Grade 7 Algebra I

Incoming Grade Summer Packet

Dear Student,

Welcome to your math course for the year! There is much to learn this year, and each class session during school will require students to work diligently, both during and outside of class. This summer Math packet addresses the material that you should be comfortable with before the start of grade 7. This Math packet serves 2 purposes:

1) It will allow you to remain mathematically fresh during the summer and

2) It will enable you to "hit the ground running" when this course begins.

This packet should be completed and brought with you on the first day of school. Use the answer key provided to check your work. If you come across questions that you are unsure of, make note and bring that up to your teacher during the review. It would be a mistake to complete this packet immediately upon the completion of this past school year as well as waiting until just before the next school year begins. Take some time off and look towards beginning the packet come mid-summer. It is important that the techniques practiced in this packet are fresh in your mind come the first day of school.

You will be assessed on this content within the first week or so of school.

Good luck!

Name:_____

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Objective: Write an algebraic expression to represent unknown quantities with one unknown and 1 or 2 operations.

Examples:

The tables below show phrases written as mathematical expressions.

Phrases	Expression
9 more than a number the sum of 9 and a number a number plus 9 a number increased by 9 the total of *x* and 9	$X + 9$
Phrases	**Expression**
6 multiplied by *g* 6 times a number the product of *g* and 6	$6g$

Phrases	Expression
4 subtracted from a number a number minus 4 4 less than a number a number decreased by 4 the difference of *h* and 4	$h - 4$
Phrases	**Expression**
a number divided by 5 the quotient of *t* and 5 divide a number by 5	$\frac{t}{5}$

Write each phrase as an algebraic expression.

1.) 7 less than *m*

$m - 7$

2.) The quotient of 3 and *y*

$\frac{y}{3}$

3.) 7 years younger than Jessica

$j - 7$

4.) 3 times as many marbles as Bob has

$3b$

5.) Let t = the number of tomatoes Tye planted last year. This year she planted 3 times as many. Write an algebraic expression to show how many tomatoes Tye planted this year.

$3t$

6.) Last week Jason sold x number of hot dogs at the football game. This week he sold twice as many as last week, and then he sold 10 more. Write an expression to show how many hot dogs Jason sold this week.

$2x + 10$

Objective: Evaluate an algebraic expression using one unknown and no more than 2 operations.

Example 1: Evaluate $6x - 7$ if $x = 8$.

$6x - 7 = 6(8) - 7$ Replace x with 8.
$= 48 - 7$ Use order of operations.
$= 41$ Subtract 7 from 48.

Example 2: Evaluate $5m - 15$ if $m = 6$.

$5m - 15 = 5(6) - 15$ Replace m with 6..
$= 30 - 15$ Use order of operations.
$= 15$ Subtract 15 from 30.

Example 3: Evaluate $\frac{7b}{3}$ if b = 6.

$\frac{7b}{3} = \frac{(7)(6)}{3}$ Replace b with 6.
$= \frac{42}{3}$ Multiply 6 by 7.
$= 14$ Divide.

Example 4: Evaluate $x^3 + 4$ if $x = 3$.

$x^3 + 4 = 3^3 + 4$ Replace x with 3.
$= 27 + 4$ Use order of operations.
$= 31$ Add 27 and 4.

Evaluate the following expressions using the given values for a, b, and c. Show each step!

1.) Evaluate $6 + 3b$ if $b = 7$

27

2.) Evaluate $6a^2$ if $a = 4$

96

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3.) Evaluate $5(6) - c$ if $c = 7$

23

4.) Evaluate $\frac{b^4}{4}$ if $b = 2$

4

Objective: Evaluate numeric expressions using order of operations with no more than 4 operations.

Use the order of operations to evaluate numerical expressions.
1. Do all operations within grouping symbols first.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

Example 1: Evaluate $14 + 3(7 - 2) - 2 \cdot 5$

$14 + 3(7 - 2) - 2 \cdot 5$
$= 14 + 3(5) - 2 \cdot 5$ **Subtract first since 7 – 2 is in parentheses**
$= 14 + 15 - 2 \cdot 5$ **Multiply left to right, 3 • 5 = 15**
$= 14 + 15 - 10$ **Multiply left to right, 2 • 5 = 10**
$= 29 - 10$ **Add left to right, 14 + 15 = 29**
$= 19$ **Subtract 10 from 29**

Example 2: $8 + (1 + 5)^2 \div 4$

$8 + (1 + 5)^2 \div 4$
$= 8 + (6)^2 \div 4$ **Add first since 1 + 5 is in parentheses**
$= 8 + 36 \div 4$ **Find the value of 6^2**
$= 8 + 9$ **Divide 36 by 4**
$= 17$ **Add 8 and 9**

Evaluate each of the following. Show each step!

1.) $(2 + 10)^2 \div 4$

36

2.) $(6 + 5) \cdot (8 - 6)$

22

3.) $72 \div 3 - 5(2.8) + 9$

19

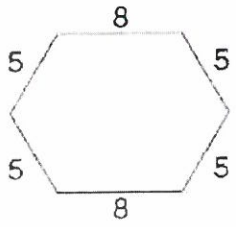
4.) $3 \cdot 14(10 - 8) - 60$

24

5.) The perimeter of a hexagon is found by adding the lengths of all six sides of the hexagon. For the hexagon below write a numerical expression to find the perimeter. Then evaluate the expression.

$4(5) + 2(8)$

36



6.) Without parentheses, the expression $8 + 30 \div 2 + 4$ equals 27. Place parentheses in the expression so that it equals 13; then 23.

$8 + 30 \div (2 + 4) = 13$

$(8 + 30) \div 2 + 4 = 23$

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Objective: Write **equations** and inequalities

Examples:

The table below shows sentences written as an equation.

Sentences	Equation
Sixty less than three times the amount is $59. Three times the amount less 60 is equal to 59. 59 is equal to 60 subtracted from three times a number. A number times three minus 60 equals 59.	$3n - 60 = 59$

Write an equation for each of the following:

1.) 4 less than 3 times a number is 14.

$3x - 4 = 14$

2.) There are 5 people in Johnny's rock band. They made x dollars playing at a dance hall. After dividing the money 5 ways, each person got $67.

$\frac{x}{5} = 67$

3.) The Washington Monument is 555 feet tall. It is 75 feet shorter than the Gateway to the West Arch.

$m - 75 = 555$

4.) The lifespan of a zebra is 15 years. The lifespan of a black bear is 3 years longer than the lifespan of a zebra. Write an addition equation that you could use to find the lifespan of a bear.

$b = 15 + 3$

Objective: Write equations and **inequalities -**

An **inequality** is a mathematical sentence that contains the symbols $<$, $>$, $\leq$, or $\geq$.

Words	Symbols
m is greater than 7.	$m > 7$
r is less than -4.	$r < -4$
t is greater than or equal to 6.	$t \geq 6$
y is less than or equal to 1.	$y \leq 1$

Examples:

1) Two times a number is greater than 10 **$2x > 10$**
2) Three less than a number is less than or equal to 7. **$x - 3 = 7$**
3) The sum of a number and 1 is at least 5. **$x + 1 \geq 5$**
4) Cody has $50 to spend. How many shirts can he buy at $16.50 each? **$16.50x \leq 50$**

Write an inequality for each of the following:

1.) Five times a number is greater than 25.

$5n > 25$

2.) The sum of a number and 6 is at least 15.

$x + 6 \geq 15$

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3.) In Ohio, you can get your license when you turn 16. Write an inequality to show the age of all drivers in Ohio.

$x \geq 16$

4.) Suppose a DVD costs $19 and a CD costs $14. Write an inequality to find how many CDs you can buy along with one DVD if you have $65 to spend.

$14c + 19 \leq 65$

Objective: Determine the unknown in a linear equation with 1 or 2 operations

> Remember, equations must always remain balanced.
> - If you add or subtract the same number from each side of an equation, the two sides remain equal.
> - If you multiply or divide the same number from each side of an equation, the two sides remain equal.

Example 1: Solve $x + 5 = 11$

$x + 5 = 11$	Write the equation
$-5 = -5$	Subtract 5 from both sides
$x = 6$	Simplify

⇨ **Check**

$x + 5 = 11$	Write the equation
$6 + 5 = 11$	Replace x with 6
$11 = 11$ ✓	The sentence is true

Example 2: Solve $-21 = -3y$

$\frac{-21}{-3} = \frac{-3y}{-3}$	Write the equation
$7 = y$	Divide each side by –3 Simplify

⇨ **Check**

$-21 = -3y$	Write the equation
$-21 = -3(7)$	Replace the y with 7
$-21 = -21$?	Multiply – is the sentence true?

Example 3: Solve $3x + 2 = 23$

$3x + 2 = 23$	Write the equation
$-2 = -2$	Subtract 2 from each side
$\frac{3x}{3} = \frac{21}{3}$	Simplify Divide each side by 3
$x = 7$	Simplify

⇨ **Check**

$3x + 2 = 23$	Write the equation
$3(7) + 2 = 23$?	Replace x with 7
$21 + 2 = 23$?	Multiply
$23 = 23$?	Add – is the sentence true?

1.) Solve $x - 9 = -12$

$x = -3$

2.) Solve $48 = -6r$

$r = -8$

5.) It costs $12 to attend a golf clinic with a local pro. Buckets of balls for practice during the clinic cost $3 each. How many buckets can you buy at the clinic if you have $30 to spend?

$3x + 12 = 30$
$-12 \quad -12$
$3x = 18$
$x = 6$

You can buy 6 buckets if you have $30

6.) An online retailer charges $6.99 plus $0.55 per pound to ship electronics purchases. How many pounds is a DVD player for which the shipping charge is $11.94?

$0.55x + 6.99 = 11.94$
$-6.99 \quad -6.99$
$0.55x = 4.95$
$x = 9$

The DVD player is 9 lbs.

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Objective: Solve for the unknown in an inequality with one variable.

An **inequality** is a mathematical sentence that contains the symbols $<$, $>$, $\leq$, or $\geq$.

Words	Symbols
m is greater than 7.	$m > 7$
r is less than -4.	$r < -4$
t is greater than or equal to 6.	$t \geq 6$
y is less than or equal to 1.	$y \leq 1$

Example 1: Solve $v + 3 < 5$

$v + 3 < 5$ Write the inequality

$-3 \quad -3$ Subtract 3 from each side

$v < 2$ Simplify

Check: Try 1, a number less than 2

$v + 3 < 5$ Write the inequality

$1 + 3 < 5$ Replace v with 1

$4 < 5$? Is this sentence true? **yes**

Example 2: Solve $2x + 8 < 24$

$2x + 8 < 24$ Write the inequality

$-8 \quad -8$ Subtract 8 from each side

$\frac{2x}{2} < \frac{16}{2}$ Simplify

$x < 8$ Divide each side by 2

Simplify

Check: Try 7, a number less than 8

$2x + 8 < 24$ Write the inequality

$2(7) + 8 < 24$ Replace x with 7

$14 + 8 < 24$ Multiply 7 by 2

$22 < 24$? Is the sentence true? **yes**

1.) Solve $5y + 1 < 36$

$5y + 1 < 36$

$-1 \quad -1$

$5y < 35$

$y < 7$

2.) Solve $4x - 6 > -10$

$4x - 6 > -10$

$+6 \quad +6$

$4x > -4$

$x > -1$

3.) The speed limit on highways in Florida is 70 miles per hour. Write and solve an inequality to find how long it will take you to travel the 105 miles from Orlando to St. Augustine if you travel at or below the speed limit.

$70h \geq 105$

$h \geq 1.5$

It will take 1.5 hours to travel the 105 miles

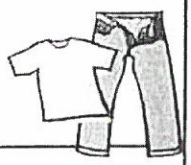
4.) You have $80. Jeans cost $29 and shirts cost $12. Mom told you to buy one pair of jeans and use the rest of the money to buy shirts. Use this information to write and solve an inequality. How many shirts you can buy?

$12x + 29 \leq 80$

$12x \leq 51$

$x \leq 4.25$

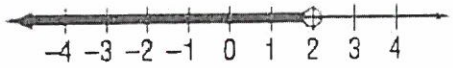
You can buy 4 shirts



Objective: Identify or graph solutions of inequalities on a number line.

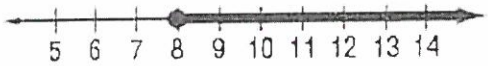
Examples: Graph each inequality on a number line.

$x < 2$



The open circle means that the number is **not** included in the solution.

$y \geq 8$



The closed circle means that the number **is** included in the solution.

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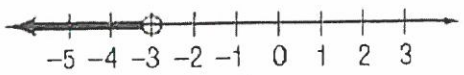
$m < -3$

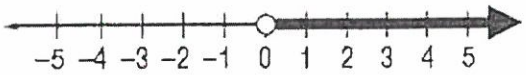


The solution is all numbers less than negative three.
-3 is **not** included in the solution.

1.) Write an inequality for the graph.

$x \geq -3$

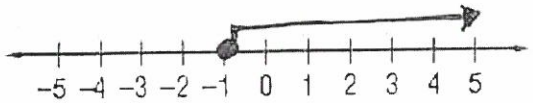
2.) Write an inequality for the graph.



$x > 0$

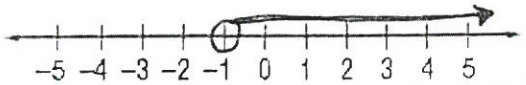
3.) Graph the inequality.

$b \geq -1$



4.) Solve the inequality, then graph it on the number line.

$4x - 6 > -10$
$+6 \quad +6$
$4x > -4$
$x > -1$



Objective: Apply given formulas to a problem-solving situation using formulas having no more than three variables.

Example 1:

The perimeter of a rectangle is twice the length (L) plus twice the width (W). **P = 2L + 2W**

Use the given formula to find the perimeter of the rectangle.

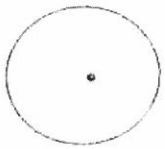
P = 2L + 2W	Write the equation
P = 2(10) + 2(8)	Replace L and W with the length and width
P = 20 + 16	Multiply
P = 36 cm	Simplify and add the correct label

Example 2:

The area *A* of a circle equals the product of pi (π) and the square of its radius (r). $A = \pi r^2$ $(\pi \approx 3.14)$

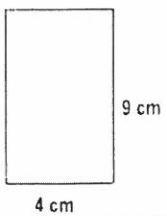
Use the given formula to find the area of the circle.

r = 2 ft



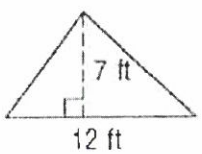
$A = \pi r^2$	Write the equation
$A = 3.14 \cdot (2)^2$	Replace π with 3.14 and r with 2
$A = 3.14 \cdot 4$	Square the 2
$A = 12.56\ ft^2$	Simplify and add the correct label

1.) The formula for finding the area of a rectangle is $A = L \cdot W$. Use this formula to find the area of the rectangle.



$A = (4)(9)$
$A = 36\ cm^2$

2.) The formula for finding the area of a triangle is $A = \frac{1}{2}bh$. Find the area of the triangle below.



$A = \frac{1}{2}(12)(7)$
$A = \frac{1}{2}(84)$
$A = 42\ ft^2$

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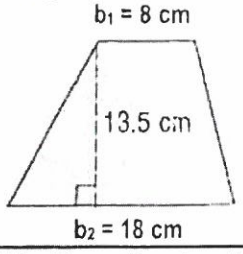
3.) A trapezoid has two bases (b_1 and b_2). The formula for finding the area of a trapezoid is: $A = \frac{1}{2}h(b_1 + b_2)$

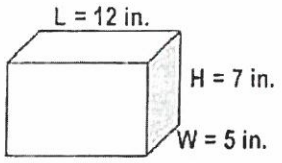


Find the area of the trapezoid.

$A = \frac{1}{2}(13.5)(8+18)$

$A = 175.5\ cm^2$

4.) The formula for finding the volume of a rectangular prism is V = L • W • H. Find the volume of the box.



$V = (12)(7)(5)$

$V = 420\ in^3$

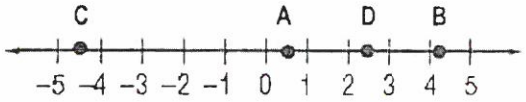
Objective: Graph rational numbers on a number line.

Rational Numbers are numbers that can be written as fractions.

Some examples of rational numbers are ½, 5 ¾, 0.8, and -1.4444...

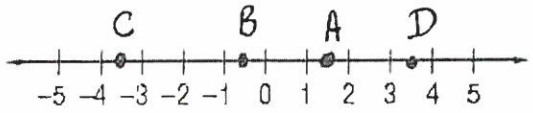
Example: Graph and label the following numbers on the number line:

A: $\frac{1}{2}$ B: $4\frac{1}{4}$ C: - 4.5 D: 2.5



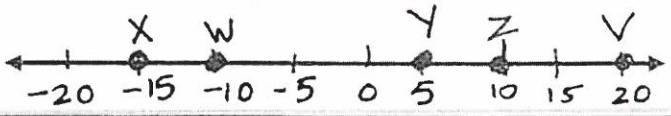
1.) Graph and label the following numbers on the number line.

A: 1.5 B: –0.5 C: –3.5 D: 3.5



2 Graphing numbers on a number line can help you put them in order from smallest to greatest. Draw a number line and graph the numbers in the chart below. Label the points. Which number is the smallest?

V	W	X	Y	Z
20	–10	–15	5	10



Objective: Graph ordered pairs in a coordinate plane.

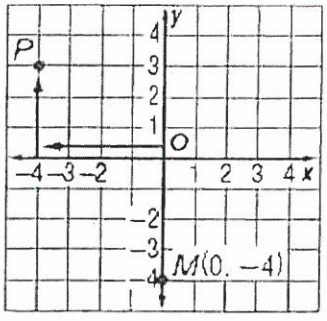
The **coordinate plane** is used to locate points. The horizontal number line is the ***x*-axis**. The vertical number line is the ***y*-axis**. Their intersection is the **origin**.
Points are located using **ordered pairs**. The first number in an ordered pair is the ***x*-coordinate**; the second number is the ***y*-coordinate**.
The coordinate plane is separated into four sections called **quadrants**.

Example 1: Name the ordered pair for point P. Then identify the quadrant in which P lies.

- Start at the origin.
- Move 4 units left along the *x*-axis.
- Move 3 units up on the *y*-axis.

The ordered pair for point P is (- 4, 3).
P is in the upper left quadrant or quadrant II.

Quadrant 2 Quadrant 1



Quadrant 3 Quadrant 4

Example 2: Graph and label the point M (0, - 4).

- Start at the origin.
- Move 0 units along the x-axis.
- Move 4 units down on the y-axis.
- Draw a dot and label it M(0, - 4).

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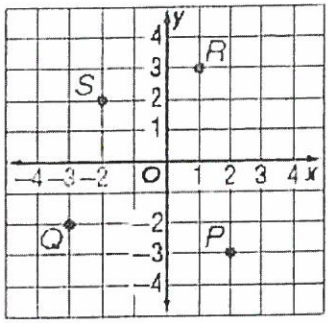
1.) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

	Coordinates	Quadrant
P	(2, -3)	IV
Q	(-3, -2)	III
R	(1, 3)	I
S	(-2, 2)	II



2.) Graph and label each point on the coordinate plane.

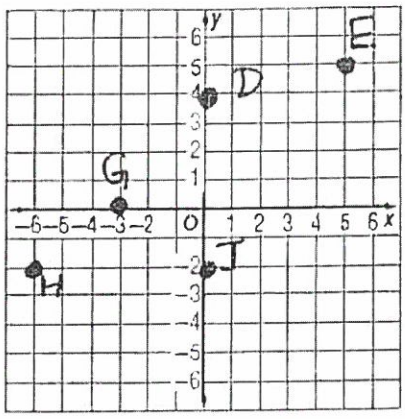
D (0, 4)

E (5, 5)

G (-3, 0)

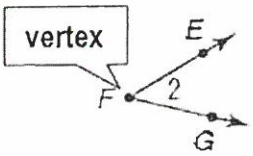
H (-6, -2)

J (0, -2)



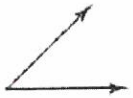
Objective: Identify and describe angles formed by intersecting lines, rays, or line segments - A

An **angle** is formed by two rays with a common vertex.
Angles are also formed by intersecting lines or line segments.
Angles are measured in **degrees**.
Angles are classified according to their measures.

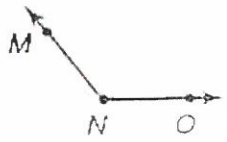


∠2 (also called ∠EFG)

is formed by rays FE and FG

Right Angle	Acute Angle	Obtuse Angle	Straight Angle
			
exactly 90°	less than 90°	between 90° and 180°	exactly 180°

1.) Classify the angle as **acute, obtuse, right**, or **straight.**

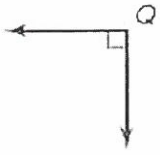


obtuse

2.) Classify the angle as **acute, obtuse, right**, or **straight.**

acute

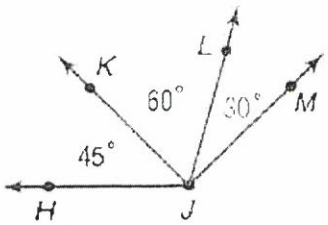
3.) Classify the angle as **acute, obtuse, right**, or **straight.**



right

4.) Name all of the acute angles.

∠ LJM
∠ LJK
∠ KJH



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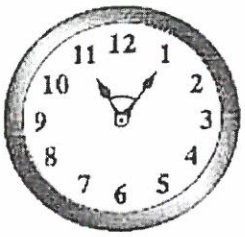
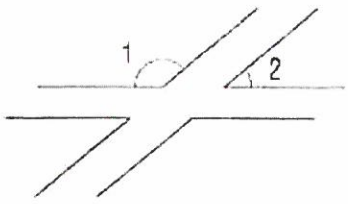
5.) The time shown on the clock is 11:05. Starting at this time, approximately what time will it be when the hands form an obtuse angle?

after 11:10



6.) The runways at a local airport are sketched in the figure. Classify $\angle 1$ and $\angle 2$ as acute, obtuse, right, or straight.

$\angle 1$ is obtuse
$\angle 2$ is acute

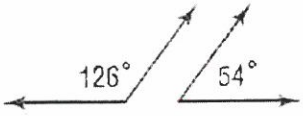


Unit: Knowledge of Geometry **Textbook Section: 10-3**

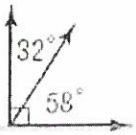
Objective: Identify and describe angles formed by intersecting lines, rays, or line segments - **B**

Examples:

When two lines intersect, they form two pairs of opposite angles called **vertical angles**, which are always congruent.
Congruent angles have the same measure.
$\angle 1 \cong \angle 2$ means that angle 1 is congruent to angle 2.

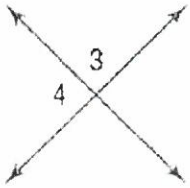


Two angle are **supplementary** if the sum of their measures is 180°.
126° + 54° = 180°



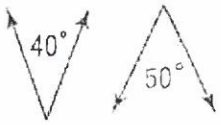
Two angles are **complementary** if the sum of their measures is 90°.
32° + 58° = 90°

1.) Classify the angles as **complementary**, **supplementary**, or **neither**.



$\angle 3 + \angle 4 = 180$
The two angles are supplementary since the sum of their measures is 180°

2.) Classify the angles as **complementary**, **supplementary**, or **neither**.

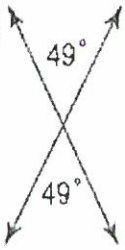


The two angles add to a 90°.
The sum of their measures is 90°.
The two angles are Complementary

3.) Classify the angles as **complementary**, **supplementary**, or **neither**.

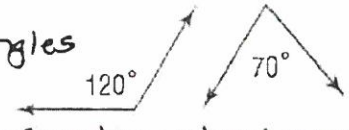
The two angles form vertical angles.

Neither



4.) Classify the angles as **complementary**, **supplementary**, or **neither**.

Neither
$120° + 70° = 190°$
These pair of angles do not form supplementary or complementary angles.



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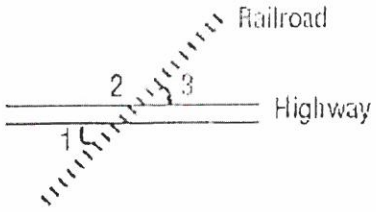
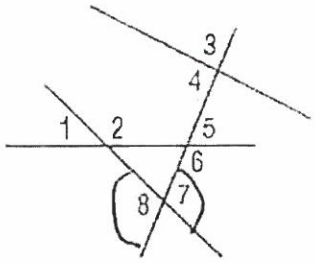
5.) A map shows a railroad crossing a highway, as shown below. Which of the numbered angles are vertical angles?



∠1 and ∠3 are vertical angles

6.) In a game of pick-up-sticks, the last 4 sticks are shown below. Which of the numbered angles are vertical angles?



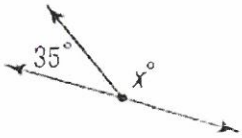
∠7 and ∠8

Objective: Determine the measure of angles formed by intersecting lines, line segments, and rays.

Example 1: Find the value of **x** in the figure.

The two angles are supplementary, so the sum of their measures is 180°

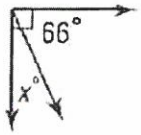
x + 35 = 180	**Write the equation**
- 35 - 35	**Subtract 35 from both sides**
x = 145	**Simplify**
	The angle is 145°



Example 2: Find the value of **x** in the figure.

The two angles are complementary, so the sum of their measures is 90°.

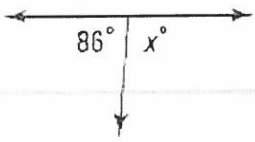
x + 66 = 90	**Write the equation**
- 66 - 66	**Subtract 66 from both sides**
x = 24	**Simplify**
	The angle is 24°



1.) Find the value of **x**.

x + 86 = 180

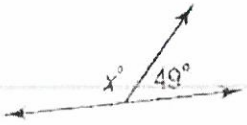
x = 94



2.) Find the value of **x**.

x + 49 = 180°

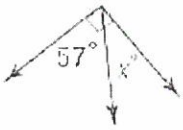
x = 131°



3.) Find the value of **x**.

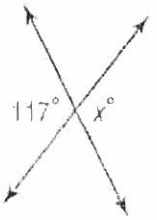
x + 57 = 90°

x = 33°



4.) Find the value of **x**.

x = 117°



Unit: Knowledge of Number Relationships & Computation

Objective: Determine equivalent forms of rational numbers expressed as **fractions, decimals**, percents, and ratios. - **A**

Examples:

To write a decimal as a fraction, divide the numerator of the fraction by the denominator.

Use a power of ten in the denominator to change a decimal to a fraction.

Write $\frac{5}{9}$ **as a decimal.**

$$9\overline{)5.000} = 0.555 = 0.\overline{5}$$

- 45
50
- 45

because 5 repeats forever.

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50
- 45

Write 0.32 as a fraction in simplest form. $0.32 = \frac{32}{100} = \frac{\div 4}{\div 4} = \frac{8}{25}$

1.) Write 0.735353535... using bar notation to represent the repeating decimal.

$0.\overline{735}$

2.) Write $\frac{3}{5}$ as a decimal.

0.6

3.) There were 6 girls and 18 boys in Mrs. Johnson's math class. Write a ratio of the # of girls to the # of boys in fraction form. Then write the fraction as a repeating decimal.

$\frac{6}{18}$ The fraction as a repeating decimal $0.\overline{3}$

4.) Write 0.94 as a fraction in simplest form.

$\frac{94 \div 2}{100 \div 2} = \frac{47}{50}$

Objective: Determine equivalent forms of rational numbers expressed as **fractions,** decimals, **percents, and ratios.-**
Examples:

A RATIO is a comparison of two numbers by division. When a ratio compares a number to 100, it can be written as a PERCENT. To write a ratio or fraction as a percent, find an equivalent fraction with a denominator of 100. You can also use the meaning of percent to change percents to fractions.

Write $\frac{19}{20}$ **as a percent.**

$\frac{19}{20} \frac{\bullet 5}{\bullet 5} = \frac{95}{100} = 95\%$ **Since 100 ÷ 20 = 5, multiply the numerator and denominator by 5.**

Write 92% as a fraction in simplest form.

$\frac{92}{100} = \frac{\div 4}{\div 4} = \frac{23}{25}$

Write 92% as a decimal. **Move decimal two places to the left. Add zeros if needed.** **92.0% = 0.92**

Write 0.4 as a percent. **Move decimal two places to the right. Add zeros if needed.** **0.4 = 40%**

1.) Write $\frac{7}{25}$ as a percent and decimal.

28%

0.28

2.) Write 19% as a decimal and fraction in simplest form.

0.19

$\frac{19}{100}$

3.) Ms. Crest surveyed her class and found that 15 out of 30 students brushed their teeth more than twice a day. Write this ratio as a fraction in simplest form, then write it as a % and a decimal.

$\frac{15}{30} = \frac{1}{2}$, 50%, 0.5

4.) A local retail store was having a sale and offered all their merchandise as a 25% discount. Write this percent as a fraction in simplest form, then write it as a decimal.

$\frac{1}{4}$, 0.25

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Objective: Add, subtract, multiply and divide integers.

Examples:

ADDITION INTEGER RULES:

For integers with the same sign:

- The sum of two positive integers is POSITIVE.
- The sum of two negative integers is NEGATIVE.

For integers with different signs, subtract their absolute value. The sum is:

- Positive IF the positive integer has the greater absolute value.
- Negative IF the negative integers has the greater absolute value.

Examples:

- 6 + (- 3) = add keep the sign = - 9

- 34 + (- 21) = add keep the sign = - 55

8 + (- 7) = subtract keep the sign of the higher = 1

- 5 + 4 = subtract keep the sign of the higher = - 1

SUBTRACTION INTEGER RULES:

- Keep the first number the same
- Switch the subtraction sign to ADDITION
- Change the second number to it's opposite. Opposite: - 6 to 6
- Follow Addition rules above.

Examples:

6 – 9 = 6 + (- 9) = -3

- 10 – (- 12) = - 10 + 12 = 2

- 3 – 7 = - 3 + (- 7) = - 10

1 – (- 2) = 1 + 2 = 3

1.) Add: 2 + (- 7)

-5

2.) Subtract: - 13 - 8

-21

3.) Evaluate a – b if a = - 2 and b = - 7

$-2-(-7)$

$=5$

4.) In Mongolia the temperature can dip down to – 45° C in January. The temperature in July may reach 40° C. What is the temperature range in Mongolia?

$85^\circ C$

Objective: Add, subtract, multiply and divide integers. -

MULTIPLYING & DIVIDING INTEGER RULES:

- Two integers with DIFFERENT signs the answer is NEGATIVE.
- Two integers with SAME signs the answer is POSITIVE.

Examples:

5 (- 2) = 5 times – 2, the signs are different so the answer will be negative = - 10

(- 6) • (- 9) = the signs are the same so the answer will be positive = 54

30 ÷ (- 5) = the signs are different so the answer will be negative = - 6

- 100 ÷ (- 5) = the signs are the same so the answer will be positive = 20

1.) Multiply: - 14 (- 7)

98

2.) Divide: 350 ÷ (- 25)

-14

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3.) Evaluate if a = - 3 and c = 5

$-3ac$

45

4.) Evaluate if d = - 24, e = - 4, and f = 8

$\frac{de}{f}$

12

5.) A computer stock decreased 2 points each hour for 6 hours. Determine the total change in the stock value over the 6 hours.

$-2(6) = -12$ points

6.) A submarine descends at a rate of 60 feet each minute. How long will it take it to descend to a depth of 660 feet below the surface?

$\frac{660}{60} = 11$ minutes

Objective: Add, subtract, and multiply positive fractions and mixed numbers.

Examples:

- **To add unlike fractions (fractions with different denominators), rename the fractions so there is a common denominator.**

Add: $\frac{1}{6}+\frac{2}{5}=$ $\quad \frac{1}{6}=\frac{1x5}{6x5}=\frac{5}{30}$ $\quad \frac{2}{5}=\frac{2x6}{5x6}=\frac{12}{30}$ $\quad \frac{5}{30}+\frac{12}{30}=\frac{17}{30}$

Add: $12\frac{1}{2}+8\frac{2}{3}=$ $\quad 12\frac{1}{2}=12\frac{1x3}{2x3}=12\frac{3}{6}$ $\quad 8\frac{2}{3}=8\frac{2x2}{3x2}=8\frac{4}{6}$

$12\frac{3}{6}+8\frac{4}{6}=20\frac{7}{6}$ $\quad \frac{7}{6}$ is improper so we must change it to proper. 7 divided by 6 = $1\frac{1}{6}$

$20+1\frac{1}{6}=21\frac{1}{6}$

1.) Add: $\frac{1}{3}+\frac{1}{9}$ $= \frac{4}{9}$

2.) Add: $7\frac{4}{9}+10\frac{2}{9}$ $\quad \frac{159}{9} = 17\frac{6}{9}$

$\frac{67}{9}+\frac{92}{9}=\frac{159}{9}$ $\quad = 17\frac{2}{3}$

3.) A quiche recipe calls for $2\frac{3}{4}$ cups of grated cheese. A recipe for quesadillas requires $1\frac{1}{3}$ cups of grated cheese. What is the total amount of grated cheese needed for both recipes?

$2\frac{3}{4}+1\frac{1}{3}=\frac{11}{4}+\frac{4}{3}$

$=\frac{49}{12}$

$= 4\frac{1}{2}$ cups

4.) You want to make a scarf and matching hat. The pattern calls for $1\frac{7}{8}$ yards of fabric for the scarf and $2\frac{1}{2}$ yards of fabric for the hat. How much fabric do you need in all?

$1\frac{7}{8}+2\frac{1}{2}=\frac{35}{8}$

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Objective: Add, **subtract**, and multiply positive fractions and mixed numbers. - **B**

Examples:

- **To subtract unlike fractions (fractions with different denominators), rename the fractions so there is a common denominator.**

Subtract: $\frac{7}{8}-\frac{1}{2}=$ $\frac{7}{8}=\frac{7x1}{8x1}=\frac{7}{8}$ $\frac{1}{2}=\frac{1x4}{2x4}=\frac{4}{8}$ $\frac{7}{8}-\frac{4}{8}=\frac{3}{8}$

Subtract: $5\frac{3}{4}-2\frac{1}{3}=$ $5\frac{3}{4}=5\frac{3x3}{4x3}=5\frac{9}{12}$ $2\frac{1}{3}=2\frac{1x4}{3x4}=2\frac{4}{12}$

$5\frac{9}{12}-2\frac{4}{12}=3\frac{5}{12}$

**Note: If you have to borrow from the whole number change to improper fractions, find a common denominator, subtract, and then change back to proper fractions.

1.) Subtract: $\frac{9}{10}-\frac{1}{10}$

$\frac{8}{10}=\frac{4}{5}$

2.) Subtract: $5\frac{3}{8}-4\frac{11}{12}$

$\frac{11}{24}$

Objective: Add, subtract, and **multiply** positive fractions and mixed numbers.

Examples:

- **To multiply fractions – Multiply the numerators & denominators.**
- **Be sure to change mixed numbers to improper fractions before multiplying.**

$\frac{1}{3}x\frac{5}{8}=\frac{5}{24}$

$1\frac{1}{3}x3\frac{2}{5}=\frac{4}{3}x\frac{17}{5}=\frac{68}{15}=4\frac{8}{15}$

**Remember: Changing mixed numbers to improper fractions. $2\frac{3}{4}=4x2+3=\frac{11}{4}$

$1\frac{1}{3}x21=\frac{4}{3}x\frac{21}{1}=\frac{4x21}{3x1}=\frac{84}{3}=28$

1.) $\frac{2}{3}x\frac{4}{5}=\frac{8}{15}$

2.) $\frac{7}{3}\times4\frac{1}{2}=\frac{7}{3}\times\frac{9}{2}$

$=\frac{63}{6}$

$=21=10\frac{1}{2}$

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3.) $2\frac{1}{2} \times 2\frac{1}{3} = \frac{35}{6}$

$\frac{35}{6} = 5\frac{5}{6}$

4.) $3 \times 5\frac{2}{9} = \frac{141}{9}$

$\frac{141}{9} = \frac{47}{3}$

$= 15\frac{2}{3}$

Objective: Identify and use the properties of addition and multiplication to simplify expressions using the commutative property.

Examples:

PROPERTY	ARITHMETIC	ALGEBRA
Distributive Property	5(3+4) = 5(3) + 5(4)	a (b + c) = a (b) + a (c)
Commutative Property of Addition	5 + 3 = 3 + 5	a + b = b + a
Commutative Property of Multiplication	5 x 3 = 3 x 5	a x b = b x a
Associative Property of Addition	(2 + 3) + 4 = 2 + (3 + 4)	(a + b) + c = a + (b + c)
Associative Property of Multiplication	(4 x 5) x 6 = 4 x (5 x 6)	(a x b) x c = a x (b x c)
Identity Property of Addition	5 + 0 = 5	a + 0 = a
Identity Property of Multiplication	5 x 1 = 5	a x 1 = a

1.) Use the distributive property to write the expression s an equivalent expression. Then evaluate the expression.

$3(5 + 1) = 3(5) + 3(1)$

$= 15 + 3$

$= 18$

2.) Name the property shown:

$6 + (1 + 4) = (6 + 1) + 4$

Associative Property of Addition

3.) Name the property shown:

$y \times 3 = 3 \times y$

Commutative Property of Multiplication

4.) Name the property shown:

$b + 0 = b$

Identity Property of Addition.

5.) Mr. Brooks was working on addition using dominoes with a group of 1st graders. When picking the domino with 3 dots on one end and 5 dots on the other, some students read. "3 plus 5 equals 8" while other read it as "5 plus 3 equals 8." What property were these students using? Explain.

$3 + 5 = 8$, $5 + 3 = 8$

Commutative Property of addition

Changing the order of the numbers we are adding, does not change the sum.

6.) Students in Mr. River's class were practicing their multiplication skills by rolling three 6-sided number cubes. Bailey rolled a 2, a 3, and a 5 on her roll. He multiplied the three numbers as follows using the order of operations: (2 x 3) x 5 = 30. Write another way Bailey could have performed the multiplication without changing the order of the numbers. State the property you used.

$2 \times (3 \times 5) = 30$

Associative Property of Multiplication