

**Juneau School District  
Math Core Standards  
8th Grade Pre-Algebra**

Standard	Number Sense:
<b>8-CS1</b>	<b>Students know the properties of, and compute with, rational numbers expressed in a variety of forms</b>
	<p>* Add, subtract, multiply, and divide rational numbers (integers, fractions and terminating decimals) and take positive rational numbers to whole-number powers, using order of operation.</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>1. <math>\frac{1}{4} \times 0.33</math></p> <p>2. <math>2\frac{1}{7} - \frac{3}{7}</math> <math>\frac{2}{3} - \left(\frac{2}{3}\right)^2</math></p> </div> <div style="width: 45%;"> <p>3. Evaluate:</p> <p><math>\frac{12}{7} \times \frac{6}{5} \times \frac{7}{8} =</math></p> <p><math>3\frac{1}{5} + (-5) =</math></p> <p><math>(0.2)^5 \times \left(\frac{3}{2}\right)^4 =</math></p> <p><math>\frac{1}{2} (58.3 - 11.29) =</math></p> </div> </div>
	<p>* Differentiate between rational and irrational numbers.</p> <p style="text-align: center; color: #00a651;">Which is an irrational number?</p> <p style="text-align: center;">(a) <math>\sqrt{5}</math>      (b) <math>\sqrt{9}</math>      (c) <math>-1</math>      (d) <math>-\frac{2}{3}</math></p>
	<p>* Know that every rational number is either a terminating or a repeating decimal and be able to convert terminating decimals into reduced fractions.</p> <p style="text-align: center; color: #00a651;">Change to fractions:</p> <p style="text-align: center;">0.25      <math>0.\overline{27}</math></p> <p style="text-align: center; color: #00a651;">Find the period of the repeating part of <math>\frac{41}{13}</math>.</p>

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Standard	Number Sense:
<b>8-CS1</b>	<p>* Solve problems that involve discounts, markups, commissions, and profits, and compute simple and compound interest.</p> <p>Heather deposits \$800 in an account that earns a flat rate of 10% (simple) interest. Jim deposits \$800 in an account that earns 10% interest compounded yearly. Who will have more money at the end of one year? Two years? Three years? Who will have more money over the long run? Explain why.</p> <p>Jason bought a jacket on sale for 50% off the original price and another 25% off the discounted price. If the jacket originally cost \$88, what was the final sale price that Jason paid for the jacket?</p>
<b>8-CS2</b>	<p><b>Students use exponents, powers, and roots, and use exponents in working with fractions:</b></p> <p>* Add and subtract fractions by using factoring to find common denominators.</p> <p>Make use of prime factors to compute:</p> <ol style="list-style-type: none"><li><math>\frac{2}{28} + \frac{1}{49}</math></li><li><math>\frac{-5}{63} + \left(\frac{-7}{99}\right)</math></li></ol>

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Standard	Number Sense:
<b>8-CS2</b>	<p>* Multiply, divide, and simplify rational numbers by using exponent rules.</p> <p style="color: #008080;">Simplify:</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>1. <math>\frac{\left(-\frac{2}{3}\right)^{-3}}{2\frac{1}{4}} + \left(\frac{3}{-2}\right)^2 \left(4 - 3\frac{1}{3}\right)</math></p> <p>2. <math>\frac{\left(\frac{2}{5} \times 2\frac{1}{3}\right)^4}{\left(\frac{2}{5}\right)\left(-2\frac{1}{3}\right)^3}</math></p> </div> <div style="text-align: center;"> <p>3. <math>\frac{3^{-2}}{2^{-3}}</math></p> <p>4. <math>\frac{2x^3}{2^3x^{-1}}</math></p> <p>5. <math>\frac{4^2 \cdot 3^5 \cdot 2^4}{4^3 \cdot 3^5 \cdot 2^2}</math></p> </div> </div>
	<p>* Understand the meaning of the absolute value of a number: interpret the absolute value as the distance of the number from zero on a number line; determine the absolute value of real numbers.</p> <p style="color: #008080;">Is it always true that for any numbers <math>a</math> and <math>b</math>, <math>a -  b  \leq a + b</math>?</p> <p style="text-align: center;"><math> 9 - 5  -  6 - 8  = ?</math></p>
Standards	Algebra and Functions:
<b>8-CS3</b>	<p><b>Students express quantitative relationships by using algebraic terminology, expressions, equations, and graphs:</b></p> <p>* Simplify numerical and algebraic expressions by applying properties of rational numbers (eg., Identify, inverse, distributive, associative, commutative) and by applying order of operations and justify the process used.</p>

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Standards	Algebra and Functions:
<b>8-CS3</b>	<p style="text-align: center;">Name the property illustrated by each of the following:</p> <ol style="list-style-type: none"> <li>1. <math>y + -y = 0</math></li> <li>2. <math>x(y + z) = xy + xz</math></li> <li>3. <math>x(y + z) = (y + z)x</math></li> <li>4. <math>x + y = y + x</math></li> <li>5. <math>y \left( \frac{1}{y} \right) = 1</math></li> </ol> <p style="text-align: center;">* Simplify algebraic expressions by applying properties of rational numbers.</p>
<b>8-CS4</b>	<p style="background-color: #cccccc;"><b>Students graph and interpret linear and some nonlinear functions:</b></p> <p>* Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-values) is always the same and know that the ratio ("rise over run") is called the slope of the graph.</p> <p style="text-align: center;">A function of <math>x</math> has value 7 when <math>x = 1</math>; it has value 15.5 when <math>x = 3.5</math>; and it has value 20 when <math>x = 5</math>. Is this a linear function?</p> <p>* Plot the values of quantities whose ratios are always the same (e.g., cost to number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the ratio of the quantities.</p>
<b>8-CS5</b>	<p style="background-color: #cccccc;"><b>Students solve simple linear equations and inequalities over the rational numbers:</b></p> <p>* Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the result.</p>

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Standards	Algebra and Functions:
<b>8-CS5</b>	<p>Solve for <math>x</math> if <math>3x - 12 = 3,821</math>. If <math>x</math> stands for the number of books in a bookstore, can it satisfy this equation?</p> <p>What is the solution set to the inequality <math>6z + 5 &gt; 35</math>?</p> <p><math>\{z:z &lt; 5\}</math>      <math>\{z:z &lt; 24\}</math>      <math>\{z:z &gt; 5\}</math>      <math>\{z:z &gt; 24\}</math></p>
	<p>* Solve multi-step problems involving rate, average speed, distance, and time of a direction variation.</p> <p>A train can travel at either of two speeds between two towns that are 72 miles apart. The higher speed is 25% faster than the lower speed and reduces the travel time by 30 minutes. What are the two speeds in miles per hour?</p> <p>A duck flew at 18 miles per hour for 3 hours, then at 15 miles per hour for 2 hours. How far did the duck fly in all?</p> <p>Juanita earns \$36 for 3 hours of work. At that rate how long would she have to work to earn \$720?</p>
Standards	Measurements and Geometry:
<b>8-CS6</b>	<b>Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:</b>
	<p>*Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.</p>

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Standards	Measurements and Geometry:										
8-CS	<p>The chart shown below describes the speed of four printers.</p> <table border="1"><thead><tr><th>Printer</th><th>Description</th></tr></thead><tbody><tr><td>Roboprint</td><td>Prints 2 pages per second</td></tr><tr><td>Voltronn</td><td>Prints 1 page every 2 seconds</td></tr><tr><td>Vantek Plus</td><td>Prints 160 pages in 2 minutes</td></tr><tr><td>DLS Pro</td><td>Prints 100 pages per minute</td></tr></tbody></table> <p>Which printer is the fastest?</p>	Printer	Description	Roboprint	Prints 2 pages per second	Voltronn	Prints 1 page every 2 seconds	Vantek Plus	Prints 160 pages in 2 minutes	DLS Pro	Prints 100 pages per minute
Printer	Description										
Roboprint	Prints 2 pages per second										
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8-CS7	<p><b>Students know the Pythagorean theorem:</b></p> <p>*Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.</p> <p>What is the side length of an isosceles right triangle with hypotenuse <math>\sqrt{72}</math> ?</p> <p>A right triangle has sides of lengths <math>a</math>, <math>b</math>, and <math>c</math>; <math>c</math> is the length of the hypotenuse. How would the areas of the three equilateral triangles with sides of lengths <math>a</math>, <math>b</math>, <math>c</math>, respectively, be related to each other?</p>										

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Standards	Measurements and Geometry:
<b>8-CS8</b>	<b>Deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:</b>
	<p>*Demonstrate an understanding of conditions that indicate two geometrical figures are congruent, and what congruence means about the relationships between the sides and angles of the two figures.</p>
	<p>*Identify elements of three-dimensional geometric objects (e.g., diagonals of rectangular solids) and describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect).</p> <p style="text-align: center; color: #00b050;">True or false? If true, give an example. If false, explain why.</p> <p style="text-align: center; color: #00b050;">Two planes in three-dimensional space can:</p> <ol style="list-style-type: none"> <li>1. Intersect in a line.</li> <li>2. Intersect in a single point.</li> <li>3. Have no intersection at all.</li> </ol>
Standards	Statistics, Data Analysis, and Probability:
<b>8-CS9</b>	<b>Students collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program:</b>
	<p>*Understand the meaning of box and whisker plots, and be able to compute, the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set.</p>

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