

# MATH 7

Priority Standard #1: Operations with Rational Numbers Apply and extend understanding of operations with rational numbers	
<b>0</b>	<i>Does not meet level one even with help</i>
<b>1</b>	<ul style="list-style-type: none"> <li>Define additive inverse in terms of opposites and zero.</li> <li>Engage in the process of combining a number and its additive inverse.</li> <li>Plot quantities and their additive inverses on a number line. Notice that the number halfway between is always zero.</li> <li>Add and subtract rational numbers without understanding why the process works.</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>Identify situations in context where two quantities combine to make zero.</li> <li>Know that when a number is added to its inverse the result is zero.</li> <li>Using a number line, show that <math>p + q</math> is a number <math>q</math> units from <math>p</math> for rational values of <math>p</math> and <math>q</math>.</li> <li>Write additive inverses for given rational numbers.</li> <li>Apply properties of operations to add and subtract integer numbers.</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>Describe situations in context where two quantities combine to make zero.</li> <li>Model and explain why a number and its opposite have a sum of zero.</li> <li>Use absolute value to understand that <math>p + q</math> is a number <math> q </math> units from <math>p</math>, either in a positive or negative direction, for rational values of <math>p</math> and <math>q</math>.</li> <li>Understand and demonstrate that subtraction of rational numbers is the same as adding the additive inverse.</li> <li>Apply properties of operations to add and subtract rational numbers.</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>Create mathematical and real-world, relevant situations in context where two quantities combine to make zero. Reason about the significance of such situations.</li> <li>Reason abstractly that <math>p + q</math> is a number <math> q </math> units from <math>p</math>, either in a positive or negative direction and explain reasoning.</li> <li>Justify why subtracting any rational number will give the same result as adding its additive inverse.</li> <li>Apply and justify properties of operations to add and subtract rational numbers in multi-step mathematical problems and problems in context.</li> </ul>



<b>Priority Standard #2: Proportional Reasoning</b>	
<b>0</b>	<i>Does not meet level one even with help</i>
<b>1</b>	<ul style="list-style-type: none"> <li>• Use a procedure to determine if a relationship is proportional without explaining why.</li> <li>• Identify a unit rate from one or more of the following, a graph, a table, an equation, or a context.</li> <li>• Identify variables of interest in a proportional relationship by examining contexts, tables, graphs, or equations.</li> <li>• Solve one-step mathematical ratio problems.</li> <li>• Know that a proportional relationship creates a linear graph going through the point (0, 0).</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>• Identify proportional relationships from contexts, tables, graphs, and equations.</li> <li>• Identify unit rate from a graph, table, equation, or context.</li> <li>• Identify the variables in a proportional relationship by examining context, table, graph and equation.</li> <li>• Identify algebraic equations of proportional relationships between two variables.</li> <li>• Solve mathematical ratio problems.</li> <li>• Identify the points (0,0) and (1, <math>r</math>) as key points on the graph of a proportional relationship.</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>• Determine whether a relationship between two variables is proportional by examining context, table, graph, and equation and explain what it means for a relationship to be proportional.</li> <li>• Compute unit rate (constant of proportionality) from a graph, table, equation, and context.</li> <li>• Interpret the variables in a proportional relationship by examining context, table, graph and equation.</li> <li>• Represent and explain what each part of the equation means in a proportional relationship between two variables using an algebraic equation (<math>y = kx</math>).</li> <li>• Solve multistep real-world ratio problems including percent increase and decrease, and scaling. Interpret solutions and justify solution pathways in terms of the problem situation.</li> <li>• Interpret the points (<math>x, y</math>), (0,0), and (1, <math>r</math>) on the graph in terms of a proportional relationship. Notice that any point (<math>x, y</math>) is proportional to any other point on the graph.</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>• Create real-world, multi-step, proportional relationships using multiple representations. Explain how key features are shown in each representation.</li> <li>• Justify abstractly why the point (<math>x, y</math>) will always be proportional to every other point on the graph of a proportional relationship.</li> </ul>



<b>Priority Standard #3: Simplify Expressions and Solve Equations</b>	
<b>0</b>	<i>Does not meet level one even with help</i>
<b>1</b>	<ul style="list-style-type: none"> <li>Identify equations, expressions, like terms, variables, coefficients, constants, and the distributive property.</li> <li>Define what it means for two expressions to be equivalent.</li> <li>Substitute given numbers for variables and evaluate the resulting numerical expression.</li> <li>Solve mathematical problems involving variables using equations of the form <math>kx=y</math> and <math>x + b = y</math>.</li> <li>Solve mathematical problems involving variables of the form <math>kx &lt; y</math> and <math>x + b &lt; y</math></li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>Identify whether two expressions are equivalent. Simplify linear expressions using the distributive property and combining like terms.</li> <li>Solve one or two-step mathematical problems using numerical expressions.</li> <li>Solve mathematical problems involving variables using equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>.</li> <li>Solve mathematical problems involving variables of the form <math>px + q &lt; r</math> and <math>p(x + q) &lt; r</math></li> <li>Identify algebraic and arithmetic solution pathways from contexts.</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>Apply properties of operations to add, subtract, simplify, factor, and expand linear expressions with emphasis on writing equivalent expressions. Explain what it means to be equivalent.</li> <li>Solve multi-step real-world and mathematical problems using numerical expressions and relate the parts of the expression to the context of the problem.</li> <li>Solve real-world problems involving variables using equations of the form <math>px + q = r</math> and relate the solution and pathway to the context of the problem</li> <li>Solve real-world problems involving variables using inequalities of the form <math>px + q &lt; r</math> and <math>p(x + q) &lt; r</math></li> <li>Compare algebraic solution pathways to arithmetic solution pathways of contextual problems.</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>Write and simplify an expression that matches a given contextual problem with multiple variables, steps, and operations.</li> <li>Justify steps taken to simplify a given expression.</li> <li>Write, simplify, and solve an equation that matches a real-world problem with multiple steps and operations.</li> <li>Write, simplify, and solve an inequality that matches a real-world problem with multiple steps and operations.</li> </ul>



<b>Priority Standard #4: Represent and Analyze Relationships</b>	
<b>0</b>	<i>Does not meet level one even with help</i>
<b>1</b>	<ul style="list-style-type: none"> <li>Find mean, median, mode, range, and mean absolute deviation given a data set.</li> <li>Define sample and population. Identify whether or not a sample is random.</li> <li>Understand that a sample can be analyzed using a measure of center or variability. Define simple probability as a number between 0 and 1 that measures the chance of an event happening.</li> <li>Calculate theoretical probability.</li> <li>Given experimental data, engage in calculating the experimental probability of an event.</li> <li>Know what sample space means and list the sample space for an experiment.</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>Use a random sample to identify unknown characteristics of interest (mean, median, mode, range, mean absolute deviation).</li> <li>Understand the difference between variable and measure of center and variability</li> <li>Use measures of center and variability for two samples to draw informal comparisons between them.</li> <li>Understand that simple probability is a number between 0 and 1, with 0 being impossible and 1 being certain.</li> <li>Calculate theoretical probability and understand whether the probability indicates that an event is likely or unlikely.</li> <li>Collect data and use it to calculate the experimental probability of an event.</li> <li>Find probabilities of compound events using lists, tables, tree diagrams and simulation.</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>Make informal comparative inferences from random samples about two populations using measures of center and variability.</li> <li>Use a random sample to calculate and explain unknown characteristics of interest (mean, median, mode, range, mean absolute deviation).</li> <li>Use measures of center and variability for two samples to draw formal (with explanations) and informal comparisons between them.</li> <li>Express simple probability as a fraction, decimal and/or percent and explain what the probability indicates about the likelihood of an event.</li> <li>Collect data and use it to calculate and explain experimental probabilities of multiple events.</li> <li>Explain probabilities of compound events using lists, tables, tree diagrams and simulation.</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>Use multiple random samples to draw comparisons between measures of center and variability. Evaluate the validity of the comparisons using appropriate references to statistical measures.</li> <li>Create data sets from given measures of center and variability and other constraints.</li> <li>Justify conclusions about the likelihood of an event based on probability calculations, sample size, and method of collecting data. Calculate theoretical probability of independent compound events.</li> <li>Collect data to calculate experimental probabilities of real-world and relevant cross-curricular events. Engage in deep reflection about the probabilities.</li> <li>Analyze probabilities of compound events and create and connect various models for given probabilities.</li> </ul>

