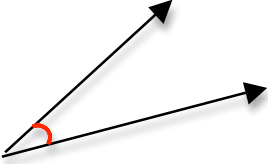
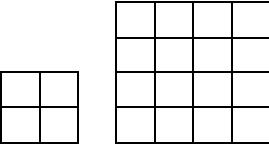

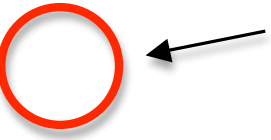
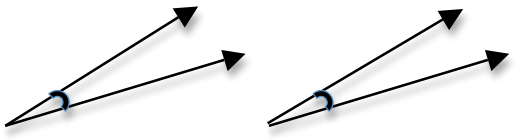




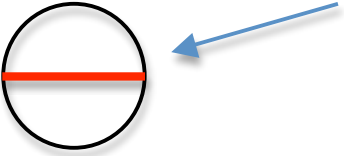
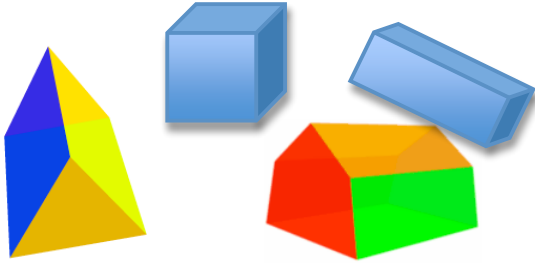
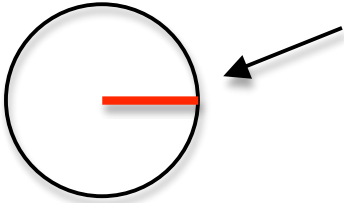




Term and Definition	Application
<p>angle: the amount of turn between two rays that meet at a common endpoint</p> 	<p>Triangles have three angles, the sum of whose measurements equals 180 degrees. Right triangles have one 90-degree angle formed by two perpendicular rays, so the sum of the other two angles also must equal 90 degrees. For example, if one of these angles measures 34 degrees, the other must measure 56 degrees.</p>
<p>area: the size of a two-dimensional surface or region, usually measured in square units</p>  <p>The smaller of these squares has an area of 4 square units, and the larger has an area of 16 square units.</p>	<p>The formula for the area of a rectangle is length times width or base times height.</p> <p>Doubling the length and width of a rectangle—as in the illustration to the left—quadruples its area. Tripling the length and width increases its area by nine times.</p>
<p>circle: a two-dimensional closed figure made up of points that are the same distance from a given point, the center</p> 	<p>The formula for the area of a circle is pi (π) times the radius squared (area = πr^2). Doubling the radius of a circle quadruples its area, and tripling the radius increases its area by nine times. See <i>circumference</i>, <i>radius</i>, and <i>pi</i>.</p>
<p>circumference (of a circle): the distance around a circle</p> 	<p>Measuring the circumferences and diameters of different size circles reveals a consistent mathematical relationship. The circumference of any circle is always a little over three times as great as its diameter. The value of this ratio is known as pi. See <i>circle</i> and <i>pi</i>.</p>
<p>congruent (angles): two angles that have the same measure</p> 	<p>Outdoors on a sunny day, you can use shadows and a known height to determine an unknown height. When both objects casting shadows (for example, a meter stick and a tree) are perpendicular to the ground, the angles formed by the objects and their shadows will be congruent, in this case, two 90° right angles.</p>


<p>congruent (figures): two geometric figures that are the same size and shape</p> 	<p>All 6 faces of a cube are congruent figures (see <i>cube</i>).</p>
<p>congruent (line segments): two line segments that are the same length</p> 	<p>All 12 edges of a cube are congruent line segments (see <i>cube</i>).</p>
<p>constant: a quantity that does not change its value</p>	<p>In mathematical formulas, constants are represented by the letter k.</p>
<p>constant (of a proportion or variation): the value of the ratio between two directly proportional quantities (see direct proportion) or the product of two inversely proportional quantities (see indirect proportion)</p>	<p>You can calculate value of the ratio of an object's height to its shadow's length by dividing the two measurements. This value is a constant (k) that will also describe the value of the ratios of the heights of other objects to the their shadows' lengths at the same time on the same day. Knowing this mathematical fact can help you determine the heights of objects that are too tall for hands-on measurement.</p>
<p>cube: a rectangular prism with six square faces</p> 	<p>Because all the edges of a cube are equal in length, the formula for finding the surface area of a cube may be simplified. The surface area of a cube equals 6 times the length of its edges squared.</p>
<p>cubic unit: the amount contained in a cube with edges that are each one unit in length</p>	<p>If you compare a cube with 1-cm edges (a cubic unit) with a cube with 2-cm edges, you will see that the larger cube has a volume of four cubic units—that is, it would hold four of the smaller cubes.</p>
<p>cylinder (right circular cylinder): a three-dimensional figure with two congruent, parallel circular bases</p> 	<p>The volume of a cylinder may be found by multiplying the area of its circular base by its height. The World's Largest Stainless Steel Skillet, used to cook chicken at the World Chicken Festival, is a cylinder with a radius of $5\frac{1}{4}$ feet and a height of 8 inches. That information—and the value of pi—is all you need to calculate the big skillet's volume. (See <i>circle</i> and <i>pi</i>.)</p>

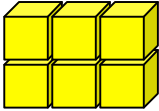
<p>decimal: a number with a decimal point that uses a base-ten system and multiples and powers of tenths to represent rational numbers</p>	<p>If Annie is 0.94 of her sister Amanda's height, and Amanda is 5 feet 7 inches or 67 inches tall, Annie is $0.94 \cdot 67$ inches or 62.98 inches. So Annie is approximately 5 feet 3 inches.</p>
<p>diameter (of a circle): a line segment that connects two points on a circle and passes through the center</p> 	<p>A circle's diameter is a little more than a third the length of its circumference. A circle's radius is equal to one-half its diameter. See <i>circumference</i>.</p>
<p>direct proportion (direct variation): the relationship between two quantities or variables whose ratio remains constant. This may be written as $x \div y = k$ where x and y are two related variables and k is a constant.</p>	<p>If a miniature of a 20-inch object is made on a scale of 1:20 or one-twentieth the size of the real object, it will be 1 inch high. The value of the ratio of the miniature and the original is 1 divided by 20 or 0.05. This figure is k, the constant. Using the 1:20 scale, the value of the ratio of a miniature of a 40-inch object to the real object will be 2 to 40, and the value of the ratio will remain constant at 0.05.</p>
<p>equivalent: equal in value</p>	
<p>equivalent fractions (equal fractions, equal ratios, equivalent ratios): two fractions that name the same number; fractions with the same quotient or ratio that may have different numerators and denominators</p>	<p>2:1 and 8:4 are equivalent ratios. Although they have different numbers, the value of both ratios ($2 \div 1$ and $8 \div 4$) is 2. Likewise, these two fractions are equivalent:</p> $\frac{5}{15} = \frac{30}{90}$ <p>Both fractions can be reduced to $\frac{1}{3}$, so they name the same number.</p>
<p>fraction: a number that can be expressed as the quotient of</p> $\frac{a}{b}$ <p>where both a and b are whole numbers and $b \neq 0$.</p>	<p>Four hundred or $\frac{2}{3}$ of the students at the middle school have cell phones. That means that the total number of students at the middle school is 600, because $400 = \frac{2}{3} \cdot 600$.</p>
<p>frequency: the number of times something occurs within a specific interval</p>	<p>In the case of sound, frequency refers to the number of full cycles of sound waves that occur within a second.</p>

<p>Hertz (Hz): unit of frequency that represents the number of complete cycles per second. In music, for example, each note has a frequency that can be measured in Hertz.</p>	<p>Higher notes have greater frequencies, so more complete cycles of sound waves are produced per second as you move up a musical scale. The Musical Scale interactive includes a visual representation of this phenomenon.</p>
<p>inverse proportion (inverse variation): a relationship between two quantities or variables where one gets smaller as the other gets larger and where $x \cdot y = k$ where x and y are two related variables and k is a constant</p>	<p>Let's say you want to build a tree house with a floor area of 120 square feet. A tree house 4 feet by 30 feet would equal 120 square feet, but it wouldn't work very well. If you doubled the width to 8 feet, the length would have to be reduced by half to 15 feet for the area of the tree house to still equal 120 square feet. If you tripled the width to 12 feet, the length would have to be one-third less or 10 feet in order to end up with 120 square feet. The length and width of your tree house are inversely proportional—when one gets larger, the other gets proportionally smaller.</p>
<p>inverse relationship: a relationship between two quantities or variables where one gets smaller as the other gets larger. The product of the two related variables may or may not be a constant.</p>	<p>For a science project, Callie researched the relationship between hand washing and school absences. She found that students who washed their hands for 10 seconds had fewer absences than students who washed their hands for 5 seconds. However, she could not find a clear mathematical relationship. Multiplying the time various students spent washing their hands by their total number of absences resulted in many different products, not in a single number or constant. So this is an inverse relationship, but not an inverse proportion.</p>
<p>musical pitch: the listener's perception of the frequency of a sound</p>	<p>As a note's pitch gets lower, the number of full cycles of sound waves per second decreases. As the pitch gets higher, the number of cycles per second increases. See <i>frequency</i> and <i>Hertz</i>.</p>
<p>non-standard measurement units: any measurement units that are not part of the metric system or standard (English, foot/pound) system of measurement</p>	<p>If you use your own foot as a way of measuring off a room, you are using a non-standard measurement unit.</p>
<p>octave: an interval of eight notes on a musical scale</p>	<p>The same note an octave higher (think <i>do-re-mi-fa-so-la-ti-do</i>) has a frequency double the frequency of the lower note. See <i>frequency</i>.</p>
<p>pi: the ratio of the circumference of any circle to its diameter</p>	<p>The value of this ratio is approximately 3.14. Also expressed as π, this value is used to find the area of a circle. Area = π times the radius squared. See <i>circle</i>, <i>circumference</i>, and <i>radius</i>.</p>

<p>prism: a three-dimensional figure (a polyhedron) with two parallel, congruent faces, called bases, that are made up of polygons. All other faces are parallelograms. If this is a right prism, the other faces make right angles with the bases and are rectangles.</p> 	<p>See <i>cube</i>, <i>surface area</i>, and <i>volume</i>.</p>
<p>proportion: two equal ratios, often written as</p> $\frac{a}{b} = \frac{c}{d}$	<p>See <i>equivalent fractions</i>.</p>
<p>proportional (parts of polygons): In two similar figures (with the same shape but not necessarily the same size), the ratios of the lengths of the corresponding sides form a proportion.</p>	<p>If a painting 15 inches by 30 inches is used as the basis for a 5-foot by 10-foot mural, the two paintings will be proportional. Both have a width that is one-half of their length.</p>
<p>proportional (relationships): a relationship between two equal ratios</p>	<p>In the case of the two paintings above,</p> $\frac{15 \text{ inches}}{30 \text{ inches}} = \frac{5 \text{ feet}}{10 \text{ feet}}$ <p>The value of the two ratios is equal; in both cases, it is $\frac{1}{2}$ or 0.5. See <i>proportion</i> and <i>ratio</i>.</p>
<p>radius: a line segment connecting the center of a circle to any point on its circumference</p> 	<p>The radius of a circle equals one-half its diameter. This measurement is used to compute the circle's area. (Area = πr^2.) In the real world, circles or spheres (the three-dimensional counterparts of circles) are not perfectly round. So when we talk about the radius of the earth, for example, we call it the mean radius. It is the average of many different measurements from the center of the earth to its surface. See <i>circle</i>, <i>circumference</i>, and <i>pi</i>.</p>
<p>rate: a ratio between two different kinds of units such as miles per hour or meters per second</p>	<p>In the U.S., we typically express speed as miles per hour. Other examples of rates include prices (\$1.50 per pound), salaries (\$8.00 per hour), and population density (number of people per square kilometer or mile).</p>

<p>ratio: a comparison of two quantities. This may be expressed in different ways: for example:</p> <p>1:4, $\frac{1}{4}$, and 1 to 4.</p> <p>The value of the ratio may be found by division. For example, the value of this ratio is $1 \div 4$ or 0.25.</p>	<p>Examples of ratios are everywhere. Scales are ratios: in a dollhouse scale, the ratio is 1 inch to 1 foot or 1 inch to 12 inches. Recipes use ratios—a pancake recipe might specify 1 cup of flour for every $\frac{3}{4}$ cup of milk, for example. Sports use ratios: in baseball, batting average is the value of the ratio of hits to times at bat. Pi is the value of the ratio of a circle's circumference to its diameter. Farmers use ratios to determine how much fertilizer to use per acre. Grade point average is the value of the ratio of grade points earned to number of class units taken. If you think about ways that people use numbers in everyday life, you'll find many more examples of ratios.</p>
<p>rectangle: a parallelogram with four right angles. Note that a square is a special rectangle where all sides are congruent or equal.</p> 	<p>See <i>area</i>.</p>
<p>right triangle: a triangle with one right (90°) angle</p> 	<p>See <i>angle</i>.</p>
<p>scale (of a scale drawing or model): a ratio between the actual size of an object and its proportional representation</p>	<p>The bat that Babe Ruth used in 1927 to break the homerun record was 34 inches in length. The 120-foot bat outside the Louisville Slugger Museum is a scale model of Ruth's bat. So the ratio of the small bat's length to the replica's length is 34 inches to 120 feet or 34 inches to 1,440 inches. Rounding the nearest whole number, that's 1:42, so the big bat is about 42 times taller than the small one. See <i>ratio</i> and <i>proportional</i>.</p>

<p>scale factor: the value of a ratio between the lengths of parts of a scale drawing or model and the actual size of the corresponding parts of an object. This is the number by which all parts of the original object are multiplied to create a proportional enlargement or reduction.</p>	<p>The scale factor of the big bat at the Louisville Slugger Museum is 42. To create the big bat, the museum multiplied the dimensions of the 34-inch bat on which it is modeled by 42.</p> <p>In a typical railroad scale, one-half inch equals 1 foot (a ratio of 1:24). To create a model of a train engine in this scale, you would multiply the length, width, and height of the engine by the scale factor of $\frac{1}{24}$. You could do the same thing by dividing the length, width, and height of the actual engine by 24.</p>
<p>significant digits: way of describing how precisely a number is written. Significant digits arise from inexact measurements. Non-zero digits as well as any zeroes between non-zero digits are considered significant when reporting measures.</p> <p>Zero is considered to be significant if it indicates a measurement found to be zero. In general, the number of significant digits in an answer is about the same as the number of significant digits in the least accurate measurement given as an input value.</p>	<p>If a length is reported to be 1050 meters, this number is considered to have only three significant digits (1, 5, and the 0 between 1 and 5) since this length might be rounded to the nearest 10 meters. The figure 1050.0 meters is considered to have five significant digits because it appears to be accurate to the nearest tenth of a meter. If 1050.0 represented the radius of a circle and you multiplied its square by 3.14159 to find the circle's area, you'd get 3,463,602.98 m². But you would round your answer to five significant digits (the significant digits of your least accurate input—the radius) or 3,463,600 m².</p>
<p>similar figures: objects or figures that are the same shape, but not necessarily the same size. If they are also the same size, the objects are said to be congruent.</p> 	<p>The real bat used by Babe Ruth and the 120-foot model at the Louisville Slugger Museum are similar objects. By contrast, real dinosaurs and the dinosaur replicas at Dinosaur World are congruent similar objects. Based on the fossil record, the park tries to recreate the exact size of extinct dinosaur species. So the scale or ratio of the models to the real dinosaurs is 1:1.</p>
<p>sound wave: a pattern of the vibrations carrying sound energy away from the source of a sound</p>	<p>See <i>frequency</i> and <i>Hertz</i>.</p>
<p>square unit: a unit for measuring area such as a square inch or square meter</p>	<p>See <i>area</i>.</p>
<p>standard measurement units: commonly used measurement units such as those used in the metric system (meters, liters, grams, etc.) or the English system of measurement (inches, feet, pounds, quarts, etc.)</p>	<p>A hand, which is equal to 4 inches, is the standard measurement unit for the height of horses. The height is measured from the withers, a point right behind the horse's neck in the middle of its back.</p>

<p>surface area: the total area of all the faces or two-dimensional surfaces of a three-dimensional object</p>	<p>The surface area of a three-dimensional object does not increase proportionally when all the dimensions are increased by the same factor. If you double the length, width, and height of a right rectangular prism, you will increase its surface area by four times. If you triple these dimensions, you will increase its surface area by nine.</p>
<p>variable: a letter or other symbol that represents a value that may change</p>	<p>In the equation $x \div y = k$, which represents a directly proportional relationship, x and y are variables. For example, as speed (x) increases, the distance a car travels in an hour (y) also increases, but the time on the road (k, which equals 1 hour) remains the same.</p>
<p>volume: the amount of space occupied by a three-dimensional figure, usually measured in cubic units.</p> <div style="text-align: center;">  </div> <p>This rectangular prism has a volume of 6 cubic units.</p>	<p>Volume does not increase proportionally when all three dimensions of an object are increased by the same scale factor.</p> <p>Let's say you double the dimensions of the 6-cubic-unit prism shown here. The new prism is 4 units high, 6 units long, and 2 units wide. That's $4 \times 6 \times 2 = 48$ cubic units or 8 times the volume of the original prism.</p> <p>If you increase the dimensions by a factor of three, you'll get a prism that is $6 \times 9 \times 3$ with a volume of 162 cubic units or 27 times the volume of the original.</p>