.MG.A.1	Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.*	For example, determine which geometric shape best approximates a real-world object.
	G.MG.A.2	Apply geometric methods to solve real world problems.★	Geometric methods may include but are not limited to using geometric shapes, the probability of a shaded region, density, and design problems. There are no assessment limits for this standard. The entire standard is assessed in this course.				
				Statistics and Probability			
				Conditional Probability and the Rules of Probability* (S.CP)			
				A. Understand independence and conditional probability and use them to create visual representations of data.	G.S.CP.A.1	Use set notation to represent contextual situations.* a. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or", "and", "not"). b. Flexibly move between visual models (Venn diagrams, frequency tables, etc.) and set notation.	There are no assessment limits for this standard. The entire standard is assessed in this course.
					G.S.CP.B.2	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the given context.*	Calculating conditional probability may be performed via use of a visual model (Venn diagrams, frequency tables, etc.).
				B. Use the rules of probability to compute probabilities of compound events in a uniform probability model.	G.S.CP.B.3	Understand and apply the Addition Rule.* a. Explain the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ in terms of visual models (Venn diagrams, frequency tables, etc.). b. Apply the Addition Rule to solve problems and interpret the answer in terms of the given context.	There are no assessment limits for this standard. The entire standard is assessed in this course.
					G.S.CP.C.4	Calculate probabilities using geometric figures.*	Geometric figures include line segments, two-dimensional shapes, and three-dimensional solids.
				C. Apply geometric concepts to situations involving probability.			

Algebra Two

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New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Scope and Clarifications	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard	Scope and Clarifications
Number and Quantity				Number and Quantity			
The Real Number System (N.RN)				The Real Number System (N.RN)			
A. Extend the properties of exponents to rational exponents.	A2.N.RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Extend the properties of exponents to rational exponents.	A2.N.RN.A.1	Extend the properties of integer exponents to rational exponents.	For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5. There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.N.RN.A.1a	Develop the meaning of rational exponents by applying the properties of integer exponents.	
					A2.N.RN.A.1b	Explain why $x^{1/n}$ can be written as the nth root of x.	
	A2.N.RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A2.N.RN.A.1c	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
Quantities★ (N.Q)				Quantities★ (N.Q)			
				A. Reason quantitatively and use units to solve problems.	A2.N.Q.A.1	Use units as a way to understand real-world problems.*	
					A2.N.Q.A.1a	Choose and interpret the scale and the origin in graphs and data displays.	
					A2.N.Q.A.1b	Use appropriate quantities in formulas, converting units as necessary.	
A. Reason quantitatively and use units to solve problems.	A2.N.Q.A.1	Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.	Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous information; choosing appropriate units; etc. There are no assessment limits for this standard. The entire standard is assessed in this course.		A2.N.Q.A.1c	Define and justify appropriate quantities within a context for the purpose of modeling.	Apply this standard to any real-world problems studied within the scope of this course.
					A2.N.Q.A.1d	Choose an appropriate level of accuracy when reporting quantities.	
The Complex Number System (N.CN)							
A. Perform arithmetic operations with complex numbers.	A2.N.CN.A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	A2.N.CN.A.2	Know and use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Use complex numbers in quadratic equations.	A2.N.CN.B.3	Solve quadratic equations with real coefficients that have complex solutions.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
				Matrices (N.M)			
				A. Perform operations on matrices and use matrices in applications.	A2.N.M.A.1	Use matrices to represent data in a real-world context. Interpret rows, columns, and dimensions of matrices in terms of the context.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.N.M.A.2	Perform operations on matrices in a real-world context.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.N.M.A.2a	Multiply a matrix by a scalar to produce a new matrix.	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.N.M.A.2b	Add and/or subtract matrices by hand and using technology.	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.N.M.A.2c	Multiply matrices of appropriate dimensions, by hand in simple cases and using technology for more complicated cases.	Each matrix used as a factor is limited to no more than six elements when multiplying by hand.
					A2.N.M.A.2d	Describe the roles that zero matrices and identity matrices play in matrix addition and multiplication, recognizing that they are similar to the roles of 0 and 1 in the real number system.	There are no assessment limits for this standard. The entire standard is assessed in this course.

				A2.N.M.A.3	Create and use augmented matrices to solve systems of linear equations in real-world contexts, by hand and using technology. *	When solving by hand, limit system size to at most two unknowns, and when solving by technology, limit system size to at most three unknowns.	
Algebra				Algebra			
Seeing Structure in Expressions (A.SSE)				Seeing Structure in Expressions (A.SSE)			
				A. Interpret the structure of expressions.	A2.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context. *	For example, interpret $P(1 + r)^n$ as the product of the initial value P and the growth rate after the first n years. View $(1000 - 70x)(0.5 + 0.1x)$ as the product of the number of items sold and the cost of each item, which produces the profit, where x is the number of 10-cent price increases. View $x(100 - 2x)(30 - 2x)$ as the product of the length, width, and height, which produces the volume of an open box made from a 100 by 30 rectangle with an x by x square cut out of each corner.
					A2.A.SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.	
					A2.SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.	Tasks are limited to exponential, quadratic and cubic expressions.
A. Interpret the structure of expressions.	A2.A.SSE.A.1	Use the structure of an expression to identify ways to rewrite it.	For example, see $2x^4 + 3x^2 - 5$ as its factors $(x^2 - 1)$ and $(2x^2 + 5)$; see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$; see $(x^2 + 4)/(x^2 + 3)$ as $((x^2 + 3) + 1)/(x^2 + 3)$, thus recognizing an opportunity to write it as $1 + 1/(x^2 + 3)$. Tasks are limited to polynomial, rational, or exponential expressions.				
B. Use expressions in equivalent forms to solve problems.	A2.A.SSE.B.2	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★	For example the expression 1.15^t can be rewritten as $((1.15)^{1/12})^{12t} \approx 1.012^{12t}$ to reveal that the approximate equivalent monthly interest rate is 1.2% if the annual rate is 15%. i) Tasks have a real-world context. As described in the standard, there is an interplay between the mathematical structure of the expression and the structure of the situation such that choosing and producing an equivalent form of the expression reveals something about the situation. ii) Tasks are limited to exponential expressions with rational or real exponents.				
	A2.SSE.B.2a	Use the properties of exponents to rewrite expressions for exponential functions.					
	A2.A.SSE.B.3	Recognize a finite geometric series (when the common ratio is not 1), and use the sum formula to solve problems in context.		There are no assessment limits for this standard. The entire standard is assessed in this course.			
Arithmetic with Polynomials and Rational Expressions (A.APR)				Arithmetic with Polynomials and Rational Expressions (A.APR)			
				A. Understand the relationship between zeros and factors of polynomials.	A2.A.APR.A.1	Know and apply the Factor Theorem: For a polynomial $p(x)$ and a number a , $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	Polynomials are limited to degree 3 or less.
A. Understand the relationship between zeros and factors of polynomials.	A2.A.APR.A.1	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	A2.A.APR.A.2	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	Tasks include quadratic, cubic, and quartic polynomials and polynomials for which factors are not provided. For example, find the zeros of $(x^2 - 1)/(x^2 + 1)$.		A2.A.APR.A.2	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	Polynomials are limited to degree 3 or less.
B. Use polynomial identities to solve problems.	A2.A.APR.B.3	Know and use polynomial identities to describe numerical relationships.	For example, compare $(31)(29) = (30 + 1)(30 - 1) = 30^2 - 1^2$ with $(x + y)(x - y) = x^2 - y^2$. There are no assessment limits for this standard. The entire standard is assessed in this course.				
C. Rewrite rational expressions.	A2.A.APR.C.4	Rewrite rational expressions in different forms.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
Creating Equations★ (A.CED)				Creating Equations★ (A.CED)			

A. Create equations that describe numbers or relationships.	A2.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems.	Include equations arising from <i>linear and quadratic functions, and rational and exponential functions. Tasks have a real-world context.</i>	A. Create equations that describe numbers or relationships.	A2.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems in a real-world context.*	Tasks are limited to quadratic, <i>cubic, square root, cube root</i> , and exponential equations and <i>inequalities</i> .
					A2.A.CED.A.2	Create equations in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.*	Tasks are limited to linear, quadratic, <i>cubic, square root, cube root, exponential, and absolute value functions.</i>
	A2.A.CED.A.2	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations .	i) Tasks are limited to square root, cube root, <i>polynomial, rational</i> , and logarithmic functions. ii) Tasks have a real-world context.		A2.A.CED.A.3	Rearrange formulas to isolate a quantity of interest using <i>algebraic reasoning</i> .	Tasks are limited to <i>quadratic, square root, cubic, cube root, exponential, or logarithmic functions.</i> For example, rearrange the formula for the area of a circle to isolate the radius. Rearrange the formula for the volume of a cube to isolate the side length.
Reasoning with Equations and Inequalities (A.REI)				Reasoning with Equations and Inequalities (A.REI)			
A. Understand solving equations as a process of reasoning and explain the reasoning.	A2.A.REI.A.1	Explain each step in solving an equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Tasks are limited to <i>square root, cube root, polynomial, rational</i> , and logarithmic functions.	A. Understand solving equations as a process of reasoning and explain the reasoning.	A2.A.REI.A.1	Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.	Tasks are limited to <i>quadratic, radical, exponential, and logarithmic equations.</i>
	A2.A.REI.A.2	Solve <i>rational</i> and radical equations in one variable, and identify extraneous solutions when they exist.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A2.A.REI.A.2	Solve radical equations in one variable, and identify extraneous solutions when they exist.	Limit radicand to a linear or quadratic expression. Limit the index to a value of 2 or 3. Tasks may or may not have a real-world context.
B. Solve equations and inequalities in one variable.	A2.A.REI.B.3	Solve quadratic equations and inequalities in one variable.	In the case of equations that have roots with nonzero imaginary parts, students write the solutions as $a \pm bi$ for real numbers a and b .				
	A2.A.REI.B.3a	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .					
C. Solve systems of equations.	A2.A.REI.C.4	Write and solve a system of linear equations in context.	When solving algebraically, tasks are limited to systems of at most three equations and three variables. With graphic solutions systems are limited to only two variables.	B. Solve systems of equations.	A2.A.REI.B.3	Write and solve a system of linear equations in a <i>real-world</i> context. *	When solving algebraically and graphically, tasks are limited to systems of at most two equations and two variables. When solving using technology, tasks are limited to systems of at most three equations and three variables. For example, use systems of equations to find the vertices of a triangle defined by three lines.
	A2.A.REI.C.5	Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	There are no assessment limits for this standard. The entire standard is assessed in this course.		A2.A.REI.B.4	Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically, graphically, and using technology.	Tasks may or may not have a real-world context.
D. Represent and solve equations graphically.	A2.A.REI.D.6	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. *	Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. Tasks may involve any of the function types mentioned in the standard				
Functions				Functions			
Interpreting Functions (F.IF)				Interpreting Functions (F.IF)			
A. Interpret functions that arise in applications in terms of the context.	A2.F.IF.A.1	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. i) Tasks have a real-world context. ii) Tasks may involve square root, cube root, <i>polynomial</i> , exponential, and logarithmic functions.	A. Interpret functions that arise in applications in terms of the context.	A2.F.IF.A.1	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and/or asymptotes where appropriate. Tasks are limited to linear, quadratic, <i>cubic, square root, cube root, exponential, logarithmic, and piecewise (including absolute value functions).</i>
	A2.F.IF.A.2	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★	i) Tasks have a real-world context. ii) Tasks may involve <i>polynomial, exponential, and logarithmic functions</i> .		A2.F.IF.A.2	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph. *	There are no assessment limits for this standard. The entire standard is assessed in this course.

				A2.F.IF.A.3	Understand geometric formulas as functions.	Limit to quadratic and cubic functions. For example, see geometric formulas such as area of a circle, area of a square, and surface area of a cube as quadratic functions. See the volume of a cube and volume of a sphere as cubic functions.
B. Analyze functions using different representations.	A2.F.IF.B.3	Graph functions expressed symbolically and show key features of the graph, by hand and using technology.★	A2.F.IF.B.3a: Tasks are limited to square root and cube root functions. The other functions are assessed in Algebra 1.	A2.F.IF.B.4	Graph functions expressed algebraically and show key features of the graph by hand and using technology.	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and/or asymptotes where appropriate. Tasks are limited to linear, quadratic, cubic, square root, cube root, exponential, logarithmic, and piecewise functions (including absolute value functions).
	A2.F.IF.B.3a	Graph square root, cube root, and piecewise defined functions, including step functions and absolute value functions.		A2.F.IF.B.5	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.*	
	A2.F.IF.B.3b	Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.		A2.F.IF.B.5a	Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context.	For example, the growth of bacteria can be modeled by either $f(t) = 3^{t+2}$ or $g(t) = 9(3^t)$ because the expression 3^{t+2} can be rewritten as $(3^1)^t (3^2) = 9(3^t)$.
	A2.F.IF.B.3c	Graph exponential and logarithmic functions, showing intercepts and end behavior.		A2.F.IF.B.5b	Know and use the properties of exponents to interpret expressions for exponential functions in terms of a real-world context.	
	A2.F.IF.B.4	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	For example, identify percent rate of change in functions such as $y = 2^x$, $y = (1/2)^x$, $y = 2^{-x}$, $y = (1/2)^{-x}$. There are no assessment limits for this standard. The entire standard is assessed in this course.	A2.F.IF.B.6	Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.	Functions may or may not have a real-world context.
				A2.F.IF.B.6a	Compare properties of two different functions. Functions may be of different types and/or represented in different ways.	Tasks are limited to linear, quadratic, cubic, square root, cube root, exponential, logarithmic, and piecewise functions (including absolute value functions).
	A2.F.IF.B.4a	Know and use the properties of exponents to interpret expressions for exponential functions.		A2.F.IF.B.6b	Compare properties of the same function on two different intervals or represented in two different ways.	
	A2.F.IF.B.5	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Tasks may involve polynomial , exponential , and logarithmic functions.			
Building Functions (F.BF)				Building Functions (F.BF)		
A. Build a function that models a relationship between two quantities.	A2.F.BF.A.1	Write a function that describes a relationship between two quantities. ★	For example, given cost and revenue functions, create a profit function. For A2.F.BF.A.1a: i) Tasks have a real-world context. ii) Tasks may involve linear functions, quadratic functions, and exponential functions.	A2.F.BF.A.1	Build a function that describes a relationship between two quantities.*	Tasks are limited to linear, quadratic, square root, cubic, cube root, exponential, and logarithmic functions. Part a: for example, if $1000 - 70x$ represents the number of items sold in a month and $0.5 + 0.1x$ represents the cost of each item, multiply $(1000 - 70x)(0.5 + 0.1x)$ to write the quadratic function representing the profit, where x is the number of 10-cent price increases. Part b: for example, given a product originally priced at \$ x is \$4 off, build a function that will calculate the final price including 10% sales tax (i.e., $f(g(x)) = 1.10(x - 4)$).
	A2.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.		A2.F.BF.A.1a	Combine standard function types using arithmetic operations.	
	A2.F.BF.A.1b	Combine standard function types using arithmetic operations.		A2.F.BF.A.1b	Combine standard function types using composition.	
			There are no assessment limits for this standard. The entire standard is assessed in this course.	A2.F.BF.A.2	Define sequences as functions, including recursive definitions, whose domain is a subset of the integers. Write explicit and recursive formulas for arithmetic and geometric sequences in context and connect them to linear and exponential functions.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
	A2.F.BF.A.2	Write arithmetic and geometric sequences with an explicit formula and use them to model situations.★				
B. Build new functions from existing functions.	A2.F.BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	i) Tasks may involve polynomial , exponential , and logarithmic functions. ii) Tasks may involve recognizing even and odd functions.	A2.F.BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs.	Experiment with cases and illustrate an explanation of the effects on the graph using technology.
	A2.F.BF.B.4	Find inverse functions.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A2.F.BF.B.4	Find the inverse of a function.	
				A2.F.BF.B.4a	Determine whether a function is one-to-one.	Tasks are limited to linear, quadratic, square root, cubic, cube root, exponential, and logarithmic functions.
	A2.F.BF.B.4a	Find the inverse of a function when the given function is one-to-one.		A2.F.BF.B.4b	Find the inverse of a function on an appropriate domain.	

				A2.F.BF.B.4c	Given an invertible function on an appropriate domain, identify the domain of the inverse function.	
Linear, Quadratic, and Exponential Models★ (F.LE)				Linear, Quadratic, and Exponential Models★ (F.LE)		
	A2.F.LE.A.1	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	There are no assessment limits for this standard. The entire standard is assessed in this course.			
A. Construct and compare linear, quadratic, and exponential models and solve problems.				A2.F.LE.A.1	Know the relationship between exponential functions and logarithmic functions.	Bases should include ALL numbers, including the natural base e. For example, illustrate using graphs and tables that $g(x) = 2^{1.6x}$ eventually exceeds $f(x) = 4x^3 + 18$. Tasks are limited to linear, quadratic, cubic and exponential functions.
				A2.F.LE.A.1a	Solve exponential equations using a variety of strategies, including logarithms.	
	A2.F.LE.A.2	For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A2.F.LE.A.1b	Understand that a logarithm is the solution to $ab^{ct} = d$, where a , b , c , and d are numbers.	
				A2.F.LE.A.1c	Evaluate logarithms using technology.	
				A2.F.LE.A.2	Know that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or cubically.	
B. Interpret expressions for functions in terms of the situation they model.	A2.F.LE.B.3	Interpret the parameters in a linear or exponential function in terms of a context.	For example, the equation $y = 5000(1.06)^t$ models the rising population of a city with 5000 residents when the annual growth rate is 6 percent. What will be the effect on the equation if the city's growth rate was 7 percent instead of 6 percent? There are no assessment limits for this standard. The entire standard is assessed in this course.			
Trigonometric Functions (F.TF)						
A. Extend the domain of trigonometric functions using the unit circle.	A2.F.TF.A.1	Understand and use radian measure of an angle.	Commonly recognized angles include all multiples $n\pi/6$ and $n\pi/4$, where n is an integer. There are no assessment limits for this standard. The entire standard is assessed in this course.			
	A2.F.TF.A.1a	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.				
	A2.F.TF.A.1b	Use the unit circle to find $\sin \theta$, $\cos \theta$, and $\tan \theta$ when θ is a commonly recognized angle between 0 and 2π .				
	A2.F.TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	There are no assessment limits for this standard. The entire standard is assessed in this course.			
B. Prove and apply trigonometric identities.	A2.F.TF.B.3	Know and use trigonometric identities to find values of trig functions.	Commonly recognized angles include all multiples $n\pi/6$ and $n\pi/4$, where n is an integer. There are no assessment limits for this standard. The entire standard is assessed in this course.			
	A2.F.TF.B.3a	Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of $\sin \theta$, $\cos \theta$, and $\tan \theta$ to evaluate the trigonometric functions.				
	A2.F.TF.B.3b	Given the quadrant of the angle, use the identity $\sin^2 \theta + \cos^2 \theta = 1$ to find $\sin \theta$ given $\cos \theta$, or vice versa.				
Statistics and Probability						
Interpreting Categorical and Quantitative Data (S.ID)						
A. Summarize, represent, and interpret data on a single count or measurement variable.	A2.S.ID.A.1	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A2.S.ID.A.1	Use statistics appropriate to the shape of the data distribution to compare center (mean, median, and/or mode) and spread (range, standard deviation) of two or more different data sets.*	Students will be given a visual and/or verbal description of a density curve. Shapes of distribution are limited to: uniform, symmetric, right skewed, and left skewed. Student will not have to calculate standard deviation.
				A2.S.ID.A.2	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.S.ID.A.3	Compute, interpret, and compare z-scores for normally distributed data in a real-world context.*
B. Summarize, represent, and interpret data on two categorical and quantitative variables.	A2.S.ID.B.2	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. i) Tasks have a real-world context. ii) Tasks are limited to exponential functions with domains not in the integers.	B. Summarize, represent, and interpret data on two categorical and quantitative variables.		Use given functions or choose a function suggested by the shape of the data. Tasks are limited to linear, quadratic, cubic, logarithmic, and exponential functions.
	A2.S.ID.B.2a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data.			Represent data from two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.*	
Making Inferences and Justifying Conclusions (S.IC)						

A. Make inferences and justify conclusions from sample surveys, experiments, and observational studies.	A2.S.I.C.A.1	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	For example, in a given situation, is it more appropriate to use a sample survey, an experiment, or an observational study? Explain how randomization affects the bias in a study. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Make inferences and justify conclusions from sample surveys, experiments, and observational studies.	A2.S.I.C.A.1	Recognize the purposes of and differences among sample surveys, experiments, and observational studies.*	For example, in a given situation, is it more appropriate to use a sample survey, an experiment, or an observational study?
	A2.S.I.C.A.2	Use data from a sample survey to estimate a population mean or proportion; use a given margin of error to solve a problem in context.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
					A2.S.I.C.A.2	Identify potential sources of bias in statistical studies.*	Sources of bias include but are not limited to: leading questions, lack of randomization, sampling bias, undercoverage, nonresponse, and/or small sample size.
					A2.S.I.C.A.3	Distinguish between a statistic and a parameter; Evaluate reports based on data and recognize when poor conclusions are drawn from well-collected data.	There are no assessment limits for this standard. The entire standard is assessed in this course.
Conditional Probability and the Rules of Probability (S.CP)				Conditional Probability and the Rules of Probability (S.CP)			
A. Understand independence and conditional probability and use them to interpret data.	A2.S.CP.A.1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	A2.S.CP.A.2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	A2.S.CP.A.3	Know and understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	A2.S.CP.A.4	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer. There are no assessment limits for this standard. The entire standard is assessed in this course.				
				B. Understand and apply basic concepts of probability.	A2.S.CP.B.2	Apply statistical counting techniques.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
					A2.S.CP.B.2a	Use the Fundamental Counting Principle to compute probabilities of compound events and solve problems.	
					A2.S.CP.B.2b	Use permutations and combinations to compute probabilities of compound events and solve problems.	
					A2.S.CP.B.3	Use the Law of Large Numbers to assess the validity of a statistical claim. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
B. Use the rules of probability to compute probabilities of compound events in a uniform probability model.	A2.S.CP.B.5	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the model.	For example, a teacher gave two exams. 75 percent passed the first quiz and 25 percent passed both. What percent who passed the first quiz also passed the second quiz? There are no assessment limits for this standard. The entire standard is assessed in this course.	C. Use the rules of probability to compute probabilities of compound events in a uniform probability model.	A2.S.CP.C.4	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the given context.*	Calculating conditional probability may be performed via use of a visual model (Venn diagrams, frequency tables, etc.), calculation/formula, or by using counting techniques. For example, a teacher gave two exams. 75 percent passed the first exam and 25 percent passed both. What percent who passed the first exam also passed the second exam?
	A2.S.CP.B.6	Know and apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.	For example, in a math class of 32 students, 14 are boys and 18 are girls. On a unit test 6 boys and 5 girls made an A. If a student is chosen at random from a class, what is the probability of choosing a girl or an A student? There are no assessment limits for this standard. The entire standard is assessed in this course.				

Integrated Math One								
Deleted language is in red. Added language is in blue.								
New standards are highlighted in yellow.								
Deleted standards are highlighted in red.								
TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Scope and Clarifications	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard	Scope and Clarifications	
Number and Quantity				Number and Quantity				
Quantities* (N.Q)				Quantities* (N.Q)				
A. Reason quantitatively and use units to solve problems.	M1.N.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Reason quantitatively and use units to understand problems.	M1.N.Q.A.1	Use units as a way to understand real-world problems.*	Apply this standard to any real-world problems studied within the scope of this course.	
					M1.N.Q.A.1a	Choose and interpret the scale and the origin in graphs and data displays.		
					M1.N.Q.A.1b	Use appropriate quantities in formulas, converting units as necessary.		
	M1.N.Q.A.2	Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.	Clarification: Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous information; choosing appropriate units; etc. Tasks are limited to linear or exponential equations with integer exponents.		M1.N.Q.A.1c	Define and justify appropriate quantities within a context for the purpose of modeling.		
	M1.N.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.N.Q.A.1d	Choose an appropriate level of accuracy when reporting quantities.		
				Matrix Quantities (N.M)				
				A. Perform operations on matrices and use matrices in applications.	M1.N.M.A.1	Use matrices to represent data in a real-world context. Interpret rows, columns, and dimensions of matrices in terms of the context.*	There are no assessment limits for this standard. The entire standard is assessed in this course.	
					M1.N.M.A.2	Perform operations on matrices in a real-world context.*	Part c: each matrix used as a factor is limited to no more than six elements when multiplying by hand.	
					M1.N.M.A.2a	Multiply a matrix by a scalar to produce a new matrix.		
					M1.N.M.A.2b	Add and/or subtract matrices by hand and using technology.		
					M1.N.M.A.2c	Multiply matrices of appropriate dimensions, by hand in simple cases and using technology for more complicated cases.		
					M1.N.M.A.2d	Describe the roles that zero matrices and identity matrices play in matrix addition and multiplication, recognizing that they are similar to the roles of 0 and 1 in the real number system.		
					M1.N.M.A.3	Create and use augmented matrices to solve systems of linear equations in real-world contexts, by hand and using technology.*	When solving by hand, limit system size to at most two unknowns, and when solving by technology, limit system size to at most three unknowns.	
Algebra				Algebra				
Seeing Structure in Expressions (A.SSE)				Seeing Structure in Expressions (A.SSE)				
A. Interpret the structure of expressions.	M1.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.★	For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P. Tasks are limited to linear and exponential expressions, including related numerical expressions.	A. Interpret the structure of expressions.	M1.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.*	For example, one train can transport A cubic feet, and a second train can transport B cubic feet. The first train makes x trips to a job site, while the second makes y trips. Interpret the expression $Ax + By$ in terms of the context.	
	M1.A.SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.			M1.A.SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.	For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P. Tasks are limited to linear and	
	M1.A.SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.			M1.A.SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.		
	M1.A.SSE.B.2	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★	For M1.A.SSE.B.2a: For example, the growth of bacteria can be modeled by either $f(t) = 3^{(t+2)}$ or $g(t) = 9^{(t/2)}$ because the expression $3^{(t+2)}$ can					

Use expressions in equivalent forms to solve problems.	M1.A.SSE.B.2a	Use the properties of exponents to rewrite exponential expressions.	be rewritten as $(\frac{1}{3})^j = 9^{-j}$. Tasks have a real-world context. As described in the standard, there is an interplay between the mathematical structure of the expression and the structure of the situation such that choosing and producing an equivalent form of the expression reveals something about the situation.	M1.A.SSE.A.2	Use the structure of an algebraic expression to identify ways to rewrite it.	There are no assessment limits for this standard. The entire standard is assessed in this course.	
Creating Equations★ (A.CED)				Creating Equations★ (A.CED)			
A. Create equations that describe numbers or relationships	M1.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems.	i) Tasks are limited to linear or exponential equations with integer exponents. ii) Tasks have a real-world context. iii) In the linear case, tasks have more of the hallmarks of modeling as a mathematical practice (less defined tasks, more of the modeling cycle, etc.).	A. Create equations that describe numbers or relationships	M1.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems in a real-world context.*	Tasks are limited to equations or inequalities of these types: linear and absolute value.
	M1.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.	i) Tasks are limited to linear equations ii) Tasks have a real-world context. iii) Tasks have the hallmarks of modeling as a mathematical practice (less defined tasks, more of the modeling cycle, etc.).		M1.A.CED.A.2	Create equations in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.*	Tasks are limited to linear, absolute value, and exponential equations of two variables.
	M1.A.CED.A.3	Represent constraints by equations or inequalities and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.	For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.A.CED.A.3	Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.*	For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
	M1.A.CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	i) Tasks are limited to linear equations. ii) Tasks have a real-world context.		M1.A.CED.A.4	Rearrange formulas to isolate a quantity of interest using algebraic reasoning.*	Tasks are limited to linear and absolute value expressions. For example, rearrange the formula for the perimeter of a rectangle to isolate the length or width.
Reasoning with Equations and Inequalities (A.REI)				Reasoning with Equations and Inequalities (A.REI)			
			A. Understand solving equations as a process of reasoning and explain the reasoning.	M1.A.REI.A.1	Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.	Tasks are limited to linear and absolute value equations.	
A. Solve equations and inequalities in one variable.	M1.A.REI.A.1	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.		B. Solve equations and inequalities in one variable.	M1.A.REI.B.2	Solve linear and absolute value equations and inequalities in one variable.	Equations and inequalities should include integer, rational, and/or irrational coefficients. If coefficients are irrational, rationalization of a denominator is not required.
					M1.A.REI.B.2a	Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically.	Tasks may or may not have a real-world context.
			M1.A.REI.B.2b		Solve absolute value equations and inequalities in one variable. Represent solutions algebraically and graphically.		
B. Solve systems of equations.	M1.A.REI.B.2	Write and solve a system of linear equations in context.	Solve systems both algebraically and graphically. Systems are limited to at most two equations in two variables.	C. Solve systems of equations.	M1.A.REI.C.3	Write and solve a system of linear equations in a real-world context.*	When solving algebraically and graphically, tasks are limited to systems of at most two equations and two variables. When solving using technology, tasks are limited to systems of at most three equations and three variables. For example, use systems of equations to find the vertices of a triangle defined by three lines.
	M1.A.REI.C.3	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.A.REI.D.4	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	There are no assessment limits for this standard. The entire standard is assessed in this course.

C. Represent and solve equations and inequalities graphically.	M1.A.REI.C.4	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. ★	Include cases where $f(x)$ and/or $g(x)$ are linear, absolute value, and exponential functions. For example: $f(x) = 3x + 5$. i) Tasks that assess conceptual understanding of the indicated concept may involve any of the function types mentioned in the standard except exponential and logarithmic functions. ii) Finding the solutions approximately is limited to cases where $f(x)$ and $g(x)$ are polynomial. iii) Tasks are limited to linear and absolute value functions.	D. Represent and solve equations and inequalities graphically.	M1.A.REI.D.5	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$. Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate. *	When finding solutions approximately, students may be expected to produce graphs of functions that are linear, but may be given graphs of other function types. Exponential functions are limited to domains in the integers.
	M1.A.REI.C.5	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.A.REI.D.6	Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	There are no assessment limits for this standard. The entire standard is assessed in this course.
Functions				Functions			
Interpreting Functions (F.IF)				Interpreting Functions (F.IF)			
A. Understand the concept of a function and use function notation.	M1.F.IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Understand the concept of a function and use function notation.	M1.F.IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M1.F.IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.F.IF.A.2	Use function notation.*	Limit to functions of one variable.
					M1.F.IF.A.2a	Use function notation to evaluate functions for inputs in their domains, including functions of two variables.	
					M1.F.IF.A.2b	Interpret statements that use function notation in terms of a context.	
					M1.F.IF.A.3	Understand geometric formulas as functions.*	Limit to linear functions. For example, see geometric formulas such as interior angle sum, perimeter of a square, and circumference of a circle as linear functions.
B. Interpret functions that arise in applications in terms of the context.	M1.F.IF.B.3	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. i) Tasks have a real-world context. ii) Tasks are limited to linear functions, absolute value, and exponential functions with domains in the integers.	B. Interpret functions that arise in applications in terms of the context.	M1.F.IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. Tasks are limited to linear functions and exponential functions with integer exponents.
	M1.F.IF.B.4	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. ★	For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. i) Tasks have a real-world context. ii) Tasks are limited to linear functions, piecewise functions (including step functions and absolute value functions), and exponential functions with domains in the integers.		M1.F.IF.B.5	Relate the domain of a function to its graph and, where applicable, to the context of the function it models.*	For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. Tasks are limited to linear functions and exponential functions with integer exponents.

	M1.F.IF.B.5	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★	i) Tasks have a real-world context. ii) Tasks are limited to linear functions, piecewise functions (including step functions and absolute value functions), and exponential functions with domains in the integers.				
C. Analyze functions using different representations.	M1.F.IF.C.6	Graph functions expressed symbolically and show key features of the graph, by hand and using technology.	Tasks are limited to linear functions.				
	M1.F.IF.C.6a	Graph linear functions and show it's intercepts.					
	M1.F.IF.C.7	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	i) Tasks have a real-world context. ii) Tasks are limited to linear functions, piecewise functions (including step functions and absolute value functions), and exponential functions with domains in the integers.	C. Analyze functions using different representations.	M1.F.IF.C.6	Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. *	Functions may or may not have a real-world context. Tasks are limited to linear functions and exponential functions with integer exponents.
					M1.F.IF.C.6a	Compare properties of two different functions. Functions may be of different types and/or represented in different ways.	
					M1.F.IF.C.6b	Compare properties of the same function on two different intervals or represented in two different ways.	
Building Functions (F.BF)				Building Functions (F.BF)			
A. Build a function that models a relationship between two quantities.	M1.F.BF.A.1	Write a function that describes a relationship between two quantities.★	i) Tasks have a real-world context. ii) Tasks are limited to linear functions and exponential functions with domains in the integers.	A. Build a function that models a relationship between two quantities.	M1.F.BF.A.1	Write a function that describes a relationship between two quantities.★	Tasks are limited to linear and exponential relationships. For example, create a function from a visual pattern and describe how each component of their function relates to characteristics of figures in the pattern.
	M1.F.BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.			M1.F.BF.A.1a	Determine steps for calculation, a recursive process, or an explicit expression from a context.	
	M1.F.BF.A.2	Write arithmetic and geometric sequences with an explicit formula and use them to model situations.★	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.F.BF.A.2	Define sequences as functions, including recursive definitions, whose domain is a subset of the integers. Write explicit and recursive formulas for arithmetic and geometric sequences in context and connect them to linear and exponential functions.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
Linear and Exponential Models★ (F.LE)				Linear and Exponential Models★ (F.LE)			
A. Construct and compare linear and exponential models and solve problems.	M1.F.LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Construct and compare linear and exponential models and solve problems.	M1.F.LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M1.F.LE.A.1a	Recognize that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.			M1.F.LE.A.1a	Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.	
	M1.F.LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.			M1.F.LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	
	M1.F.LE.A.1c	Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.			M1.F.LE.A.1c	Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.	
	M1.F.LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.F.LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M1.F.LE.A.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly.	Tasks are limited linear and exponential functions.				

B. Interpret expressions for functions in terms of the situation they model.	M1.F.IE.B.4	Interpret the parameters in a linear or exponential function in terms of a context.	For example, the total cost of an electrician who charges 35 dollars for a house call and 50 dollars per hour would be expressed as the function $y = 50x + 35$. If the rate were raised to 65 dollars per hour, describe how the function would change. Tasks have a real-world context.	B. Interpret expressions for functions in terms of the situation they model.	M1.F.IE.B.3	Interpret the parameters in a linear or exponential function in terms of a context. *	For example, the total cost of an electrician who charges a flat fee for a house call and an hourly rate is given by the function $y = 50x + 35$. Interpret the value 35 as the flat fee and the value of 50 as the hourly rate. For example, a population is modeled by a function $y = 30000(1.04)^x$. Interpret the value 30000 as the initial population and 1.04 as a 4% increase per year.
Geometry Congruence (G.CO)				Geometry Congruence (G.CO)			
A. Experiment with transformations in the plane.	M1.G.CO.A.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Experiment with transformations in the plane.	M1.G.CO.A.1	Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.	For example, a translation will preserve both distances and angle measures associated with a figure, a compression based around a point preserves angle measures but not distances, and a horizontal stretch does not preserve either except in the cases of a vertical line, ray, or line segment. Limit the comparison of transformations to figures graphed on a coordinate plane.
	M1.G.CO.A.2	Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch).	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M1.G.CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry the shape onto itself.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M1.G.CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.G.CO.A.2	Given a rectangle, parallelogram, trapezoid, or regular polygon, determine the transformations that carry the shape onto itself and describe them in terms of the symmetry of the figure.	Limit transformations to figures graphed on a coordinate plane.
	M1.G.CO.A.5	Given a geometric figure and a rigid motion, draw the image of the figure in multiple ways, including technology. Specify a sequence of rigid motions that will carry a given figure onto another.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M1.G.CO.B.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Understand congruence in terms of rigid motions.	M1.G.CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M1.G.CO.B.8	Explain how the criteria for triangle congruence (ASA, SAS, AAS, and SSS) follow from the definition of congruence in terms of rigid motions.	There is no additional scope or clarification information for this standard.				

C. Prove geometric theorems.	M1.G.CO.C.9	Prove theorems about lines and angles.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	B. Use geometric theorems to justify relationships.	M1.G.CO.B.3	Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures.	"Justification" may take a variety of forms. Students should be introduced to the terminology of "congruence" when measuring angles and segment lengths. For example, tasks may include, but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
	M1.G.CO.C.10	Prove theorems about triangles.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.		M1.G.CO.B.4	Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures.	"Justification" may take a variety of forms. For example, tasks may include, but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent.
	M1.G.CO.C.11	Prove theorems about parallelograms.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.				
				C. Perform geometric constructions.	M1.G.CO.C.5	Perform formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	Constructions are limited to: bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
					M1.G.CO.C.6	Use geometric constructions to solve geometric problems in context, by hand and using technology.*	For example, find the point equidistant from three given points by constructing two perpendicular bisectors and locating their point of intersection.
				Geometric Properties with Equations (G.GPE)			

				A. Use coordinates to solve problems and justify simply geometric theorems algebraically.	M1.G.GPE.A.1	Use coordinates to solve problems and justify geometric relationships algebraically.	For example, tasks could include, but are not limited to: determine whether four points in the coordinate plane are the vertices of a rectangle, trapezoid, rhombus, square, or parallelogram; determine whether three points in the coordinate plane are the vertices of a scalene, isosceles, equilateral, or right triangle; determine the median of a triangle using the midpoint formula; given the coordinates of the center of a circle and a point on the circle, find the area and/or circumference of the circle.	
					M1.G.GPE.A.2	Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.	For example, tasks could include, but are not limited to: justify why two lines are parallel, perpendicular, or neither. Create parallel and perpendicular lines to solve problems in context (e.g., given three non-collinear points in the plane, find the coordinates of a fourth point so that the four points are the vertices of a rectangle).	
					M1.G.GPE.A.3	Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane.	For example, compute the radius of a circle given a center and point on the circle, perimeters of polygons, and areas of triangles and quadrilaterals. Finding the area of a triangle is limited to cases when the triangle is either right or contains a side that is horizontal or vertical.	
Statistics and Probability					Statistics and Probability			
Interpreting Categorical and Quantitative Data (S.ID)					Interpreting Categorical and Quantitative Data* (S.ID)			
A. Summarize, represent, and interpret data on a single count or measurement variable.	M1.S.ID.A.1	Represent single or multiple data sets with dot plots, histograms, stem plots (stem and leaf), and box plots.	There are no assessment limits for this standard. The entire standard is assessed in this course.					
	M1.S.ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	There are no assessment limits for this standard. The entire standard is assessed in this course.					
	M1.S.ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	There are no assessment limits for this standard. The entire standard is assessed in this course.					
B. Summarize, represent, and interpret data on two categorical and quantitative variables.	M1.S.ID.B.4	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	i) Tasks have real-world context. ii) Tasks are limited to linear functions and exponential functions with domains in the integers.	A. Summarize, represent, and interpret data on two categorical and quantitative variables.*	M1.S.ID.A.1	Represent data from two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.*	Tasks are limited to linear functions	
	M1.S.ID.B.4a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context.						
	M1.S.ID.B.4b	Fit a linear function for a scatter plot that suggests a linear association.						
C. Interpret linear models.	M1.S.ID.C.5	Interpret the slope (rate of change) and the intercept (constant term) of a linear in the context of the data.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.S.ID.B.2	Interpret the rate of change and the constant term of a linear model in the context of the data.*	There are no assessment limits for this standard. The entire standard is assessed in this course.	
	M1.S.ID.C.6	Compute (using technology) and interpret the correlation coefficient of a linear fit.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.S.ID.B.3	Use technology to compute the correlation coefficient of a linear model; interpret the correlation coefficient in the context of the data.*	There are no assessment limits for this standard. The entire standard is assessed in this course.	
	M1.S.ID.C.7	Distinguish between correlation and causation	There are no assessment limits for this standard. The entire standard is assessed in this course.		M1.S.ID.B.4	Explain the differences between correlation and causation. Recognize situations where an additional factor may be affecting correlated data.*	There are no assessment limits for this standard. The entire standard is assessed in this course.	

Integrated Math Two										
Deleted language is in red. Added language is in blue.										
New standards are highlighted in yellow.										
Deleted standards are highlighted in red.										
TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Scope and Clarifications	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard	Scope and Clarifications			
Number and Quantity				Number and Quantity						
The Real Number System* (N.RN)				The Real Number System* (N.RN)						
A. Extend the properties of exponents to rational exponents.	M2.N.RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5. <i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>	A. Extend the properties of exponents to rational exponents.	M2.N.RN.A.1	Extend the properties of integer exponents to rational exponents.* a. Develop the meaning of rational exponents by applying the properties of integer exponents. b. Explain why $x^{1/n}$ can be written as the n^{th} root of x . c. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	Part B: for example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.			
					M2.N.RN.A.1a	Develop the meaning of rational exponents by applying the properties of integer exponents.				
					M2.N.RN.A.1b	Explain why $x^{1/n}$ can be written as the n^{th} root of x				
					M2.N.RN.A.1c	Rewrite expressions involving radicals and rational exponents using the properties of exponents.				
	M2.N.RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	There are no assessment limits for this standard. The entire standard is assessed in this course.							
Quantities* (N.Q)				Quantities* (N.Q)						
A. Reason quantitatively and use units to solve problems.	M2.N.Q.A.1	Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.	Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous information; choosing appropriate units; etc. <i>Tasks are limited to linear, quadratic, exponential equations with integer exponents, square root, and cube root functions.</i>	A. Reason quantitatively and use units to solve problems.	M2.N.Q.A.1	Use units as a way to understand real-world problems.* a. Choose and interpret the scale and the origin in graphs and data displays. b. Use appropriate quantities in formulas, converting units as necessary. c. Define and justify appropriate quantities within a context for the purpose of modeling. d. Choose an appropriate level of accuracy when reporting quantities.	Apply this standard to any real-world problems studied within the scope of this course.			
The Complex Number System (N.CN)										
A. Perform arithmetic operations with complex numbers.	M2.N.CN.A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	There are no assessment limits for this standard. The entire standard is assessed in this course.							
	M2.N.CN.A.2	Know and use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	There are no assessment limits for this standard. The entire standard is assessed in this course.							
B. Use complex numbers in polynomial identities and equations.	M2.N.CN.B.3	Solve quadratic equations with real coefficients that have complex solutions.	There are no assessment limits for this standard. The entire standard is assessed in this course.							
Algebra				Algebra						
Seeing Structure in Expressions (A.SSE)				Seeing Structure in Expressions* (A.SSE)						
A. Interpret the structure of expressions.	M2.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.* a. Interpret complicated expressions by viewing one or more of their parts as a single entity.	For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P . <i>Tasks are limited to quadratic expressions.</i>	A. Interpret the structure of expressions.	M2.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	For example, interpret $P(1 + r)^n$ as the product of the initial value P and the growth rate after the first n years. View $(1000 - 70x)(0.5 + 0.1x)$ as the product of the number of items sold and the cost of each item, which produces the profit, where x is the number of 10-cent price increases. <i>Tasks are limited to exponential and quadratic expressions.</i>			
	M2.A.SSE.A.2	Use the structure of an expression to identify ways to rewrite it.	For example, recognize $53^2 - 47^2$ as a difference of squares and see an opportunity to rewrite it in the easier-to-evaluate form $(53 + 47)(53 - 47)$. <i>See an opportunity to rewrite $a^2 + 9a + 14$ as $(a + 7)(a + 2)$. Tasks are limited to numerical expressions and polynomial expressions in one variable.</i>							

[illegible]

C. Solve systems of equations.				D. Represent and solve equations and inequalities graphically.	M2.A.REI.D.5	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$. Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.	When finding solutions approximately, students may be expected to produce graphs of functions that are linear, piecewise (including step and absolute value functions), quadratic, square root, and exponential, but may be given graphs of other function types.
Functions				Functions			
Interpreting Functions* (F.IF)				Interpreting Functions* (F.IF)			
A. Interpret functions that arise in applications in terms of the context.	M2.F.IF.A.1	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities and sketch graphs showing key features given a verbal description of the relationship.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. i) Tasks have a real-world context. ii) Tasks are limited to quadratic, exponential functions with integer exponents, square root, and cube root functions.	A. Understand the concept of function and use function notation.	M2.F.IF.A.1	Use function notation.* a. Use function notation to evaluate functions for inputs in their domains, including functions of two variables. b. Interpret statements that use function notation in terms of a context.	Limit to functions of one variable in this course.
	M2.F.IF.A.2	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*	For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. Tasks are limited to quadratic, square root, cube root , piecewise, and exponential functions.		M2.F.IF.A.2	Understand geometric formulas as functions.*	Limit to quadratic functions. For example, see geometric formulas such as area of a circle, area of a square, and surface area of a cube as quadratic functions.
	M2.F.IF.A.3	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	i) Tasks have a real-world context. ii) Tasks may involve quadratic, square root, cube root , piecewise, and exponential functions.				
B. Interpret functions that arise in applications in terms of the context.	M2.F.IF.B.3	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.	B. Interpret functions that arise in applications in terms of the context.	M2.F.IF.B.3	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.
	M2.F.IF.B.4	Relate the domain of a function to its graph and, where applicable, to the context of the function it models.*	For example, if the function $h(t)$ gives the height of a ball thrown in the air in terms of time, the interval between 0 and the time it hits the ground would be an appropriate domain for the function. Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.		M2.F.IF.B.4	Relate the domain of a function to its graph and, where applicable, to the context of the function it models.*	For example, if the function $h(t)$ gives the height of a ball thrown in the air in terms of time, the interval between 0 and the time it hits the ground would be an appropriate domain for the function. Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.
	M2.F.IF.B.5	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.*	Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.		M2.F.IF.B.5	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.*	Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.
	M2.F.IF.B.6	Graph functions expressed symbolically and show key features of the graph, by hand and using technology.* a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph exponential and logarithmic functions, showing intercepts and end behavior.	M2.F.IF.B.4a – Tasks are limited to quadratic functions. M2.F.IF.B.4c – Tasks are limited to exponential functions.		M2.F.IF.C.6	Graph functions expressed algebraically and show key features of the graph by hand and using technology.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.

B. Analyze functions using different representation.	M2.F.IF.B.5	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Know and use the properties of exponents to interpret expressions for exponential functions.	For example, identify percent rate of change in functions such as $y = 2^x$, $y = (1/2)^x$, $y = 2^{-x}$, $y = (1/2)^{-x}$. There are no assessment limits for this standard. The entire standard is assessed in this course.	C. Analyze functions using different representation.	M2.F.IF.C.7	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.* a. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context. b. Know and use the properties of exponents to interpret expressions for exponential functions in terms of a real-world context.	For example, the growth of bacteria can be modeled by either $f(t) = 3^{10t}$ or $g(t) = 9(3^t)$ because the expression 3^{10t} can be rewritten as $(3^1)^{10t} = 9(3^t)$.
	M2.F.IF.B.6	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	i) Tasks do not have a real-world context. ii) Tasks may involve quadratic, square root, cube root, piecewise, and exponential functions.		M2.F.IF.C.8	Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.* a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways. b. Compare properties of the same function on two different intervals or represented in two different ways.	Functions may or may not have a real-world context. Tasks are limited to piecewise (including step and absolute value functions), quadratic, square root, and exponential functions.
Building Functions (F.BF)				Building Functions (F.BF)			
A. Build a function that models a relationship between two quantities.	M2.F.BF.A.1	Write a function that describes a relationship between two quantities.* a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	For M2.F.BF.A.1a: i) Tasks have a real-world context. ii) Tasks may involve linear and quadratic functions.	A. Build a function that models a relationship between two quantities.	M2.F.BF.A.1	Build a function that describes a relationship between two quantities.* a. Combine standard function types using arithmetic operations.	Tasks are limited to linear, exponential, and quadratic relationships. For example, if $1000 - 70x$ represents the number of items sold in a month and $0.5 + 0.1x$ represents the cost of each item, multiply $(1000 - 70x)(0.5 + 0.1x)$ to write the quadratic function representing the profit, where x is the number of 10-cent price increases.
B. Build new functions from existing functions.	M2.F.BF.B.2	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	i) Identifying the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, and $f(x+k)$ for specific values of k (both positive and negative) is limited to linear, quadratic, and absolute value functions. ii) Experimenting with cases and illustrating an explanation of the effects on the graph using technology is limited to linear, quadratic, square root, cube root, and exponential functions. iii) Tasks do not involve recognizing even and odd functions.	B. Build new functions from existing functions.	M2.F.BF.B.2	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given graphs.	Experiment with cases and illustrate an explanation of the effects on the graph using technology. Tasks are limited to quadratic, square root, and exponential functions.
Geometry				Geometry			
A. Experiment with transformations in the plane.				Congruence (G.CO)			
				M2.G.CO.A.1	Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.	For example, a translation will preserve both distances and angle measures associated with a figure, a compression based around a point preserves angle measures but not distances, and a horizontal stretch does not preserve either except in the cases of a vertical line, ray, or line segment. Limit the comparison of transformations to figures graphed on a coordinate plane.	
				M2.G.CO.A.2	Given a rectangle, parallelogram, trapezoid, or regular polygon, determine the transformations that carry the shape onto itself and describe them in terms of the symmetry of the figure.	Limit transformations to figures graphed on a coordinate plane.	
				M2.G.CO.A.3	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	There are no assessment limits for this standard. The entire standard is assessed in this course.	
				M2.G.CO.A.4	Given a geometric figure, draw the image of the figure after a sequence of one or more rigid motions, by hand and using technology. Identify a sequence of rigid motions that will carry a given figure onto another.	There are no assessment limits for this standard. The entire standard is assessed in this course.	
				M2.G.CO.B.5	Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.	There are no assessment limits for this standard. The entire standard is assessed in this course.	

				B. Understand congruence in terms of rigid motions. M2.G.CO.B.6 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. There are no assessment limits for this standard. The entire standard is assessed in this course.			
				M2.G.CO.B.7 Explain how the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) follow from the definition of congruence in terms of rigid motions. There are no assessment limits for this standard. The entire standard is assessed in this course.			
				C. Use geometric theorems to justify relationships. M2.G.CO.C.8 Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures. <i>"Justification" may take a variety of forms. For example, tasks may include, but are not limited to: the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</i>			
				M2.G.CO.C.9 Use definitions and theorems about parallelograms to solve problems and to justify relationships in geometric figures. <i>"Justification" may take a variety of forms. For example, tasks may include, but are not limited to: opposite sides of a parallelogram are congruent, opposite angles of a parallelogram are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i>			
Similarity, Right Triangles, and Trigonometry (G.SRT)				Similarity, Right Triangles, and Trigonometry (G.SRT)			
A. Understand similarity in terms of similarity transformations.	M2.G.SRT.A.1	Verify informally the properties of dilations given by a center and a scale factor.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Understand similarity in terms of similarity transformations.	M2.G.SRT.A.1	Use properties of dilations given by a center and a scale factor to solve problems and to justify relationships in geometric figures.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M2.G.SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	There are no assessment limits for this standard. The entire standard is assessed in this course.		M2.G.SRT.A.2	Define similarity in terms of transformations. Use transformations to determine whether two figures are similar.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M2.G.SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Prove theorems involving similarity.	M2.G.SRT.B.4	Prove theorems about similar triangles.	Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.				
	M2.G.SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	There are no assessment limits for this standard. The entire standard is assessed in this course.	B. Use similarity to solve problems and justify relationships.	M2.G.SRT.B.3	Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	<i>"Justification" may take a variety of forms. For example, tasks could include, but are not limited to: a line parallel to one side of a triangle divides the other two proportionally, and conversely; finding the area of a kite by partitioning it into two congruent triangles and finding the area of one triangle.</i>
C. Define trigonometric ratios and solve problems involving triangles.	M2.G.SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	There are no assessment limits for this standard.				
	M2.G.SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M2.G.SRT.C.8	Solve triangles.* a. Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. b. Know and use the Law of Sines and the Law of Cosines to solve triangles in applied problems. Recognize when it is appropriate to use each.	Ambiguous cases will not be included in assessment.				
Geometric Measurement and Dimension (G.GMD)							
A. Explain volume and surface area formulas and use them to solve problems.	M2.G.GMD.A.1	Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.	Informal arguments may include but are not limited to using the dissection argument, applying Cavalieri's principle, and constructing informal limit arguments. There are no assessment limits for this standard. The entire standard is assessed in this course.				

	M2.G.GMD.A.2	Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.*	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
Statistics and Probability			
Interpreting Categorical and Quantitative Data (S.ID)			
A. Summarize, represent, and interpret data on two categorical and quantitative variables.	M2.S.ID.A.1	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.	<i>Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. Exponential functions are limited to those with domains in the integers. Tasks have a real-world context.</i>
Conditional Probability and the Rules of Probability (S.CP)			
A. Understand independence and conditional probability and use them to interpret data.	M2.S.CP.A.1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
	M2.S.CP.A.2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
	M2.S.CP.A.3	Know and understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
	M2.S.CP.A.4	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
B. Use the rules of probability to compute probabilities of compound events in a uniform probability model.	M2.S.CP.B.5	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the model.	<i>For example, a teacher gave two exams. 75 percent passed the first exam and 25 percent passed both. What percent who passed the first exam also passed the second exam?</i> <i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
	M2.S.CP.B.6	Know and apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.	<i>For example, in a math class of 32 students, 14 are boys and 18 are girls. On a unit test 6 boys and 5 girls made an A. If a student is chosen at random from a class, what is the probability of choosing a girl or an A student?</i> <i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>

Integrated Math Three

Deleted language is in red. Added language is in blue.

New standards are highlighted in yellow.

Deleted standards are highlighted in red.

TN Standards Domain and Cluster Heading	TN Standards code	TN Standard	Scope and Clarifications	Revised TN Standards Domain and Cluster Heading	Revised TN Standards code	Revised TN Standard	Scope and Clarifications
Number and Quantity				Number and Quantity			
Quantities* (N.Q)				Quantities* (N.Q)			
A. Reason quantitatively and use units to solve problems.	M3.N.Q.A.1	Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.	Descriptive modeling refers to understanding and interpreting graphs; identifying extraneous information; choosing appropriate units; etc. There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Reason quantitatively and use units to understand problems.	M3.N.Q.A.1	Use units as a way to understand real-world problems.*	Apply this standard to any real-world problems studied within the scope of this course.
					M3.N.Q.A.1a	Choose and interpret the scale and the origin in graphs and data displays.	
					M3.N.Q.A.1b	Use appropriate quantities in formulas, converting units as necessary.	
					M3.N.Q.A.1c	Define and justify appropriate quantities within a context for the purpose of modeling.	
					M3.N.Q.A.1d	Choose an appropriate level of accuracy when reporting quantities.	
Algebra				Algebra			
Seeing Structure in Expressions (A.SSE)				Seeing Structure in Expressions (A.SSE)			
A. Interpret the structure of expressions.	M3.A.SSE.A.1	Use the structure of an expression to identify ways to rewrite it.	For example, see $2x^4 + 3x^2 - 5$ as its factors $(x^2 - 1)$ and $(2x^2 + 5)$; see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$; see $(x^2 + 4)/(x^2 + 3)$ as $((x^2 + 3) + 1)/(x^2 + 3)$, thus recognizing an opportunity to write it as $1 + 1/(x^2 + 3)$. Tasks are limited to polynomial, rational, or exponential expressions.	A. Interpret the structure of expressions.	M3.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.*	For example, view $x(100 - 2x)(30 - 2x)$ as the product of the length, width, and height, which produces the volume of an open box made from a 100 by 30 rectangle with an x by x square cut out of each corner. Tasks are limited to exponential, quadratic, and cubic expressions.
					M3.A.SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.*	
					M3.A.SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.*	
B. Write expressions in equivalent forms to solve problems.	M3.A.SSE.B.2	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★	For example, the expression $1.15t$ can be rewritten as $((1.15)^{1/12})^{12t} \approx 1.012^{12t}$ to reveal that the approximate equivalent monthly interest rate is 1.2% if the annual rate is 15%. i) Tasks have a real-world context. As described in the standard, there				
	M3.A.SSE.B.2a	Use the properties of exponents to rewrite expressions for exponential functions.					
	M3.A.SSE.B.3	Recognize a finite geometric series (when the common ratio is not 1), and use the sum formula to solve problems in context.					
Arithmetic with Polynomials and Rational Expressions (A.APR)				Arithmetic with Polynomials and Rational Expressions (A.APR)			
A. Understand the relationship between zeros and factors of polynomials.	M3.A.APR.A.1	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	There are no assessment limits for this standard. The entire standard is assessed in this course.	A. Understand the relationship between zeros and factors of polynomials.	M3.A.APR.A.1	Know and apply the Factor Theorem: For a polynomial $p(x)$ and a number a , $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	Polynomials are limited to degree of three.
	M3.A.APR.A.2	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.			M3.A.APR.A.2	Identify zeros of polynomials when suitable factorizations are available and use the zeros to construct a rough graph of the function defined by the polynomial.	Polynomials are limited to degree of three.
B. Use polynomial identities to solve problems.	M3.A.APR.B.3	Know and use polynomial identities to describe numerical relationships.	For example, compare $(31)(29) = (30 + 1)(30 - 1) = 30^2 - 1^2$ with $(x + y)(x - y) = x^2 - y^2$.				
C. Rewrite rational expressions.	M3.A.APR.C.4	Rewrite rational expressions in different forms.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
Creating Equations★ (A.CED)				Creating Equations★ (A.CED)			
	M3.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems.	i) Tasks are limited to polynomial, rational, absolute value, exponential, or logarithmic function s. ii) Tasks have a real-world context.		M3.A.CED.A.1	Create equations and inequalities in one variable and use them to solve problems in a real-world context.*	Tasks are limited to cubic, cube root, or exponential equations and inequalities.

A. Create equations that describe numbers or relationships.	M3.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>	A. Create equations that describe numbers or relationships.	M3.A.CED.A.2	Create equations in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.*	Tasks are limited to cubic, cube root, or exponential equations and inequalities.
	M3.A.CED.A.3	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	i) Tasks have a real-world context. ii) Tasks are limited to polynomial, rational, absolute value, exponential, or logarithmic functions.		M3.A.CED.A.3	Rearrange formulas to isolate a quantity of interest using algebraic reasoning.*	Tasks are limited to cubic, cube root, exponential, or logarithmic functions. For example, rearrange the formula for the volume of a cube to isolate the side length.
Reasoning with Equations and Inequalities (A.REI)				Reasoning with Equations and Inequalities (A.REI)			
A. Understand solving equations as a process of reasoning and explain the reasoning.	M3.A.REI.A.1	Explain each step in solving an equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Tasks are limited to simple rational or radical equations.		M3.A.REI.A.1	Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.	Tasks are limited to cubic, cube root, and exponential equations.
	M3.A.REI.A.2	Solve rational and radical equations in one variable, and identify extraneous solutions when they exist.	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>		M3.A.REI.A.2	Solve radical equations in one variable and identify extraneous solutions when they exist.	Limit radicand to a linear or quadratic expression. Limit the index to a value of 3. Tasks may or may not have a real-world context.
B. Represent and solve equations graphically	M3.A.REI.B.3	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. ★	Tasks may include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, or logarithmic functions.				
Functions				Functions			
Interpreting Functions (F.IF)				Interpreting Functions (F.IF)			
				A. Understand the concept of a function and use function notation.	M3.F.IF.A.1	Use function notation.*	Use function notation with various functions of two variables. See functions as defined symbolically (e.g., $f(a,b) = 3ab - a$ or a newly defined symbol like $a\$b = 3ab - a$).
					M3.F.IF.A.1a	Use function notation to evaluate functions for inputs in their domains, including functions of two variables.*	
					M3.F.IF.A.1b	Interpret statements that use function notation in terms of a context.	
					M3.F.IF.A.2	Understand geometric formulas as functions.*	Limit to cubic functions. For example, see geometric formulas such as the volume of a cube and volume of a sphere as cubic functions.
A. Interpret functions that arise in applications in terms of the context.	M3.F.IF.A.1	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. i) Tasks have a real-world context. ii) Tasks may involve polynomial, exponential, and logarithmic functions.	B. Interpret functions that arise in applications in terms of the context.	M3.F.IF.B.3	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.*	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and/or asymptotes where appropriate. Tasks are limited to piecewise, cubic, cube root, exponential, and logarithmic functions.
	M3.F.IF.A.2	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★	i) Tasks have a real-world context. ii) Tasks may involve polynomial, exponential, and logarithmic functions.		M3.F.IF.B.4	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.*	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>
B. Analyze functions using different	M3.F.IF.B.3	Graph functions expressed symbolically and show key features of the graph, by hand and using technology. ★	<i>There are no assessment limits for this standard. The entire standard is assessed in this course.</i>	C. Analyze functions using different	M3.F.IF.C.5	Graph functions expressed algebraically and show key features of the graph by hand and using technology. *	Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and/or asymptotes where appropriate. Tasks are limited to piecewise, cubic, cube root, exponential, and logarithmic functions
	M3.F.IF.B.3a	Graph linear and quadratic functions and show intercepts, maxima, and minima.					
	M3.F.IF.B.3b	Graph square root, cube root, and piecewise defined functions, including step functions and absolute value functions.					
	M3.F.IF.B.3c	Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.					

representations.	M3.F.IF.B.3d	Graph exponential and logarithmic functions, showing intercepts and end behavior.		representations.			
	M3.F.IF.B.4	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	Tasks may involve <i>polynomial, exponential, and logarithmic functions.</i>		M3.F.IF.C.6	Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.*	Functions may or may not have a real-world context.
					M3.F.IF.C.6a	Compare properties of two different functions. Functions may be of different types and/or represented in different ways.*	Tasks are limited to <i>piecewise, cubic, cube root, exponential, and logarithmic functions.</i>
				M3.F.IF.C.6b	Compare properties of the same function on two different intervals or represented in two different ways.*		
Building Functions (F.BF)				Building Functions (F.BF)			
A. Build new functions from existing functions.	M3.F.BF.A.1	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	i) Tasks may involve <i>polynomial, exponential, and logarithmic functions.</i> ii) Tasks may involve <i>recognizing even and odd functions.</i>	M3.F.BF.A.1	Build a function that describes a relationship between two quantities.*	For example, given a product originally priced at \$ x is \$4 off, build a function using composition that would calculate the final price including 10% sales tax (i.e., $f(g(x)) = 1.10(x - 4)$).	
	M3.F.BF.A.2	Find inverse functions.	There are no assessment limits for this standard. The entire standard is assessed in this course.	M3.F.BF.A.1a	Combine standard function types using composition.		
	M3.F.BF.A.2a	Find the inverse of a function when the given function is one-to-one.		M3.F.BF.A.2	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given graphs.	Experiment with cases and illustrate an explanation of the effects on the graph using technology.	
				M3.F.BF.A.3	Find the inverse of a function.		
				M3.F.BF.A.3a	Determine whether a function is one-to-one.	Tasks are limited to <i>linear, quadratic, square root, cubic, cube root, exponential, and logarithmic functions.</i>	
				M3.F.BF.A.3b	Find the inverse of a function on an appropriate domain.		
				M3.F.BF.A.3c	Given an invertible function on an appropriate domain, identify the domain of the inverse function.		
Linear, Quadratic, and Exponential Models★ (F.LE)				Linear, Quadratic, and Exponential Models★ (F.LE)			
A. Construct and compare linear, quadratic, and exponential models and solve problems.	M3.F.LE.A.1	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	There are no assessment limits for this standard. The entire standard is assessed in this course	M3.F.LE.A.1	Know that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or cubically.*	For example, illustrate using graphs and tables that $g(x) = 21.6x$ eventually exceeds $f(x) = 4x^3 + 18$. Tasks are limited to <i>linear, quadratic, cubic and exponential functions.</i>	
				M3.F.LE.A.2	Know the relationship between exponential functions and logarithmic functions. *	Bases should include all numbers, including the natural base e .	
				M3.F.LE.A.2a	Solve exponential equations using a variety of strategies, including logarithms.		
	M3.F.LE.A.2	For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.	There are no assessment limits for this standard. The entire standard is assessed in this course	M3.F.LE.A.2b	Understand that a logarithm is the solution to $ab^{ct} = d$, where a , b , c , and d are numbers.		
				M3.F.LE.A.2c	Evaluate logarithms using technology.		
Trigonometric Functions (F.TF)							
A. Extend the domain of trigonometric functions using the unit circle.	M3.F.TF.A.1	Understand and use radian measure of an angle.	Commonly recognized angles include all multiples of $n\pi/6$ and $n\pi/4$, where n is an integer. There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M3.F.TF.A.1a	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.					
	M3.F.TF.A.1b	Use the unit circle to find $\sin \theta$, $\cos \theta$, and $\tan \theta$ when θ is a commonly recognized angle between 0 and 2π .					
	M3.F.TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Prove and apply trigonometric identities.	M3.F.TF.B.3	Know and use trigonometric identities to find values of trig functions.	Commonly recognized angles include all multiples of $n\pi/6$ and $n\pi/4$, where n is an integer. There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M3.F.TF.B.3a	Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of $\sin \theta$, $\cos \theta$, and $\tan \theta$ to evaluate the trigonometric functions.					
	M3.F.TF.B.3b	Given the quadrant of the angle, use the identity $\sin^2 \theta + \cos^2 \theta = 1$ to find $\sin \theta$ given $\cos \theta$, or vice versa.					
Geometry					Geometry		
Congruence (G.CO)				Congruence (G.CO)			

A. Make geometric constructions.	M3.G.CO.A.1	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	Constructions include but are not limited to: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; constructing a line parallel to a given line through a point not on the line, and constructing the following objects inscribed in a circle: an equilateral triangle, square, and a regular hexagon.				
Circles (G.C)				Circles (G.C)			
A. Understand and apply theorems about circles.	M3.G.C.A.1	Recognize that all circles are similar.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
	M3.G.C.A.2	Identify and describe relationships among inscribed angles, radii, and chords.	Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle, and properties of angles for a quadrilateral inscribed in a circle.				
	M3.G.C.A.3	Construct the incenter and circumcenter of a triangle and use their properties to solve problems in context.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
B. Find areas of sectors of circles.	M3.G.C.B.4	Know the formula and find the area of a sector of a circle in a real-world context.	For example, use proportional relationships and angles measured in degrees or radians. There are no assessment limits for this standard. The entire standard is assessed in this course.				
				A. Find areas of sectors of circles.	M3.G.C.A.1	Use proportional relationships between the area of a circle and the area of a sector within the circle to solve problems and represent solutions in a real-world context.*	Angles are measured in degrees.
				Similarity, Right Triangles, and Trigonometry (G.SRT)			
				A. Define trigonometric ratios and solve problems involving triangles.	M3.G.SRT.A.1	Use side ratios in right triangles to define trigonometric ratios.	There are no assessment limits for this standard. The entire standard is assessed in this course.
					M3.G.SRT.A.1a	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	
					M3.G.SRT.A.1b	Explain and use the relationship between the sine and cosine of complementary angles.	
					M3.G.SRT.A.2	Solve triangles.*	For part c: exclude ambiguous cases.
					M3.G.SRT.A.2a	Know and use the Pythagorean Theorem and trigonometric ratios (sine, cosine, tangent, and their inverses) to solve right triangles in a real-world context.*	
					M3.G.SRT.A.2b	Know and use relationships within special right triangles to solve problems in a real-world context.*	
				M3.G.SRT.A.2c	Use the Law of Sines and Law of Cosines to solve non-right triangles in a real-world context.*		
				Expressing Geometric Properties with Equations (G.GPE)			
A. Translate between the geometric description and the equation for a circle.	M3.G.GPE.A.1	Know and write the equation of a circle of given center and radius using the Pythagorean Theorem.	There are no assessment limits for this standard. The entire standard is assessed in this course.				
M3.G.GPE.B.2	Use coordinates to prove simple geometric theorems algebraically.	For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$. There are no assessment limits for this standard. The entire standard is assessed in this course.					
M3.G.GPE.B.3	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.	For example, find the equation of a line parallel or perpendicular to a given line that passes through a given point. There are no assessment limits for this standard. The entire standard is assessed in this course.					

B. Use coordinates to prove simple geometric theorems algebraically.	M3.G.GPE.B.4	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M3.G.GPE.B.5	Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles. ★	For example, use the distance formula. There are no assessment limits for this standard. The entire standard is assessed in this course.
Modeling with Geometry (G.MG)			
A. Apply geometric concepts in modeling situations.	M3.G.MG.A.1	Use geometric shapes, their measures, and their properties to describe objects. ★	There are no assessment limits for this standard. The entire standard is assessed in this course. For example, modeling a tree trunk or a human torso as a cylinder.
	M3.G.MG.A.2	Apply geometric methods to solve real-world problems. ★	Geometric methods may include but are not limited to using geometric shapes, the probability of a shaded region, density, and design problems. There are no assessment limits for this standard. The entire standard is assessed in this course.
Modeling with Geometry* (G.MG)			
A. Apply geometric concepts in modeling situations.	M3.G.MG.A.1	Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.*	For example, determine which geometric shape best approximates a real-world object.
Geometric Measurement and Dimension (G.GMD)			
A. Explain volume and surface area formulas and use them to solve problems.	M3.G.GMD.A.1	Understand and explain the formulas for the volume and surface area of a cylinder, cone, prism, and pyramid.	Informal arguments are limited to dissection. Memorizing the formulas is not required.
	M3.G.GMD.A.2	Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
Statistics and Probability			
Interpreting Categorical and Quantitative Data (S.ID)			
A. Summarize, represent, and interpret data on a single count or measurement variable.	M3.S.ID.A.1	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule.	There are no assessment limits for this standard. The entire standard is assessed in this course.
B. Summarize, represent, and interpret data on two categorical and quantitative variables.	M3.S.ID.B.2	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Use given functions or choose a function suggested by the context. i) Tasks have a real-world context. ii) Tasks are limited to linear, quadratic, and exponential functions with domains not in the integers.
		Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context.	
		Fit a linear function for a scatter plot that suggests a linear association.	
Making Inferences and Justifying Conclusions (S.IC)			
A. Make inferences and justify conclusions from sample surveys, experiments, and observational studies.	M3.S.I.C.A.1	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	For example, in a given situation, is it more appropriate to use a sample survey, an experiment, or an observational study? Explain how randomization affects the bias in a study. There are no assessment limits for this standard. The entire standard is assessed in this course.
	M3.S.I.C.A.2	Use data from a sample survey to estimate a population mean or proportion; use a given margin of error to solve a problem in context.	There are no assessment limits for this standard. The entire standard is assessed in this course.
Making Inferences and Justifying Conclusions* (S.IC)			
A. Make inferences and justify conclusions from sample surveys, experiments, and observational studies.	M3.S.I.C.A.1	Recognize the purposes of and differences among sample surveys, experiments, and observational studies.*	For example, in a given situation, is it more appropriate to use a sample survey, an experiment, or an observational study?
	M3.S.I.C.A.2	Identify potential sources of bias in statistical studies.*	Sources of bias include but are not limited to: leading questions, lack of randomization, sampling bias, undercoverage, nonresponse, and/or small sample size.

	M3.S.IC.A.3	Distinguish between a statistic and a parameter. Evaluate reports based on data and recognize when poor conclusions are drawn from well-collected data. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
Conditional Probability and the Rules of Probability* (CP)II			
A. Understand independence and conditional probability and use them to create visual representations of data.	M3.S.CP.A.1	Use set notation to represent contextual situations. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M3.S.CP.A.1a	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or", "and", "not").	
	M3.S.CP.A.1b	Flexibly move between visual models (Venn diagrams, frequency tables, etc.) and set notation.	
	M3.S.CP.A.2	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. Categorize events as independent or dependent. *	There are no assessment limits for this standard. The entire standard is assessed in this course.
B. Understand and apply basic concepts of probability.	M3.S.CP.B.3	Apply statistical counting techniques.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M3.S.CP.B.3a	Use the Fundamental Counting Principle to compute probabilities of compound events and solve problems. *	
	M3.S.CP.B.3b	Use permutations and combinations to compute probabilities of compound events and solve problems.*	
	M3.S.CP.B.4	Use the Law of Large Numbers to assess the validity of a statistical claim.*	There are no assessment limits for this standard. The entire standard is assessed in this course.
	M3.S.CP.C.5	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the given context.*	For example, a teacher gave two exams. 75 percent passed the first exam and 25 percent passed both. What percent who passed the first exam also passed the second exam? Calculating conditional probability may be performed via use of a visual model (Venn diagrams, frequency tables, etc.), calculation/formula, or by using counting techniques.
	M3.S.CP.C.6	Understand and apply the Addition Rule.*	For example, in a math class of 32 students, 14 are boys and 18 are girls. On a unit test 6 boys and 5 girls made an A. If a student is chosen at random from a class, what is the probability of choosing a girl or an A student?
	M3.S.CP.C.6a	Explain the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ in terms of visual models (Venn diagrams, frequency tables, etc.).*	
	M3.S.CP.C.6b	Apply the Addition Rule to solve problems and interpret the answer in terms of the given context.*	
	M3.S.CP.D.7	Calculate probabilities using geometric figures.*	Geometric figures include line segments, two-dimensional shapes, and three-dimensional solids.