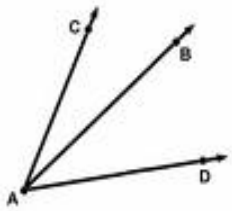
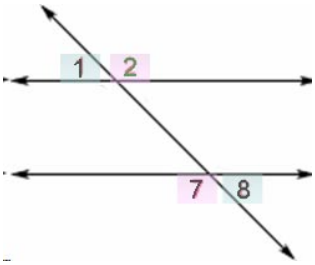
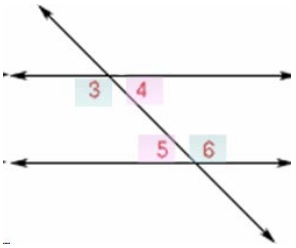
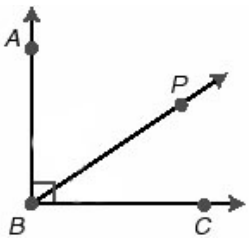
Eighth Grade

Accuracy: The closeness of a given measurement or value to the true measurement or value. How closely a measured value agrees with the correct value. (Precision refers to how closely individual measurements agree with each other. So, the smaller the unit of measurement, the better the precision.)	The accuracy of a measured value expresses the deviation of the measurement from the true value of the quantity. Since accuracy is based on the true value, relative error, in this case, would indicate how far the measurement is from the true value. If you are measuring a piece of string and do not stretch it out straight, you could have good precision, but poor accuracy.
Adjacent Angles: Angles that have a common vertex and a common side.	$\angle CAB$ and $\angle BAD$ are adjacent. Ray AB is their common side and point A is their common vertex. 
Alternate Exterior Angle: A pair of angles on the outer sides if two lines cut by a transversal, but on opposite sides of the transversal	If the lines are parallel: $\angle 1$ and $\angle 8$ are alternate exterior angles and are congruent. $\angle 2$ and $\angle 7$ are also alternate exterior angles and are congruent. 
Alternate Interior Angle: A pair of angles on the inner sides of two lines cut by a transversal, but on the opposite sides of the transversal.	If the lines are parallel $\angle 3$ and $\angle 6$ are alternate interior angles and are congruent. $\angle 4$ and $\angle 5$ are also alternate interior angles and are congruent 
Complementary Angle: Two angles that add up to 90 degrees. (Their sum is 90.)	 Angles ABP and PBC are complementary. $\angle ABP + \angle PBC = 90°$

Compound Event: An event whose probability depends on the occurrence of two or more events such as two socks being drawn from a drawer.

To find the probability of two *independent* events both occurring, multiply the probability of the first event by the probability of the second event:

$P(A \text{ and } B) = P(A) \cdot P(B)$

To find the probability of two dependent events both occurring, multiply the probability of *A* and the probability of *B* after *A* occurs:

$P(A \text{ and } B) = P(A) \cdot P(B \text{ following } A)$

To find the probability of one or the other of two *mutually exclusive* events, add the probability of the first event to the probability of the second event:

$P(A \text{ or } B) = P(A) + P(B)$

Dependent events (*and*):
A drawer contains 4 blue, 6 black, and 2 brown socks. What is the probability that you choose two blue socks in a row?

$$p(\textit{blue and blue}) = \frac{4}{12} \cdot \frac{3}{11} = \frac{12}{132} = \frac{1}{11}$$

Independent events (*and*):
If you roll two six-sided number cubes, what is the probability that you roll two even numbers?

$$p(\textit{even and even}) = \frac{3}{6} \cdot \frac{3}{6} = \frac{9}{36} = \frac{1}{4}$$

Mutually exclusive events (*or*):
If you roll a six-sided number cube, what is the probability that you roll a 1 or a 6?

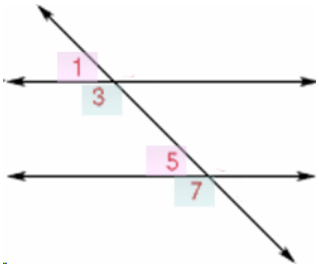
$$p(1 \text{ or } 6) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$$

Corresponding Angle: Angles that are on the same side of the transversal and are both above or both below the lines cut by the transversal

If the lines are parallel:

$\angle 1$ and $\angle 5$ are corresponding and congruent.

$\angle 3$ and $\angle 7$ are corresponding and congruent.



Cost Per Unit: A unit rate used to compare costs per single item; a rate in which the second quantity is one

$$\frac{\$3.90}{10 \text{ markers}} = \frac{\$0.39}{1 \text{ marker}}$$

Unit Cost = \$0.39

Distance Formula:
From the Pythagorean Theorem, the distance *d* between any two points (x_1, y_1) and (x_2, y_2) is

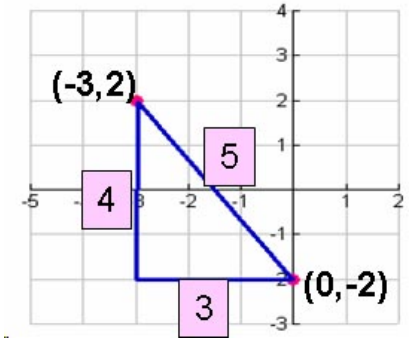
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

If you let the horizontal distance $x_2 - x_1 = a$

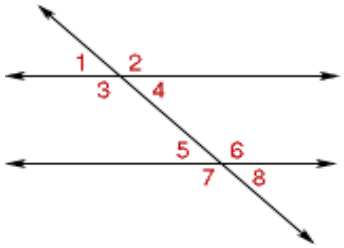
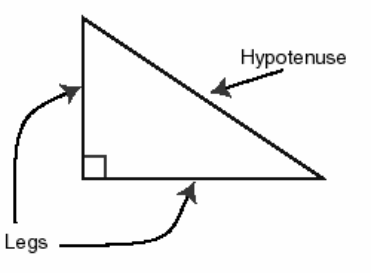
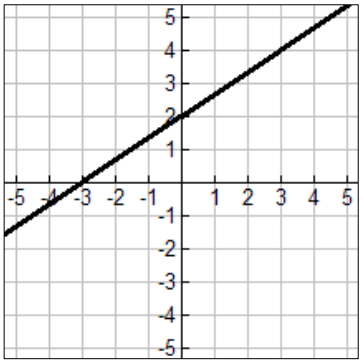
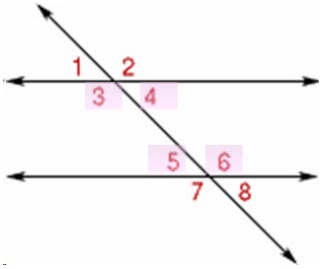
And the vertical distance $y_2 - y_1 = b$

Then the equation becomes

$d = \sqrt{a^2 + b^2}$ or $d^2 = a^2 + b^2$



The distance $d = \sqrt{9+16} = \sqrt{25} = 5$

Exterior Angles: The angles on the outer sides of two lines cut by a transversal	$\angle 1$, $\angle 2$, $\angle 7$, and $\angle 8$ are exterior angles. 
Hypotenuse: The longest side of a right triangle, or the side directly across from the right angle	
Intercept: The point where a graph crosses either the *x*- or the *y*-axis. The y-intercept of the line $y = mx + b$ is b The y-intercept can be found algebraically by letting $x = 0$ and solving for y. The *x*-intercept can be found algebraically by letting $y = 0$ and solving for x.	 $y = \frac{2}{3}x + 2$ The *y*-intercept is 2. The *x*-intercept is -3.
Interior Angles: Angles on the inner sides of two lines cut by a transversal	Angles 3, 4, 5 and 6 are interior angles. 
Irrational Numbers: A number that cannot be written as a ratio of two integers. Irrational numbers in decimal form are non-terminating and non-repeating.	These numbers are irrational: $\sqrt{2} = 1.414213562...$ 0.01011011101111... $\pi \doteq 3.14159265358979323...$

Laws of Exponents:
If you multiply two expressions with the same base, the base stays the same and you add the exponents: $b^x b^y = b^{x+y}$
If you divide two expressions with the same base, the base stays the same and you subtract the exponents:
$\frac{b^x}{b^y} = b^{x-y}$ if $b \neq 0$

If you raise an expression with an exponent to a power, the *base stays the same* and you multiply the exponents:
$\left(b^x\right)^y = b^{xy}$

Additionally, $(ab)^n = a^n b^n$

but, $(a+b)^n \neq a^n + b^n$ for $a, b, n \in \Re$

Examples:
$(2^3)(2^2) = (2 \cdot 2 \cdot 2)(2 \cdot 2) = 2^5 = 32$

$\frac{3^5}{3^2} = \frac{\cancel{3} \cdot \cancel{3} \cdot 3 \cdot 3 \cdot 3}{\cancel{3} \cdot \cancel{3}} = 3^3 = 27$

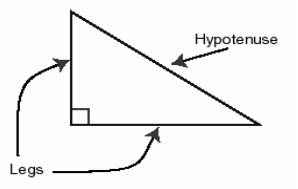
$(4^2)^3 = (4^2) \cdot (4^2) \cdot (4^2) = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 4^6 = 4096$

If $x \neq 0$, $x^0 = 1$ (0^0 is undefined)

$\frac{3^2}{3^2} = 3^0 = 1$

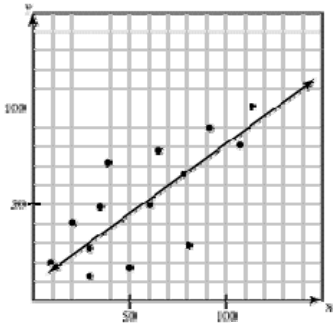
$(3+4)^2 \neq 9 + 16$

Legs of a Triangle: In a right triangle, the two sides that are not the hypotenuse (the longest side) or the two sides that form the right angle.



In a right triangle: The sum of the squares of the legs is equal to the square of the hypotenuse.

Line of Best Fit (conceptual): A straight line that best fits the data on a scatter plot. It can be used to predict a trend in the data.

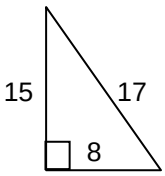


Multi-step Equations: Equations that contain more than one operation and thus take more than one step (using inverse operations) to solve.

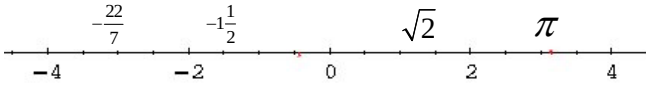
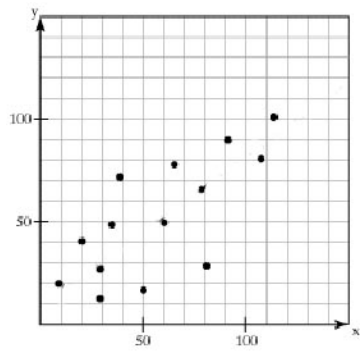
$3(x+1) = 15$
$3x + 3 = 15$
$3x = 12$
$x = 4$

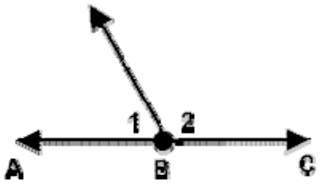
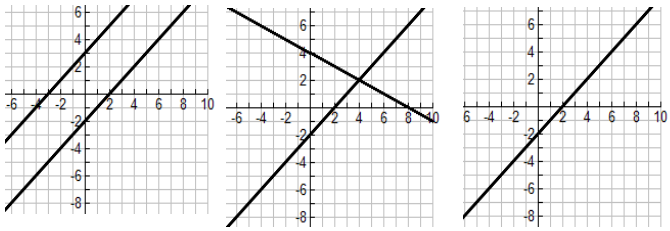
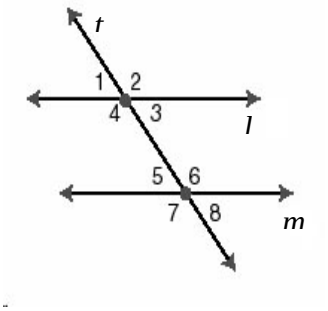
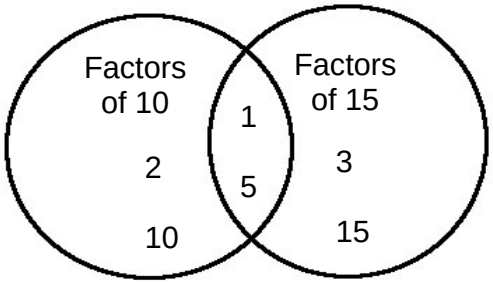
$2x - 3 = 17$
$2x = 20$
$x = 10$

Pythagorean Theorem: In a right triangle, the sum of the squares of the length of the legs is equal to the square of the length of the hypotenuse $a^2 + b^2 = c^2$



$8^2 + 15^2 = 17^2$
$64 + 225 = 289$

Precision: The level of detail of a measurement, determined by the unit of measure. Precision depends on the smallest unit of measurement being used.	A meter stick that has centimeter markings has a precision of 1 cm and a possible error of plus or minus 0.5 cm. Significant digits can indicate the precision of a measurement. A measurement of 45.32 cm contains 4 significant digits. (The 2 is the estimated digit). A ruler with $\frac{1}{16}$" markings would have greater precision than a ruler with only $\frac{1}{4}$" markings.
Real Number: A number that is either rational or irrational. Real numbers can be represented by the infinite set of points on a number line.	Real numbers include all of the following numbers: rational, irrational, and thus integers, whole numbers, natural numbers, zero. The properties of real numbers include the commutative, associative, distributive, additive and multiplicative identity, and additive and multiplicative inverse properties. 
Relative Frequency: The observed number of successful events for a given number of trials: the ratio of the total number of times a given event occurs to the total number of events. The observed relative frequency is an approximation to the true probability of an event.	If we were able to perform a trial more and more times, the relative frequency would eventually approach the actual probability. For example: If you were to flip a coin 20 times, heads might come up 12 times. The relative frequency would be $\frac{12}{20} = 0.6$. Toss the coin 100 times, if there are 54 heads, the relative frequency would be $\frac{54}{100} = 0.54$. As you continued to increase the number of coin tosses, the relative frequency should approach the theoretical probability of 0.5.
Scatter Plot: A graph on a coordinate system used to display a set of data points	

Supplementary Angle: Angles whose sums add up to 180 degrees	Angles 1 and 2 are supplementary. $\angle 1 + \angle 2 = 180°$ 
System of Equations: Two equations in two variables. The number of solutions of the system can be infinite (if they represent the same line), one point (x,y) (if the two lines intersect) or no solution (if the lines are parallel).	 $x - y = -3$ $x - y = 2$ No solution: Parallel lines $x + 2y = 8$ $x - y = 2$ One solution: (4,2) $x - y = 2$ $2x - 2y = 4$ Infinite number of solutions: same line
Transversal: A line that intersects two other lines (usually parallel).	Line *t* is a transversal which intersects parallel lines *l* and *m*. 
Venn Diagram: A diagram showing the relationships among sets of objects using overlapping circles.	 This Venn diagram shows that the intersection of the factors of 10 and the factors of 15 are those they have in common, 1 and 5.
Vertical Angles: A pair of opposite congruent angles formed by intersecting lines