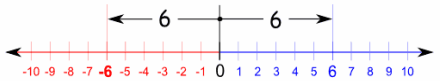
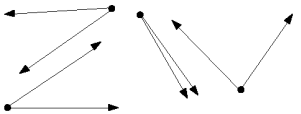
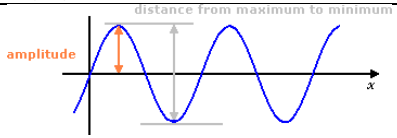
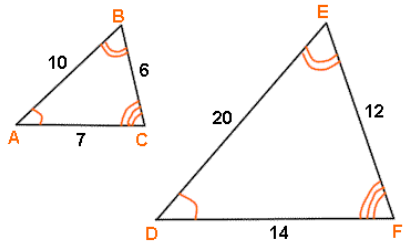
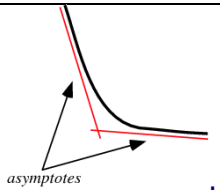
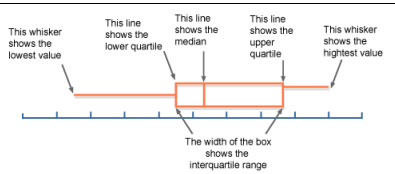
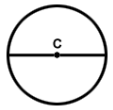
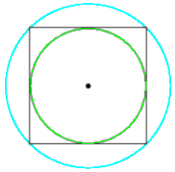
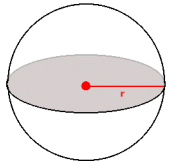
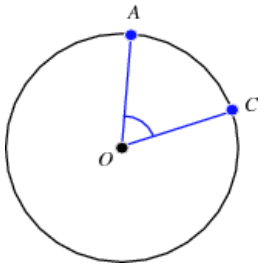
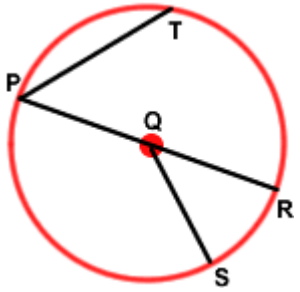
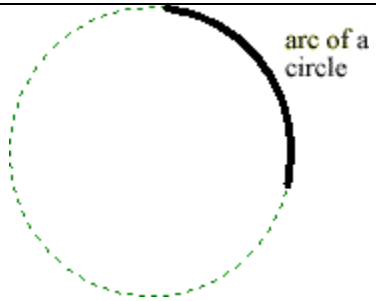
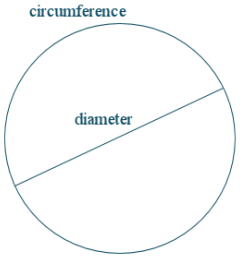
TERM	DEFINITION	SOURCE	EXAMPLE
Absolute value	A number's distance from zero. Distance is expressed as a positive value.	Adapted from Smarter Balanced Mathematics Glossary	 |6| = 6 and |-6| = 6
Acute angle	An angle that measures less than 90° and more than 0°.	Smarter Balanced Mathematics Glossary	 http://www.misterteacher.com/everything_geometry/typesofangles.html
Addition Rule	Used to determine the probability that event A or event B occurs or both occur. The rule is often written as: P(A or B) = P (A) + P(B) – P(A and B)	http://www.stats.gla.ac.uk/steps/glossary/probability.html#addrule	Suppose we wish to find the probability of drawing either a king or a spade in a single draw from a pack of 52 playing cards. We define the events A = 'draw a king' and B = 'draw a spade' Since there are 4 kings in the pack and 13 spades, but 1 card is both a king and a spade, we have: = 4/52 + 13/52 - 1/52 = 16/52 So, the probability of drawing either a king or a spade is 16/52 (= 4/13). http://www.stats.gla.ac.uk/steps/glossary/probability.html#addrule
Additive inverse	Two numbers who sum is 0.	Smarter Balanced Mathematics Glossary	2 and -2 are additive inverses; 2 + (-2) = (-2) + 2 = 0
Amplitude	Amplitude is half the distance between the minimum and maximum values of the range of a periodic function with a bounded range.	http://www.icoachmath.com/math_dictionary/Amplitude.html	 http://www.icoachmath.com/math_dictionary/Amplitude.html

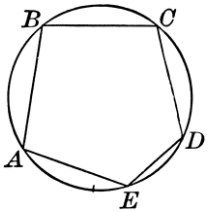
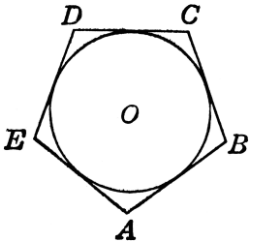
Analogous	Similar or corresponding in some respect.	http://www.thefreedictionary.com/analogous	
Analytic geometry	Geometry based on the coordinate system (also known as coordinate geometry).	Mathematics Dictionary and Handbook (MDH), page 83.	
Analytic modeling	Explains data on the basis of deeper theoretical ideas with parameters that are empirically based.	CCSS-M, page 73	
Angle-angle criterion	If two angles of one triangle are equal to two angles of another triangle, then the triangles are similar.	http://www.cliffsnotes.com/study_guide/Similar-Triangles.topicArticleId-18851,articleId-18812.html	 http://www.regentsprep.org/regents/math/geometry/GP11/Lsimilar.htm
Arithmetic operations	A mathematical operation involving numbers. Usually refers to operations of addition, subtraction, multiplication, and division.	http://www.thefreedictionary.com/arithmetic+operation	
Associative property	The way in which three or more numbers are grouped for addition or multiplication does not change their sum or product, respectively.	Smarter Balanced Mathematics Glossary	(3 + 1) + 9 = 3 + (1 + 9) (5 x 3) x 10 = 5 x (3 x 10)
Asymptotes	An asymptote is a line or curve that approaches a given curve arbitrarily closely.	http://mathworld.wolfram.com/Asymptote.html	 http://mathworld.wolfram.com/Asymptote.html
Auxiliary line	Segments and lines added to existing figures. Auxiliary lines are usually added to allow us to prove something about the figure.	Geometry Connections, College Preparatory Materials, 2007	

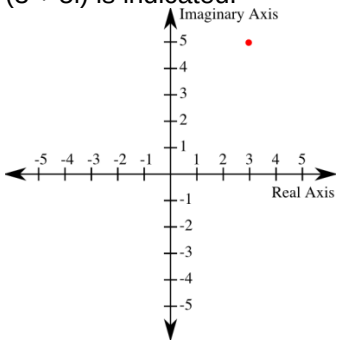
Axioms	A statement accepted to be true without proof.	MDH, page 29	
Bivariate data	Pairs of linked observations – may be numeric or categorical	Adapted from CCSS-M glossary	Height and arm span of students.
Box plots	A method of visually displaying a distribution of data values by using the median, quartiles, and extremes of the data set. A box show the middle 50% of the data.	CCSS-M glossary	 http://www.bbc.co.uk/scotland/learning/bitesize/standard/maths_ii/relationships/boxplots_rev1.shtml
Causation	An action or occurrence that causes another.	http://stats.org/in_depth/faq/causation_correlation.htm	
Cavalieri's principle	If, in two solids of equal altitude, the sections made by planes parallel to and at the same distance from their respective bases are always equal, then the volumes of the two solids are equal.	http://mathworld.wolfram.com/CavalierisPrinciple.html	 http://mrhonner.com/2011/04/06/cds-and-cavalieris-principle/

Center	1) Of a circle, a point such that every point on the circle is the same distance from it. 2) Of a regular polygon, the center of the polygon's inscribed and circumscribed circles. 3) Of a sphere, a point inside the sphere such that every point on the sphere is the same distance from it.	MDH, pages 50 and 51	1)  Point C is the center of the circle. http://www.sparknotes.com/math/geometry1/circles/section1.html 2)  http://planetmath.org/RegularPolygon.html 3)  http://library.thinkquest.org/20991/geo/solids.html

Central angle	An angle whose vertex is the center of the circle, with radii as its sides.	Smarter Balanced Mathematics Glossary	 http://mathworld.wolfram.com/CentralAngle.html
Chord	Any line segment that connects two points on a circle. The diameter is a chord passing through the center of the circle.	MDH, page 53	In the diagram, segment PT is a chord. Segment PR is a chord that is a diameter of the circle.  http://www.mathgoodies.com/lessons/vol2/geometry.html

Circular arc	A portion of the circumference of the circle.	http://www.mathopenref.com/arc.html	 http://www.mathwords.com/a/arc_circle.htm
Circumference	Perimeter of a circle	Smarter Balanced Mathematics Glossary	 http://www.intmath.com/numbers/pi.php

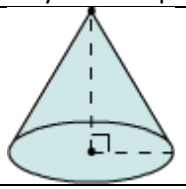
Circumscribed	1) A circle is circumscribed about a polygon if every vertex of the polygon lies on the circle. The polygon is said to be inscribed in the circle. 2) A polygon is circumscribed about a circle if every side of the polygon is tangent to the circle. The circle is said to be inscribed in the polygon.	MDH, page 57	1)  http://etc.usf.edu/clipart/38600/38686/circle4_38686.htm 2)  http://etc.usf.edu/clipart/36500/36552/circumpoly_36552.htm
Coefficient	The factor (numeric or symbolic) by which a term is to be multiplied	Adapted from MDH	Given 5y, 5 is the coefficient. Given ay^2, a is the coefficient.
Commutative property	The order in which two numbers are added or multiplied does not change their sum or product, respectively.	Smarter Balanced Mathematics Glossary	4 + 3 = 3 + 4 5 x 7 = 7 x 5
Complex number	A number that can be written in the form $a + bi$ where a and b are real numbers and $i = \sqrt{-1}$.	MDH, page 70	$3 + \sqrt{-6}$ $4+7i$

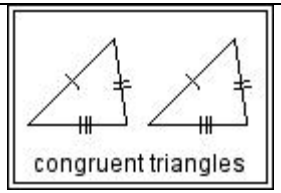
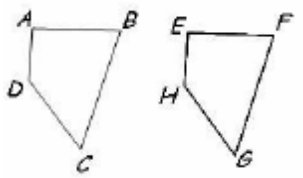
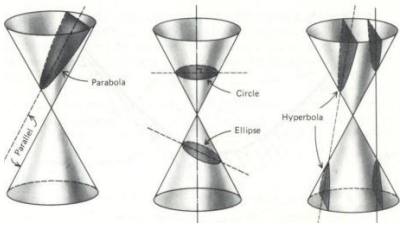
Complex plane	A set of coordinate axes with all the real numbers on the horizontal axis (the real axis) and all the imaginary numbers on the vertical axis (the imaginary axis) defines the complex plane.	Algebra II Connections, College Preparatory Materials, 2009	(3 + 5i) is indicated.  http://yozh.org/2010/11/07/mset003/
Compound events	A compound event consists of two or more outcomes or simple events.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	

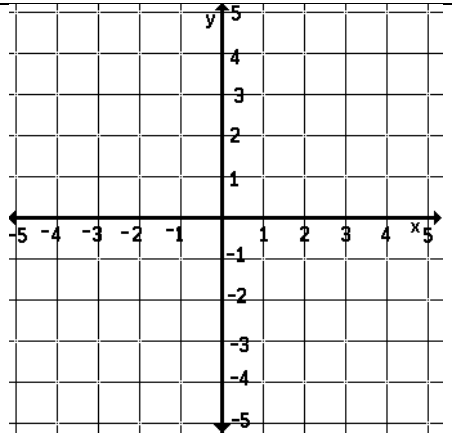
Computational models of functions	A generalization of the introductory page for high school functions in the CCSS. Functions can be modeled in several ways (graphs, tables, charts, equation, and descriptive words) and through these representations (directly or by fitting collected data to these known patterns and depictions) prediction can be made for estimating, quality control, prescription, dosing, etc; and mathematics can be applied.	CCSS-M, page 67	Almost any table, chart, graph, or equation used in a CTE program can be connected to this concept. Part of the concept embedded in the ideas surrounding this phrase in the CCSS is developing such familiarity with the relational trends between input and the output of the situation that a good mental estimate of the correct answer is made before finding the exact answer. The gives confidence that the computed/found answer is correct and decisions made on the basis of this solution are appropriate. Electronic spreadsheets are often used as computational models to manage data and calculate functional values.

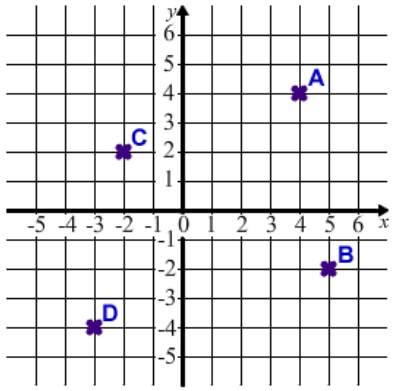
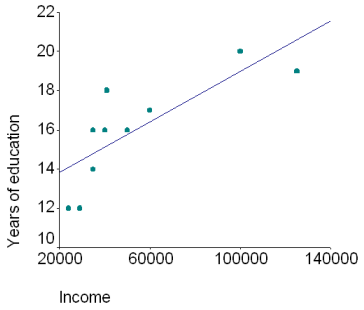
Conditional probability	The probability that an event *B* occurs after an event *A* has already occurred.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	Suppose an individual applying to a college determines that he has an 80% chance of being accepted, and he knows that dormitory housing will only be provided for 60% of all of the accepted students. The chance of the student being accepted *and* receiving dormitory housing is defined by *P(Accepted and Dormitory Housing) = P(Dormitory Housing|Accepted)P(Accepted)* = (0.60)*(0.80) = 0.48. http://www.stat.yale.edu/Courses/1997-98/101/condprob.htm In basketball, the probability of a free throw shooter making 2 points in a one and one situation is a conditional probability. (The first shot must be made before even being allowed to shoot a second time for an opportunity for a total of 2 points.) If the shooter has a 60% average on free throws then there is a 60% chance of making the first shot and a 40% chance of not making the first shot. If the first shot is made, there is again a 60% chance of making the shot and a 40% chance of not making the shot. The second shot is a dependent event. (There is a 40% chance of making 0 points in this

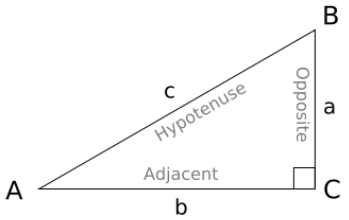
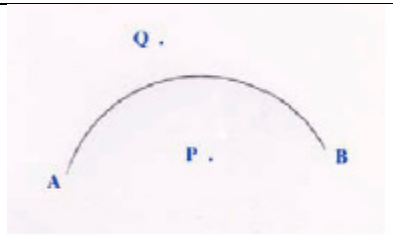
<table>
<tr><td></td><td></td><td></td><td>situation, a 24% chance of making 1 point, and a 36% chance of making 2 points. Notice that the total is 100% -- one of these three things will occur in this situation.)</td></tr>
<tr><td>Conditional relative frequencies</td><td>The relative frequencies in the body of the two-way table.</td><td>http://stattrek.com/statistics/two-way-table.aspx</td><td>Two-Way Frequency Tables
<table><tr><th></th><th>Dance</th><th>Sports</th><th>TV</th><th>Total</th></tr><tr><th>Men</th><td>0.04</td><td>0.20</td><td>0.16</td><td>0.40</td></tr><tr><th>Women</th><td>0.32</td><td>0.12</td><td>0.16</td><td>0.60</td></tr><tr><th>Total</th><td>0.36</td><td>0.32</td><td>0.32</td><td>1.00</td></tr></table>
The conditional relative frequencies are highlighted.

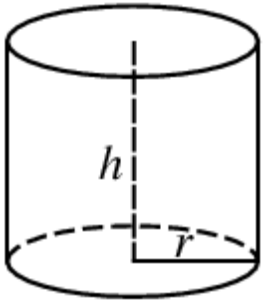
http://stattrek.com/statistics/two-way-table.aspx</td></tr>
<tr><td>Cone</td><td>A three –dimensional geometric shape (solid) that has a circular base and a surface from the boundary of the base to the vertex. A cone is a right cone if its axis is perpendicular to the base; otherwise it is an oblique cone.</td><td>MDH, page 74</td><td>  </td></tr>
</table>

Congruent	Two plane or solid figures are congruent if one can be obtained from the other by rigid motion (a sequence of rotations, reflections, and translations). In geometry, having the same shape and the same size.	CCSS – M Glossary	 http://www.mathatube.com/glo-c-congrunt.html 
Conic section	A curve that is the intersection of a plane with a double cone. Conic sections include parabolas, circles, ellipses, and hyperbolas. Conic sections that degenerate (collapse) into a point or line are excluded.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://www.andrews.edu/~calkins/math/webtexts/numb19.htm
Conjugate	Conjugates are used in working with binomials (two-part numbers) for various types of simplification and rearranging. The sign between the two parts is changed to form the conjugate.		3x + 2 → 3x – 2 5 – 4i → 5 + 4i 7x – 3y → 7x + 3y 6 + √8 → 6 - √8
Constant of proportionality	The constant value of the ratio of two proportional quantities *x* and *y*.	http://www.thefreedictionary.com/constant+of+proportionality	The scale of a drawing, the price per gallon for gasoline when filling the car on any particular day, any value used to multiply by when converting measurements.

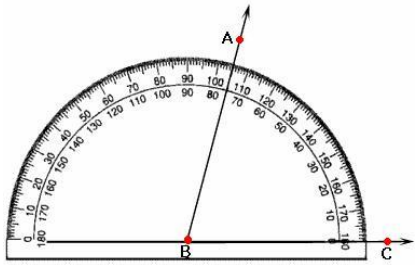
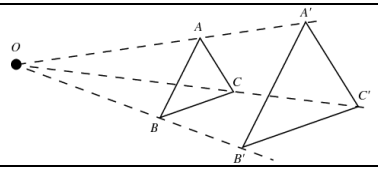
Coordinate plane	A two-dimensional network of horizontal and vertical lines that are parallel and evenly-spaced; especially designed for locating points, displaying data, or drawing maps.	Smarter Balanced Mathematics Glossary	 http://www.mathnstuff.com/papers/sheet/5x5b.htm
Coordinate system	A method of locating points in the plane or in space by means of numbers. A point in the plane is located by its distances from both horizontal (x) and vertical (y) lines called "axes." Each pair of numbers is called an ordered pair, of which the first number is the x-coordinate (designating distance along the horizontal axis), and the second is the y-coordinate (designating distance along the vertical axis). The point at which the two axes intersect has the coordinates (0,0) and is called the origin.	MDH, page 84	

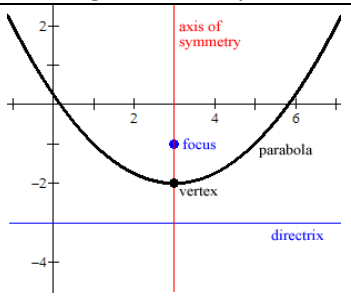
Coordinates	Numbers that correspond to points on a coordinate plane in the form (x, y), or a number that corresponds to a point on a number line.	Smarter Balanced Mathematics Glossary	The coordinates of point B are (5, -2).  http://www.cimt.plymouth.ac.uk/projects/mepres/book8/bk8i14/bk8_14i1.htm
Correlation coefficient	A number between -1 and 1 that indicates the strength and direction of a linear relationship between two variables. The closer the value is to -1 or 1, the better the equation is as a predictor.	http://mathbits.com/mathbits/tisection/statistics2/correlation.htm	The correlation of years of education and income is 0.79.  http://www.nvcc.edu/home/elanthier/methods/correlation.htm

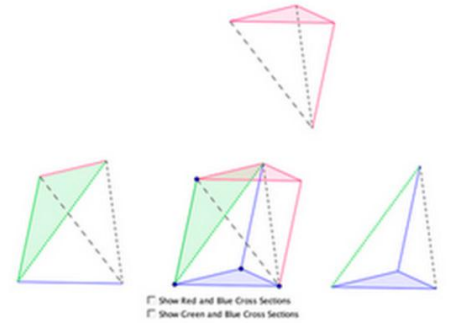
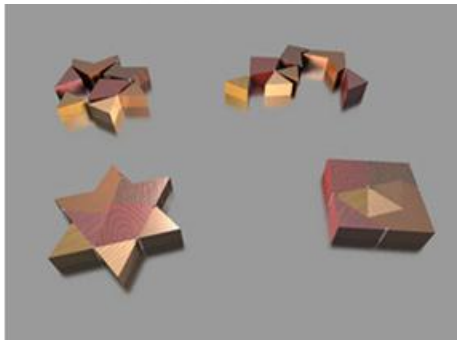
Cosine	The ratio of the lengths of the side of the triangle adjacent to the angle and the hypotenuse.	http://mathworld.wolfram.com/Cosine.html	In this example, cos $A = \frac{b}{c}$ since the side length b is adjacent to angle A.  c http://scienceray.com/mathematics/trigonometric-functions-cosecant-secant-and-cotangent/
Cube root	The cube root ($\sqrt[3]{n}$) of a number *n* is a number whose cube is *n.*	MDH, page 89	The cube root of 64 is 4, because 4x4 x 4 = 64.
Curve	A non-straight line or line segment, which may or may not intersect itself or close		

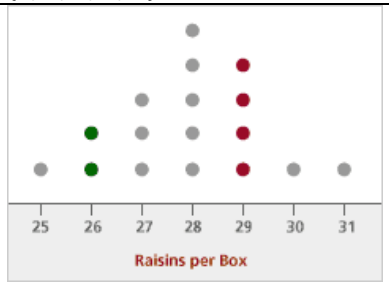
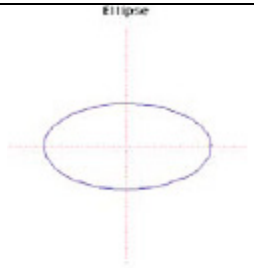
<table>
<tr>
<td>Cylinders</td>
<td>A three-dimensional figure with two parallel bases that are congruent circles.</td>
<td>Smarter Balanced Mathematics Glossary</td>
<td> 

http://mathworld.wolfram.com/Cylinder.html</td>
</tr>
<tr>
<td>Decimal expansion</td>
<td>Writing a number in base-10 form with decimals if needed rather than any fractions. If there is a repeated pattern in the decimal places, a line or bar is put over the repeating digit(s) for an ellipsis (…) might be used.</td>
<td></td>
<td>
<table>
<tr><th>Number</th><th>Decimal expansion</th></tr>
<tr><td>4 1/5</td><td>4.2</td></tr>
<tr><td>1/6</td><td>$0.\overline{16}$</td></tr>
<tr><td>√2</td><td>1.41421 …</td></tr>
</table>
</td>
</tr>
</table>

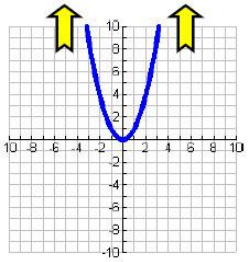
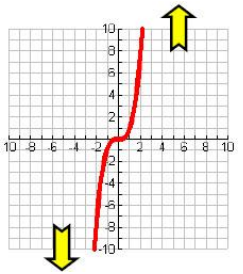
Degree	1) Of a monomial – The degree of a term is the exponent of the variable. When a term has more than one variable, the degree is the sum of the exponents of all the variables. 2) Degree of a polynomial with one variable - The degree of a polynomial or of an equation in one variable is the degree of the term with the highest exponent. The degree of a polynomial with more than one variable is the highest sum of the exponents among the terms. 3) Of angle measure- A unit for measuring angles. One degree (°)is one three-hundred-sixtieth (1/360) of a complete revolution.	MDH page 102	1) $3x^4$; degree is 4. $6x^2y^4$; degree is 6. 2) $5x^3 + 3x^2 - 1$;degree is 3. 3) Angle ABC measures 75°.  http://www.icoachmath.com/math_dictionary/Degree_(Angle).html
Descriptive modeling	A model that simply describes the phenomena or summarizes them in a compact form.	CCSS-M, page 73	Graphs of observations are a familiar descriptive model— for example, graphs of global temperature and atmospheric CO2 over time.
Dilation	A transformation that moves each point along the ray through the point emanating from a fixed center, and multiples the distances from the center by a common scale factor.	CCSS-M Mathematics glossary	

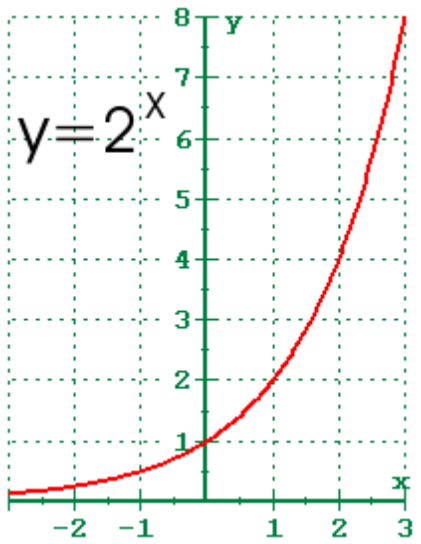
Directed line segment	A segment with an arrow at one end indicating the direction of movement. Unlike a ray, a directed line segment has a specific length.	http://www.regentsprep.org/regents/math/geometry/GT2/TransVector.htm	 http://tutorial.math.lamar.edu/Classes/LinAlg/Vectors.aspx
Directrix	A line that, along with a point (called a focus), defines a conic section.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://www.mathwords.com/d/directrix_parabola.htm

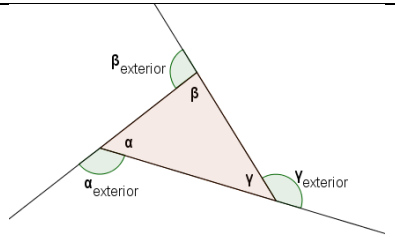
Dissection arguments	An informal argument that involves dividing a flat shape or solid into parts that have no interior points in common.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials and CCSS-M.	Cutting a prism into pieces as seen at the following website with the included picture (see also Cavalieri's principle) http://math-hombre.blogspot.com/2012/04/solid-unit.html   http://www.squidoo.com/Pre-Algebra?utm_source=google&utm_medium=imgres&utm_campaign=framebuster
Distributive property	The product of a number and the sum or difference of two numbers is equal to the sum or difference of the two products.	Smarter Balanced Mathematics Dictionary	$x(a + b) = ax + bx$

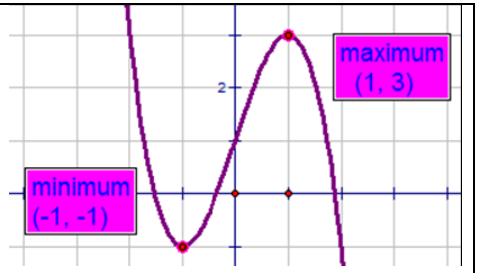
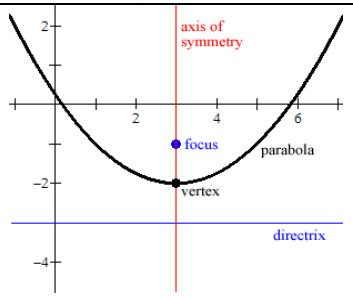
Domain of a function	The set of all first members (elements) of a function.	MDH, page 124	Given the function y = {(1, 5),(2, 10), (3,15), (4, 20), (5, 25)}, its domain is {1, 2, 3, 4, 5}.
Dot plot	A method of visually displaying of data values where each data value is shown as a dot or mark above a number line. Also known as a line plot.	CCSS-M Mathematics Glossary	 http://www.learner.org/courses/learningmath/data/session2/part_b/interpreting.html
Dynamic geometry environments	Computer platform for the learning and teaching of geometry.	http://www.emis.de/proceedings/PME31/3/177.pdf	
Ellipse	A geometric figure such that, for each point on its perimeter, the sum of the distances from that point to two fixed points within the figure is constant		

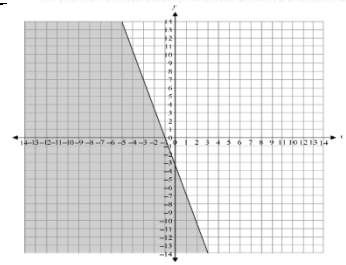
Empirical situations	Situations that are often experimental and observational, but not just theoretical, but applying math to these “real-life” contexts.		It is theoretical to say a coin will be heads half of the time when flipped. It is experimental to flip the coin 1000 times and record the results. This data will often not be exactly 500 heads; hwoever, if this experiment is done 100 times of 1000 times each and the result averaged the result will be getting close to heads half of the time. There is even math for the probability of being off of half by any chosen amount of heads.

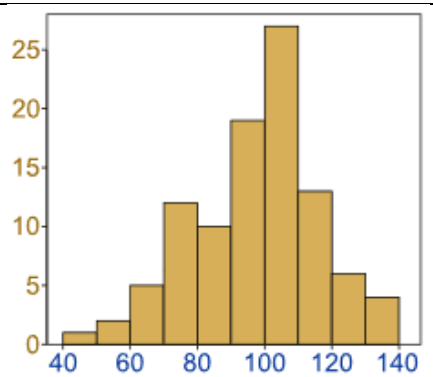
End behavior	The appearance of a graph as it is followed farther and farther in either direction.	http://www.mathwords.com/e/end_behavior.htm	The arrows indicate the end behavior.   http://www.gradeamathhelp.com/polynomials.html
Equation	A mathematical sentence in which two expressions are connected by an equality symbol.	Smarter Balanced Mathematics Glossary	x +5 = y + 2
Explicit expression	A formula that allows direct computation of any term for a sequence.	http://www.mathwords.com/e/explicit_formula.htm	5, 8, 11, 14, …. The explicit expression representing this sequence is $3x + 2$.

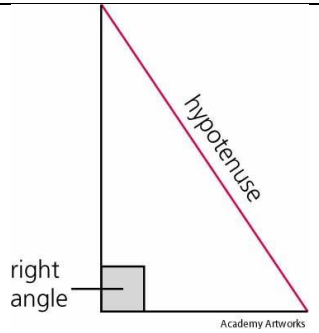
Exponential function	Functions that grow at a constant percent rate.	CCSS-M page 67	 http://people.richland.edu/james/lecture/m116/logs/exponential.html
Exponential models	Models are often equations but may be graphs or tables. Exponential equations have a variable as an exponent.		$A=1000(1.03)^t$ is an exponential growth model for investing $1000 at 3% for t years with the interest compounding annually and reinvested. Exponential models can be written for investments with interest compounded more often than annually, for population changes, depreciation, radioactive decay, healing rates, and many other applications.

Expression	A collection of numbers, symbols, and/or operation signs that stands for a number.	Smarter Balanced Mathematics Glossary	2 + 3x 13.4 – 4.7
Exterior angle of a triangle	An exterior (or external) angle is the angle between one side of a triangle and the extension of an adjacent side.	http://www.mathopenref.com/triangleextangle.html	 http://www.onemathematicalcat.org/Math/Geometry_obj/int_ext_angles_triangles.htm
Extraneous solution	A root of a derived equation that is not a root of the original equation.	MDH, page 148	In the process of solving the equation $\sqrt{x+3} = 9 - x$, both sides of the equation are squared to get $x + 3 = x^2 - 19x + 81$ which has solution 6 and 13. 6 is a solution of the original equation but 13 is extraneous because $\sqrt{13+3} \neq 9 - 13$. Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials and CCSS-M.

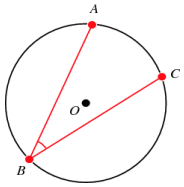
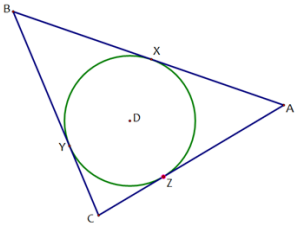
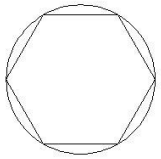
Extreme values	Maximum or minimum values for the output of a function within a given range of input values. Depending on what the function is modeling, this may represent maximum/minimum profit/loss, area/volume, altitude, efficiency, etc.		 Min output of -1 at input of -1 and max of 3 at input of 1. These are local min and max because they ignore the end behavior extremes.
Factoring/ factorization	To determine or indicate explicitly the factors of.	http://www.thefreedictionary.com/factoring	The factorization of $x^2 + 2x - 24$ is (x +6)(x – 4).
Focus (Foci)	A point, that along with a line (called a directrix), can be used to define all or part of a conic section.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://www.mathwords.com/d/directrix_parabola.htm
Frequency	1) The number of values in a specific class of a frequency distribution. 2) The value of *b* in the function *y*=sin*(bx)* or cos(*bx)*, etc. This value corresponds to the number of cycles that are completed in 2π.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	
Function	A relation in which each value of x is paired with a unique value of y.	Smarter Balanced Mathematics Glossary	f(x) = 2x + 3

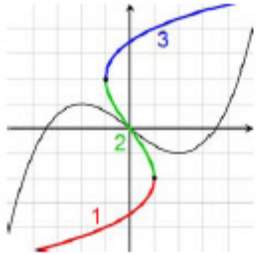
Fundamental Theorem of Algebra	A function with a variable with a positive integer power or a sum of these functions (a polynomial) has as many zeros (roots) when properly counted and taken from the set of complex numbers as the degree of the polynomial (the largest exponent/power).		The function y = f(x) = x3 – 4x2 + x + 6 has 3 zeros (3 x-values that plug into the equation to make y=0). The Fundamental Theorem of Algebra says there should be 3 because the biggest exponent on any of the x's is 3. The 3 x-values that make this function equal zero are -1, 2, and 3.
Geometric series	The indicated sum of the terms of a geometric sequence.	MDH, page 174	The geometric series corresponding to the geometric sequence 1, 2, 4, 8, 16, 32 is 1 + 2 + 4 + 8 + 16 + 32.
Geometric sequence	A sequence of numbers in which each succeeding term is obtained by multiplying the preceding term by the same number. That number is called the ratio or common ratio of the geometric sequence.	MDH, page 174	5, 15, 45, . . .
Graphical representation	A pictorial representation of some mathematical relationship.		
Half-plane	Given a line, the set of all points on each side of the lines is a half-plane. If the line is included in the half-plane, then the half-plane is said to be closed. If the line is not included, then the half-plane is said to be open.	MDH, page 183	 http://www.pdesas.org/module/content/resources/6178/view.ashx

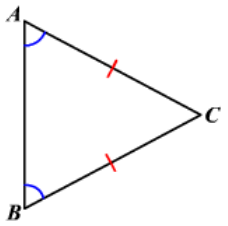
Histograms	A graph that displays the data by using vertical bars of various heights to represent the frequencies of a distribution. The data is graphed in intervals.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	 http://www.mathsisfun.com/data/histograms.html
Hyperbolas	One of the conic sections (see above). The only conic section made up of 2 distinct parts, but often one of the parts (branches) is used in applications. Hyperbolas have several applications and show up in many unexpected places as at right.	http://en.wikipedia.org/wiki/Hyperbola	 Three single branch hyperbolas can be seen in the light patterns on the wall. http://en.wikipedia.org/wiki/Hyperbola

Hypotenuse	The longest side of a right triangle; the side opposite the right angle.	Smarter Balanced Mathematics Glossary	 http://images.yourdictionary.com/hypotenuse
Hypothesis	A proposition or supposition developed to provide a basis for further investigation or research.	Smarter Balanced Mathematics Glossary	
Identity	An equality that is true for all values of the variable(s). The identity sign (≡) or the equals sign may be used	MDH, page 190	$2(x - y) \equiv 2x - 2y$
Imaginary numbers	A complex number $a + bi$ where $a=0$, $b\neq0$, and $i = \sqrt{-1}$.	MDH, page 192	$5i$, $-2i$
Independence/ Independent events	In probability, when the outcome of one event does not depend on the outcome of another event.	MDH, page 196	In two tosses of a coin, the outcome of the second toss does not depend on the outcome of the first toss. In each toss the probabiity of tails landing up is ½ and the probability of heads landing up is ½.
Informal limit arguments	Arguments that do not rely on the formal definition of a limit. Informal arguments are based on the idea that what is obvious is true	http://www.blacksacademy.net/content/4921.html	

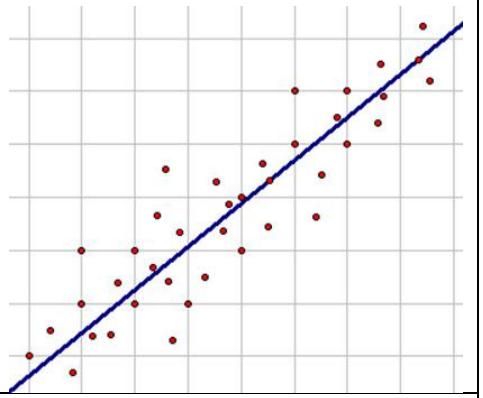
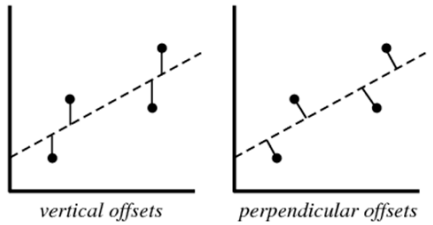
Input	Values substituted in for the independent variable of a function, equation, etc. The set of all these values available to be plugged in is often called the domain of the function. Also see output.		Find the value of the following function when t=2. D(t) = 55t This function might be a distance function D(2)=55x2=110 where D(t) represents the distance traveled in a certain time t. This could represent the distance traveled in 2 hours being 110 miles. If 3 were plugged in for t, the result would then give the distance traveled in 3 hours. Compare generalized examples for output.

Inscribed	1) Inscribed angle: An angle is inscribed in a circle when its vertex is on the circle and its sides are chords of the circle. 2) Inscribed circle: A circle is inscribed in a polygon if each side of the polygon is tangent to the circle. 3) Inscribed polygon: A polygon is inscribed in a circle if each vertex of the polygon is on the circle.	MDH, page 203 - 204	1)  http://mathworld.wolfram.com/InscribedAngle.html 2)  http://rchsbowman.wordpress.com/2010/03/11/geometry-notes-%E2%80%93-tangents-of-circles/ 3)  http://infocad2011.blogspot.com/2010/07/drawing-objects-in-autocad-2011-chapter_2406.html

Integers	A number expressible in the form *a* or –*a* for some whole number *a*.	CCSS-M Mathematics Glossary	0, 7, and -7 are integers.
Intercept	The values of a variable when all other variables in the equation equal zero (0). On a graph, the values where a function intersects the axes.	Smarter Balanced Mathematics Glossary	
Interpret	Making sense of data and mathematical models to put mathematics to work solving real-life, complex problems.		Understand the parts and meanings of formulas, measurements, etc. in order to use that knowledge to interpret the results (outcome, output) of quantitative, input data and then be able to use those results effectively.
Interquartile range	A measure of variation in a set of numerical data, the interquartile range is the distance between the first and third quartiles of the data set.	CCSS-M Mathematics Glossary	For the data set {1,3, 6, 7, 10, 12, 14, 15, 22, 120}, the interquartile range is 15 – 6 = 9.
Inverse function	A function that "undoes" what the original function does. It can also be seen as the *x*-*y* interchange of the function. The inverse of a function performs in reverse order the inverse operation for each operation of the function. The graph of an inverse function is a reflection of the original function across the line *y=x.*	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	$y = x^3$ +2 is equivalent to $x = \sqrt[3]{y-2}$. Its inverse if written $y = \sqrt[3]{x-2}$. 
Irrational number	A real number that cannot be expressed as a ratio of two numbers.	Smarter Balanced Mathematics Glossary	$\sqrt{3}$ $\frac{22}{7}$

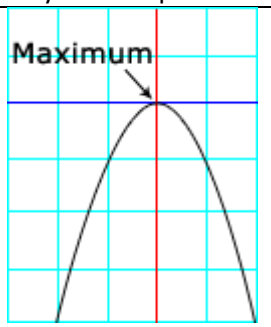
Isosceles triangle	A triangle with two congruent sides and two congruent angles.	Smarter Balanced Mathematics Glossary	 http://hotmath.com/hotmath_help/topics/isosceles-triangle-theorem.html
Joint frequencies	Entries in the body of a frequency table. Values on the horizontal and vertical margins are not included.	http://stattrek.com/statistics/two-way-table.aspx	**Two-Way Frequency Tables** Dance Sports TV Total Men 2 10 8 20 Women 16 6 8 30 Total 18 16 16 50 The joint frequencies are highlighted. http://stattrek.com/statistics/two-way-table.aspx

Law of Cosines	For any triangle ABC with sides *a, b,* and *c* opposite angle A, angle B, and angle C respectively, it is always true that $a^2 = b^2 + c^2 - 2bc \cos A$, $b^2 = a^2 + c^2 - 2ac \cos B$, and $c^2 = a^2 + b^2 - 2bc \cos C$.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	
Law of Sines	For any triangle ABC with sides *a, b,* and *c* opposite angle A, angle B, and angle C respectively, it is always true that $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	

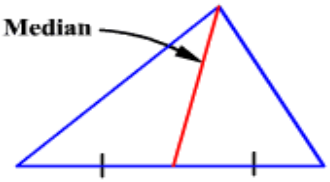
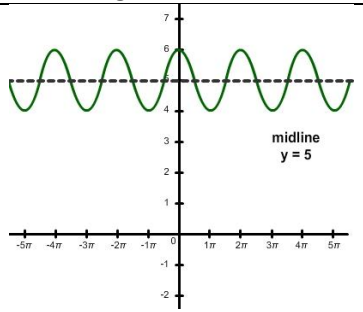
Linear association	A relationship between two variables that can be expressed as an equation and drawn as a straight line.	*Schaum's A-Z Mathematics* (2003). Berry, J. London, England: McGraw-Hill and Missouri Mathematics 7-12 Glossary.	If data were collected on students' heights and shoe lengths there would probably be a positive linear association in the data when graphed. Positive meaning as height increases shoe length also increases. Linear association would be that a straight positively sloped line could be drawn through the middle of the data points and almost all the points would be close to the line. 
Linear equation	An algebraic equation in which the variable quantity or quantities are in the first power only and the graph is a straight line.	Smarter Balanced Mathematics Glossary	40 = 5(x + 1) + 2y y = 6x + 11
Linear fit	Drawing a line, segment, or ray on a scatter plot to estimate the relationship between two sets of data. Assessing how closely the line represents the data.	*Algebra to Go: A mathematics handbook.* (2000). Wilmington, MA: Great Source Education Group, Inc. and Missouri Mathematics 7-12 Glossary	 http://mathworld.wolfram.com/LeastSquaresFitting.html

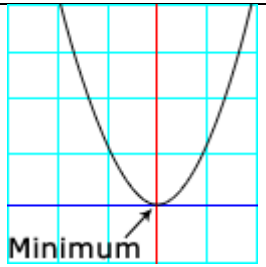
Linear functions	A function that can be expressed in the form of a linear equation (an equation in which a variable is raised to the first power).	MDH, page 230	{(1, 2), (2, 3), (3, 4), (4, 5), …} The three dots indicate that the function has an infinite number of members (ordered pairs). Expressed as an equation, this function is $y = x + 1$ (the second member of each ordered pair is 1 greater than the first member).
Logarithmic functions	Functions that involve logarithms.	*Schaum's A-Z Mathematics* (2003). Berry, J. London, England: McGraw-Hill and Missouri Mathematics 7-12 Glossary.	$f(x) = 4 \log(x + 1)$ Logarithmic functions model several scales used to describe measures of phenomena such as the Richter scale for earthquakes, loudness of sound measured in decibels, energy requirements in cells for substance transports, and some aspects of beach slopes, photographic f-stops, tornados, pH solutions, alitimeters, and astronomy. they often do the modeling making scales based on powers of ten. So a "length" of 1 has a scale "length" of 0, a "length" of 10 has a scale "length" of 1, a "length" of 100 has a scale "length" of 2, and a "length" of 1000 has a scale "length" of 3, etc.
Logarithm	The logarithm of a positive number is the exponent indicating the power to which it is necessary to raise a given number, the base, to produce the positive number.	MDH, page 232	$\log_2 8 = 3$ because $2^3 = 8$

Magnitude	A number assigned to a quantity so that it may be compared with other quantities. A property that can be described by a real number, such as the volume of a sphere or the length of a vector.	http://www.thefreedictionary.com/magnitude	Speed is a magnitude measure and is always positive with a label such as ft/sec or miles/hour. However, velocity includes a "direction" beyond just magnitude – positive if acceperating or negative if decelerating. Magnitude may be as simple as distance from 0 on a number line in which case there may not be a label and magnitude is the same as absolute value. Similarly, for 3 degrees below zero; 3 degrees is the magnitude and below zero is the direction.
Margin of error	Analytical technique that accounts for the number of acceptable errors in an experiment.	http://www.businessdictionary.com/definition/margin-of-error.html	In reports of survey polling, prior to elections for example, the result for the sampel is given and then there is often a statement like the margin of error is plus or minus 3%. This means that if the poll were conducted several more times with different groups, the result would probably only vary from what was gien by 3% up or down. If a confidence level is also given, that is a probability of any other poll taken with any survey group being within the margin of error of the original survey report. Similar general concepts apply to data collected to develop safety and other information on products, materials, tools, etc. and even with some modifications safety margins for design, planning, and engineering of such diverse thigns as medicine, finance, buildings, and many other areas.

Marginal relative frequencies	Entries in the "Total" row and "Total" column are called marginal frequencies.	http://stattrek.com/statistics/two-way-table.aspx	**Two-Way Frequency Tables** The marginal frquencies are highlighted. http://stattrek.com/statistics/two-way-table.aspx
Maximum (maxima)	The largest value in the range of a function.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://www.formyschoolstuff.com/school/math/glossary/M.htm
Mean	A measure of center in a set of numerical data, computed by adding the values in a list and then dividing by the number of values in the list.	CCSS-M Mathematics Glossary	For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the mean is 21.

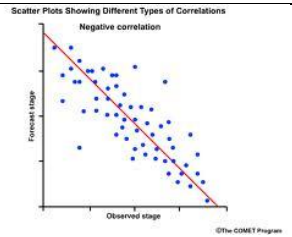
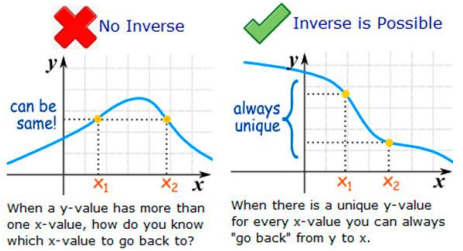
	Dance	Sports	TV	Total
Men	2	10	8	20
Women	16	6	8	30
Total	18	16	16	50

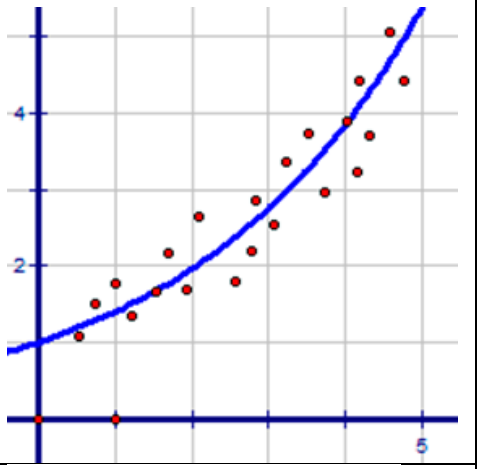
Mean absolute deviation	A measure of variation in a set of numerical data, computed by adding the distances between each data value and the mean, then dividing by the number of data values.	CCSS-M Mathematics Glossary	For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the mean absolute deviation is 20.
Median	1) Of a data set: A measure of center in a set of numerical data. The median of a list of values is the value appearing at the center of a sorted version of the list – or the mean of the two central values, if the list contains an even number of values. 2) A line segment that connects a vertex of a triangle with the midpoint of the side opposite to the vertex.	CCSS-M Mathematics Glossary Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	1) For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 90}, the median is 11. 2)  http://hotmath.com/hotmath_help/topics/medians-of-a-triangle.html
Midline	In the graph of a trigonometric function, the horizontal line halfway between its maximum and minimum values.	CCSS-M Mathematics Glossary	 http://aventalearning.com/content168staging/2008Trigonometry/unit4/html/section_3_page_19.html

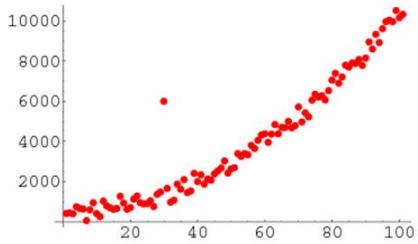
Minimum (minima)	The smallest value in the range of a function	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://www.formyschoolstuff.com/school/math/glossary/M.htm
Model	A representation of a given situation that can be used to describe the present situation or predict some aspect of the situation in the future. A mathematical model is a representation in the form of a mathematical quantity such as a number, a vector, a formula, an inequality, a graph, a table of values, etc.	*Schaum's A-Z Mathematics* (2003). Berry, J. London, England: McGraw-Hill and Missouri 7-12 Mathematics Glossary.	Manimuplatives – objects used to understand math concepts such as add, subtract, multiply, divide, learn fractions, etc. Models can be house plans, wiring diagrams, schematics, illustrations, simulations, equations, formulats, etc. These can be in textbooks, workbooks, self-contained (like house plans), etc. or electronic. Many models are pre-developed (formulas, and teaching products), but students can also make their own models to fit situations encountered while learning and doing. Often creating the model is the goal.

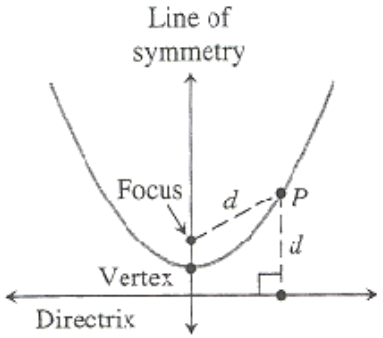
Modeling	Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions.	Common Core State Standards for Mathematics, page 72	Informal modeling could be making a quick sketch to help with thinking or explain thinking to someone else. More formal modeling requires more detail and may take more time to make graphs, charts, tables, scaled drawings, equations, etc. However, a great deal of modeling technology is available to make detailed models quickly. Walking from the park 4000 feet to get home; Taylor averages 250 feet per minute. The following statements and equation model the situation. Let d be the distance Taylor is from home in feet. Let t be the number of minutes Taylor has walked d=4000-250t. t is the independent variable and any value can be plugged in for this time and the number will represent minutes including fractional or decimal numbers representing parts of a minute. However, negative numbers for time do not make sense in this context hor do numbers greater than 16 because these yield a negative distance. In other modeling contexts, negative values might be quite appropriate such as those involving cold, Fahrenheit-scale temperatures.

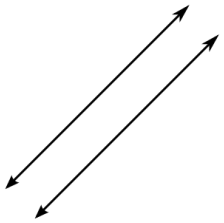
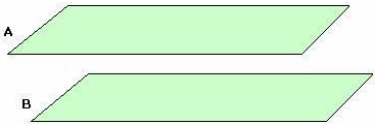
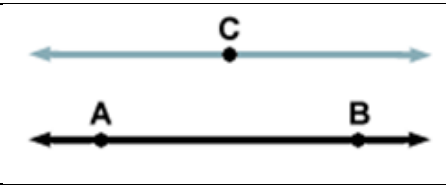
Multiplication Rule	Used for calculating the probability of two events A and B both happening. (Concept can be extended for more than two events.) For independent events, the probability of A and B equals the probability of A and times the probability of B. For dependent events, the probability of A and B equals the probability of A times the probability of B given A.		P(A and B) = P(A)P(B) = P(B)P(A) for independent events. P(A and B) = P(A)P(B|A) = P(B)P(A|B) for dependent events. Independent events are ones where A has no effect on B. Flipping a coin then rolling a die are independent events. The probability of getting a tail on the coin and a five on the die is $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$ Dependent events are ones where A affects B. If a card is drawn from a standard 52 card deck and then a second card is drawn without replacing the first card into the deck, the second draw is a conditional probability (a dependent event). So the probability of drawing a king and then a ten is $\frac{4}{52} \times \frac{4}{51} = \frac{16}{2652}$
Multiplicative inverses	Two numbers whose product is 1 are multiplicative inverses.	CCSS-M Mathematics Glossary	3/4 and 4/3 are multiplicative inverses of another because 3/4 x 4/3 = 4/3 x3/4 = 1.

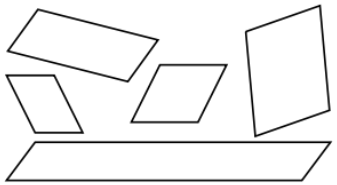
Negative association	A relationship between variables such that as one variable increases, the other variable decreases.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	 https://www.meted.ucar.edu/sign_in.php?go_back_to=http%253A%252F%252Fwww.meted.ucar.edu%252Fhydro%252Fverification%252Fintro%252Fprint_version%252F04-Correlation.htm
Non-invertible function	Function without an inverse – a way of undoing the function by plugging the output values into another (the inverse) function to obtain the original input values. Often a non-invertible function can be made invertible if certain restrictions are applied. (see second example for output)	*http://www.mathisfun.com/sets/function-inverse.html*	

Nonlinear association	A relationship between two variables x and y is described as nonlinear if it is not of the form y = ax + b. The graph will not be a straight line, the equation will not be of the first degree.	*Schaum's A-Z Mathematics* (2003). Berry, J. London, England: McGraw-Hill and Missouri Mathematics 7-12 Glossary.	$y = e^2$ and $y = x^2$ Population changes (especially bacterial cultures and mitosis – cell splitting), many financial measures and trends, and wound healing follow exponential associations. Acceleration, deceleration, and several other motions often follow quadratic associations. There are several other association types such as hyperbolas – a special case of which is called an inverse. 
Number line diagram	A diagram of the number line used to represent numbers and support reasoning about them. In a number line diagram for measurement quantities, the interval from 0 to 1 on the diagram represents the unit of measure for the quantity.	CCSS-M	 http://www.mathematic.ws/

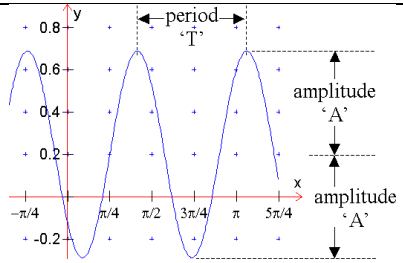
Outliers	Data that are more than 1.5 times the interquartile range from the quartiles.	Price, J., Rath, J., Leschensky, W., Malloy, C., Alban, Y., (1997). Pre-Algebra: An Integrated Transition to Algebra and Geometry. New York: McGraw Hill.	68, 72, 71, 68, 14, 73, 69, 70, 65, 74 In the list above, 14 is an outlier since all the other numbers are close to 70. There are various ways to consider and deal with an outlier but no absolute rules. 
Output	A function takes inputs, runs them through a process, to give a result – an output (the dependent variable). Also see input.		A function is somewhat like a vending machine with money going in, a button instruction and mechanism, being the operating of the function, and the product and any change received being the "output." Functions can also be thought of as similar to a replacement cipher. A number is input into the function and the outpus is the replacement. If a function is invertible, a "key" can be made for the "cipher" to undo the "coded" value and get back to the input value.

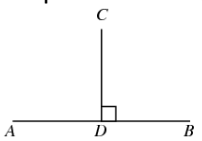
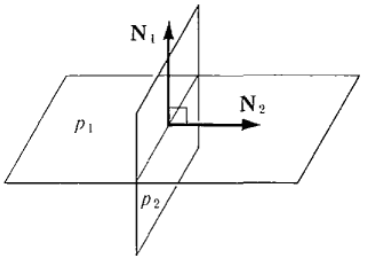
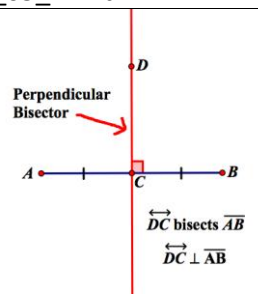
Parabola	A curve in which every point is the same distance from a fixed point, called the focus, as it is from a fixed line, called the directrix. The axis of the parabola is a line about which the parabola is symmetric. The vertex of a parabola is the point at which the parabola intersects the axis.	MDH, page 273	 http://www.personal.kent.edu/~rmuhamma/Algorithms/MyAlgorithms/parabola.htm

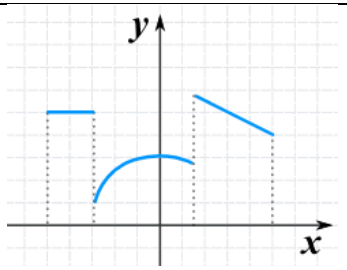
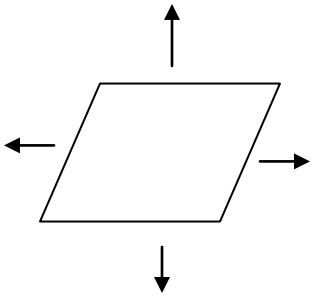
Parallel	Lines and planes that do not intersect. They are everywhere the same distance from each other.	MDH, page 274	Parallel lines  http://commons.wikimedia.org/wiki/File:Two_Parallel_lines.svg Parallel planes  http://www.icoachmath.com/math_dictionary/Parallel_Planes.html
Parallel Postulate	Through a point not on a given line there is exactly one parallel line. This is the distinguishing feature of Euclidean geometry (the type of geometry studied through high school).	http://www.sparknotes.com/math/geometry1/constructions/terms.html	

Parallelogram	A quadrilateral with both pairs of opposite sides parallel.	MDH, page 275	 http://euler.slu.edu/escher/index.php/Squares,_Rectangles,_Parallelograms_and_Other_Polygons
Pascal's Triangle	An unending number pattern named for Blaise Pascal in which the numbers in each row are obtained by adding two numbers in the row above and writing a one at the beginning and end of the row.		1 1 1 1 2 1 1 3 3 1 1 4 6 4 1 1 5 10 10 5 1

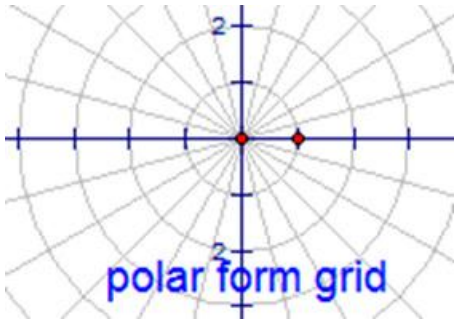
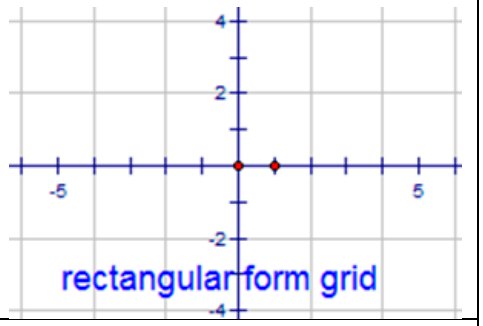
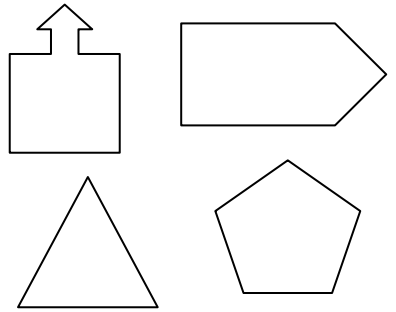
Payoff values	Return on "investment" from a particular possible outcome. This possible outcome is usually then assigned a probability value along with other payoff possibilities. Expected value can then be calculated and risk tolerances computed in order to make decisions. Could be applied in many decision situations.		Money example below is simple to create, but the concepts do not have to involve money, at least not so directly, and risks do not have to be so either/or direct. Could apply to raffles including advertising gained for a business from donating the prize, time doing homework and grades, time spent working versus money earned – basically, in all cases is the time and/or money invested worth the "reward." You pay a friend 5¢. then your friend flips a coin. If the coin is heads, your friend gives your 5¢ back and pays you an additional 5¢. If the coin is tails your friend keeps the 5¢. Outcome Probability Payoff Heads ½ 10¢ Tails ½ -5¢ Expected value calculation (1/2)*10¢ + (1/2)*(-5¢) = 5¢ + -2.5¢ = 2.5¢

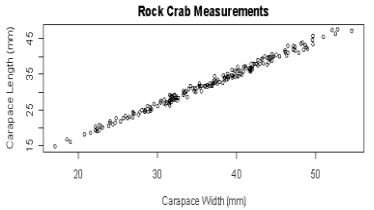
Period	The length of one cycle of a graph.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://www.teacherschoice.com.au/maths_library/functions/about_trigonometric_functions.htm
Periodic phenomena	A situation in which the same values are repeated over a set length called the period.	Sallee,T., Kysh, J., Dietiker, L., & Hoey, B. (2009). Pre-Calculus with Trigonometry. Sacremento, CA: College Preparatory Materials.	There are numerous examples—days, seasons, moon phases, years, alternating electrical current, light, sound, migrations, waves in water and crowds, gears, pulleys, business and finance, biological cycles, periodic table of elements, etc.
Periodicity	The character of being periodic; the tendency to recur at regular intervals.	http://dictionary.reference.com/browse/periodicity	

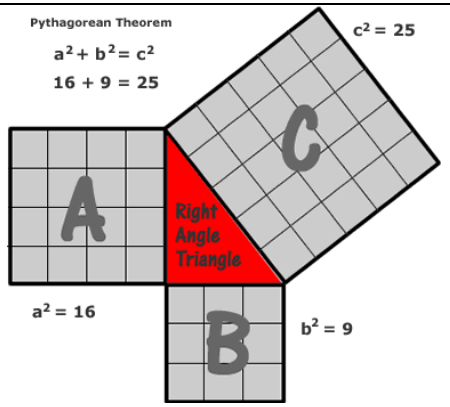
Perpendicular	Two lines, two line segments, or two planes that cross to form a right angle.	Smarter Balanced Mathematics Glossary	Perpendicular segments  http://mathworld.wolfram.com/Perpendicular.html Perpendicular planes  http://www.vias.org/calculus/10_vectors_05_12.html
Perpendicular bisector of segment	A line, ray, or line segment that divides a segment into two congruent segments and is perpendicular to the segment. Every point on the perpendicular bisector is equidistant from the endpoints of the segment.	MDH, page 283	

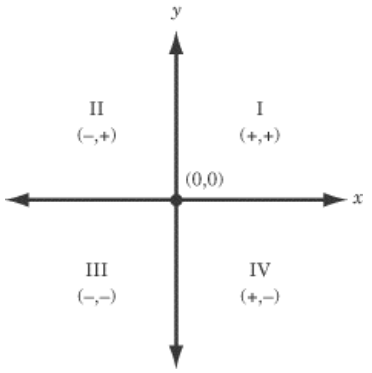
Piecewise-defined function	A function that use different rules for different parts of its domain.	Sallee,T., Kysh, J., Dietiker, L., & Hoey, B. (2009). Pre-Calculus with Trigonometry. Sacremento, CA: College Preparatory Materials.	 http://www.mathsisfun.com/sets/functions-piecewise.html cost of parking = { $3 for 0 to less than 30 minute; $6 for 30 minutes to less than 1 hour; $9 for more than 1 hour water bill = { $25 for the first 1000 gallons; then $1 per 100 gallons for additional gallons
Plane	An undefined, two-dimensional geometric surface that has no depth and no boundaries specified. A plane is determined by defining at least three distinct points or at least two distinct lines existing on the plane.	Smarter Balanced Mathematics Glossary	

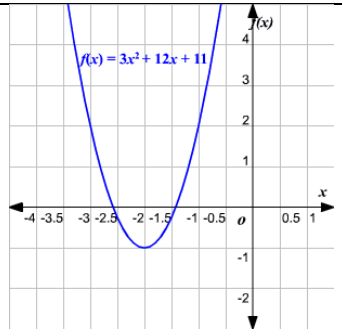
Plane Euclidean geometry	The type of geometry studied from an early age through most or all of high school. It is based on a few defined concepts and from these all other geometric ideas can be developed. It can be studied with (analytic) or without (synthetic) a coordinate (grid) system. The main difference between this and other types of geometry is the Parallel Postulate.		The point and line are fundamental. The shapes, which many of which, are learned about at an early age – triangle, square, circle, etc. The formulas, such as area of circles, squares, rectangles, etc., are often learned in the middle grades. The proofs learned in high school geometry and graphs of equations learned in algebra courses. These are all concepts of Euclidean geometry.
Plots	Graphs related to data. These may be of just points representing the raw data or assorted graphs for showing summarizations of data after some analysis.		Seatter plots (for raw data) Stem-and-leaf plots Box (and-whisker) plots Histograms Line graphs (plots) Pie graph (chart) Bar graph Pictograph Frequency polygon

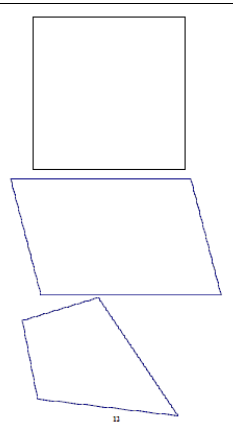
Polar form	A grid graphing system using radius and angle measures to plot locations instead of the more common rectangular Cartesian coordinate grid system. See also rectangular form.		 
Polygon	A closed-plane figure, having at least three sides that are line segments and are connected at their end-points.	Smarter Balanced Mathematics Glossary	
Polynomial	A sum and/or difference of terms. A polynomial with 2 terms is called a binomial. A polynomial with 3 terms is called a trinomial.	MDH, page 284	$3x - 2$ $4x^2 - 5x + 3$

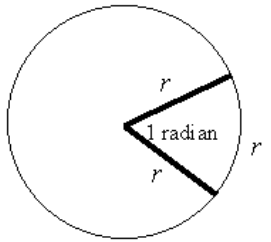
Polynomial functions	A function whose values are given by a polynomial.	MDH, page 295	$f(x) = x^2 + x + 3$
Positive association	A relationship between variables such that as one variable increases, the other variable also increases.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	 http://www.mrholloman.net/APS/Notes/Chapter03/apsnotes03.htm
Principle of superposition	Principle stating that two geometric figures are defined to be congruent if there is a sequence of rigid motions that carries one onto the other.	CCSS-M, page 74	
Probability	A number between 0 and 1 used to quantify likelihood for processes that have uncertain outcomes(such as tossing a coin, selecting a person at random from a group of people, tossing a ball at a target, or testing for a medical condition).	CCSS-M Mathematics Glossary	
Probability distribution	The set of possible values of a random variable with a probability assigned to each.	CCSS-M Mathematics Glossary	
Probability model	A probability model is used to assign probabilities to outcomes of a chance process by examining the nature of the process. The set of all outcomes is called the sample space, and their probabilities sum to 1.	CCSS-M Mathematics Glossary	
Proportion	A mathematical sentence stating that two ratios are equal.	Smarter Balanced Mathematics Glossary	1/10 = x/100
Proportional relationships	A relationship in which the ratio of inputs and outputs is always the same.	http://www.learner.org/courses/learningmath/algebra/keyterms.html#p	If oranges are sold 5 for $2, then 20 oranges would cost $8.

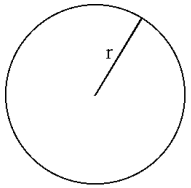
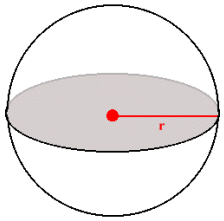
Pythagorean identity	For trigonometric function, $\cos^2 x + \sin^2 x = 1$ for any value of x.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	
Pythagorean theorem	The square of the hypotenuse (c) of a right triangle is equal to the sum of the squares of the legs (a and b) as shown in the equation $c^2 = a^2 + b^2$.	Smarter Balanced Mathematics Glossary	 http://math.about.com/od/pythagorean/ss/pythag.htm
Pythagorean triple	Any three positive integers *a, b,* and *c* that makes the relationship $a^2 + b^2 = c^2$.	Dietiker, L., Kysh, J., Hoey, B., & Sallee, T. (2007). Geometry Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	3, 4, 5 form a Pythagorean triple because $3^2 + 4^2 = 5^2$.

Quadrant	Any of the four regions formed by the axes in a rectangular coordinate system.	Smarter Balanced Mathematics Glossary	 http://www.sparknotes.com/testprep/books/sat2/math2c/chapter8section1.html
Quadratic equations	Any equation where at least one term has degree 2 and no term has degree higher than 2.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	$y = 2x^2 – 3x + 5$
Quadratic formula	$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ This formula gives the solutions for a quadratic equation in one variable that can be written in the form $ax^2 + bx + c = 0$.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	

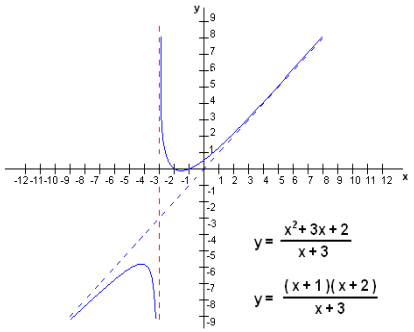
Quadratic function	A quadratic function that can be written $y= ax^2 + bx + c$ is also a quadratic function where x is the independent variable and y is the dependent variable. It's graph is a parabola with vertical orientation.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	 http://hotmath.com/hotmath_help/topics/graphing-quadratic-equations.html
Quadratic models	Representing a situation using an equation of the form $y = ax^2 + bx + c$.	http://www.wmich.edu/cpmp/1st/unitsamples/pdfs/C2U4_265-273.pdf	For a typical basketball shot, the ball's height (in feet) will be a function of time in flight (in seconds), modeled by an equation such as $h = –16t2 + 40t + 6$. http://www.wmich.edu/cpmp/1st/unitsamples/pdfs/C2U4_265-273.pdf

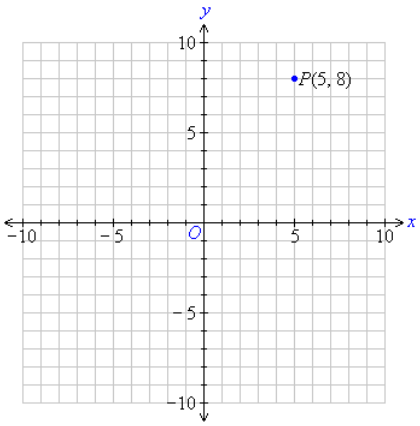
Quadrilateral	A quadrilateral with four sides.	MDH, page 318	 http://www.jamesrahn.com/geometry/pages/properties_of_quadrilaterals.htm
Qualitatively	In a qualitative manner, with respect to quality rather than quantity. Pertaining to being described or characterized without measuring attributes, characteristics, properties, etc. http://www.businessdictionary.com/definition/qualitative-data.html	http://www.allwords.com/word-qualitatively.html	
Quantification	To determine or express the quantity of.	http://www.thefreedictionary.com/quantification	
Quantitatively	Having to do with quantity, capable of being measured.	http://www.yourdictionary.com/quantitatively	
Quotient	The result of dividing two numbers.	Smarter Balanced Mathematics Glossary	In the equation 20÷5 = 4, the quotient is 4.

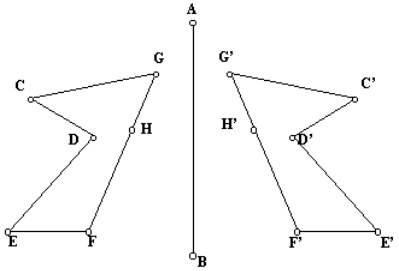
Radian	A unit for measuring angles. A central angle with sides and intercepted arcs all the same length measures 1 radian.	MDH, page 321	 http://www.intmath.com/trigonometric-functions/7-radians.php
Radian measure	An arc of a circle equal to the radius of the circle is one radian. The central angle for this arc has measure one radian. 1 radian = $\frac{180}{\pi}$ degrees. A way of measuring angles instead of using degrees. It is more commonly used in higher mathematics and is based on a relationship (ratio) between a portion of the circumference of a circle (an arc length) and its radius.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	Degrees=Radians $0=0$ $30=\frac{\pi}{6}$ $45=\frac{\pi}{4}$ $57.3 \approx 1$ $60=\frac{\pi}{3}$ $90=\frac{\pi}{2}$ $180=\pi$
Radical	An expression that has a root (e.g., square root, cube root). Any root can be specified by an index number, b, in the form $\sqrt[b]{a}$. A radical without an index number is understood to be a square root.	Smarter Balanced Mathematics Glossary	$\sqrt{36}$ $\sqrt[3]{27}$
Radical sign	The symbol ($\sqrt{}$) used before a number to show that the number is a radicand.	Smarter Balanced Mathematics Glossary	

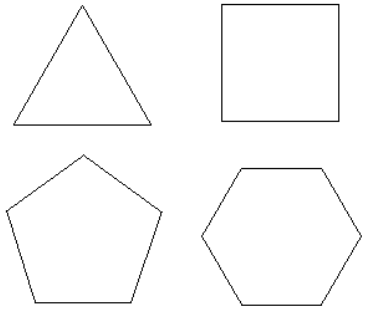
Radicand	The number that appears within a radical sign.	Smarter Balanced Mathematics Glossary	In $\sqrt{36}$, 36 is the radicand.
Radius (radii)	A line segment extending from the center of a circle or sphere to a point on the circle or sphere.	Smarter Balanced Mathematics Glossary	 http://www.diracdelta.co.uk/science/source/r/a/radius/source.html  http://library.thinkquest.org/20991/geo/solids.html

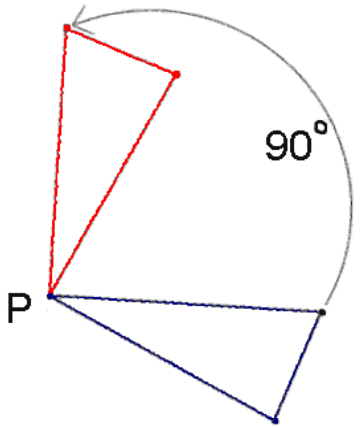
Randomization	Purposefully making all choices equally likely in a sampling survey or assigning subjects in a study to treatment or non-treatment groups in a random way. This helps minimize the effects other factors might have on conclusions drawn. Collecting data from a random sample of a population making it possible to draw valid conclusions about the population. Randomly assigning individuals to different treatments.	Common Core State Standards for Mathematics, page 79	
Range of a distribution	The lowest value (L) in a set of numbers through the highest value (H) in the set. When the width of the range is expressed as a single number, the range is calculated as the difference between the highest and lowest values (H-L). Other presentations show the range calculated as (H – L – 1). Depending on the context, the result of either calculation would be considered correct.	Smarter Balanced Mathematics Glossary	In the data set {1, 2, 3, 4, 5} the range is 5 – 1 =4, or from 1 to 5.
Range of a function	The set of all second members (elements) of a function.	MDH, page 325	Given the function {(1, 5), (2, 10), (3, 15), (4, 20), (5, 25)}, the range is {5, 10, 15, 20, 25}.
Ratio	The comparison of two quantities.	Smarter Balanced Mathematics Glossary	The ratio of a and b is a:b or a/b, where b ≠ 0.
Rational expression	A quotient or two polynomials with a non-zero denominator.	CCSS-M Mathematics Glossary	$\frac{2x+7}{x-5}$, $x \neq 5$
Rational exponents	Exponents that can *a/b* or *–a/b* for fraction *a/b*.	CCSS-M Mathematics Glossary	$x^{\frac{1}{3}}$ The exponent in the above expression is a rational exponent.

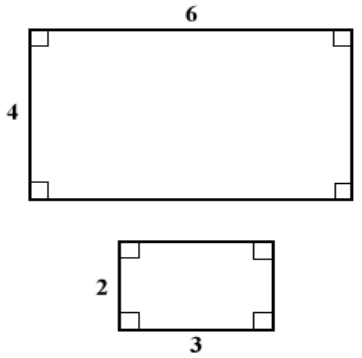
Rational functions	A quotient of two polynomials P(z) and Q(z), R(z), is called a rational function, or sometimes a rational polynomial function.	Weisstein, Eric W., "rational function," From *MathWorld* --A Wolfram Web Resource. http://mathworld.wolfram.com/RationalFunction.html	 http://algebra.freehomeworkmathhelp.com/Relations_and_Functions/Graphs/Graphs_of_Algebra_Functions/graphs_of_algebra_functions.html
Rational number	A number expression in the form *a/b* or *–a/b* for fraction *a/b*. The rational numbers include the integers.	CCSS-M Mathematics Glossary	$\frac{4}{9}$, 0.23, -2, 3 ¾ are all rational numbers.
Real numbers	The set of all rational and irrational numbers.	Smarter Balanced Mathematics Glossary	

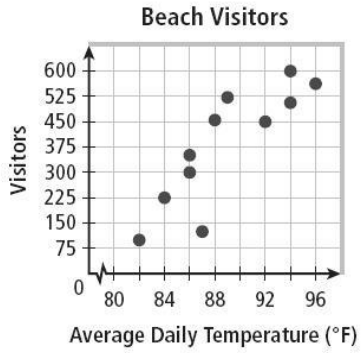
Rectangular coordinate system	A two-dimensional network of horizontal and vertical lines that are parallel and evenly-spaced; especially designed for locating points, displaying data, or drawing maps.	Smarter Balanced Mathematics Glossary	 http://www.mathsteacher.com.au/year8/ch15_graphs/01_cartesian/plane.htm
Recursive process	Using (often defining a function by) a repeating process to develop a series of results (see recursive rule). This process is many times used when having a spreadsheet technology do fill multiple calculations in a table.		 Series: 5, 8, 14, 17, … (adds 3 every time from a start of 5)
Recursive rule	A rule that gives the first term and then tells how to get the next term of the sequence from the term or terms that precede it.	Kysh, J., Dietiker, L., &Sallee, T. & Hoey, B., (2009). Algebra 2 Connections, College Preparatory Materials, Sacramento, CA: College Preparatory Materials.	Consider the sequence 3, 9, 27, 81, ... Each succesive term is found by multiplying the preceding term by 3.

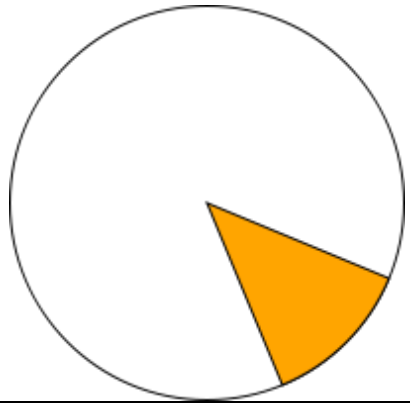
Recursively defined functions	A function ƒ is *recursively* defined if at least one value ƒ(*x*) is defined in terms of another value ƒ(*y*), where $x \neq y$.	http://web.cecs.pdx.edu/~jhein/lectures/Section.3.2.pdf	
Reflection	A transformation that produces the mirror image of a geometric figure over a line of reflection.	Smarter Balanced Mathematics Glossary	 http://www.woodrow.org/teachers/mi/1993/23bann.html
Regression functions	A function that describes the results of regression. Regression is a statistical method used to describe the nature of the relationship between variables.	Bluman, A. G. (2001). Elementary Statistics: A Step by Step Approach, Boston: McGraw Hill.	**http://people.hofstra.edu/stefan_waner/realworld/calctopic1/regression.html** This has detailed information on linear regression including how to calculate it, some information on calculating exponential regression, and links to several other regression function "calculators."

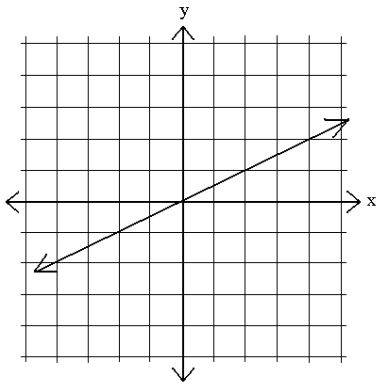
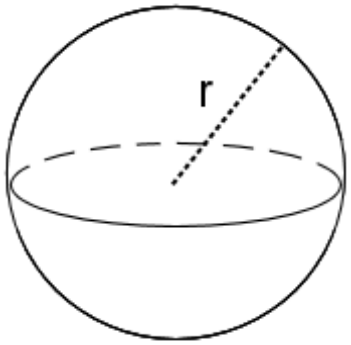
Regular polygon	A polygon that is both equilateral (all sides congruent) and equiangular (all angles congruent).	Smarter Balanced Mathematics Glossary	 **http://mathforum.org/sum95/math_and/poly/reg_polygons.html**
Relative frequencies	The ratio of frequency in a given category to the total number, usually expressed as a decimal. For a given set of data, the sum of the relative frequencies is 1.	MDH, page 341	In a class of 20 students, 5 students got As. 6 students got Bs amd 9 students got Cs. The relative frequencies are: As: 5/20 or 0.25 Bs: 6/20 or 0.3 Cs: 9/20 or 0.45
Residuals	Residual (or error) represents unexplained (or residual) variation after fitting a regression model. It is the difference (or left over) between the observed value of the variable and the value suggested by the regression model.	http://www.stats.gla.ac.uk/steps/glossary/paired_data.html#resid	

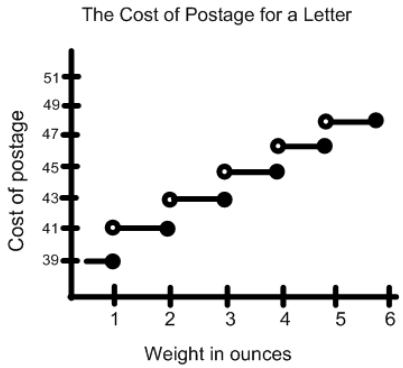
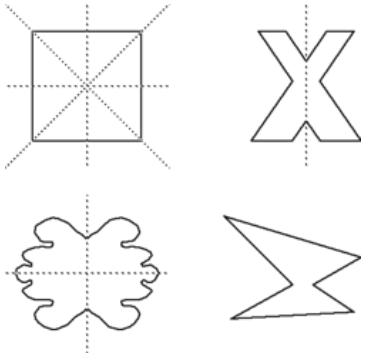
Rigid Motion	A transformation of points in space consisting of a sequence of one or more translations, reflections, and/or rotations. Rigid motions here are assumed to preserve distances and angle measures.	CCSS-M Mathematics Glossary	
Rotation	A transformation of a figure by turning it about a center point or axis. The amount of rotation is usually expressed in the number of degrees (e.g., a 90° rotation.)	Smarter Balanced Mathematics Glossary	 http://www.lessonplanspage.com/mathtransformationsunit912-rotations-htm/
Sample Space	In a probability model for a random process, a list of the individual outcomes that are to be considered.	CCSS-M Mathematics Glossary	If a regular die is rolled, the sample space (possible outcome) contains {1, 2, 3, 4, 5, 6}.

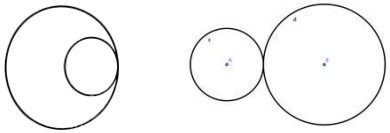
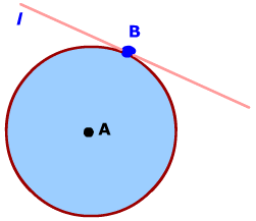
Scale	The numeric values, set at fixed intervals, assigned to the axis of a graph.	Smarter Balanced Mathematics Glossary	
Scale factor	The constant that is multiplied by the length of each side of a figure that produces an image that is the same shape as the original figure, but a different size.	Smarter Balanced Mathematics Glossary	The scale factor from the larger rectangle to the smaller rectangle is ½.  http://similartriangles3.pbworks.com/w/page/23046494/Definition%20of%20similar%20figures,%20similar%20triangles%20And%20general%20information

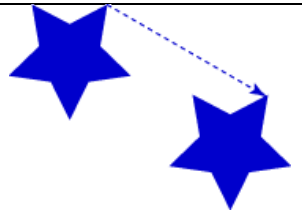
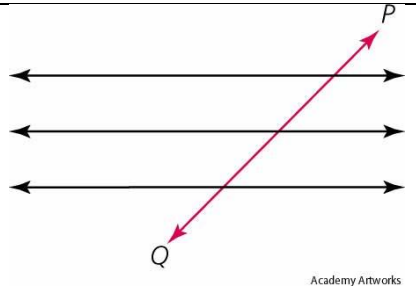
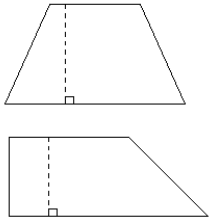
Scale model	A model or drawing based on a ratio of the dimension for the model and the actual object it represents.	Smarter Balanced Mathematics Glossary	
Scatter plot	A graph in the coordinate plane representing a set of bivariate data. For example, the heights and weights of a group of people could be displayed on a scatter plot.	CCSS-M Mathematics Glossary	 http://lbstatic-001.tenmarks.com/static/albums/Understanding-and-Graphing-Functions/Scatter-Plots-and-Trend-Lines-practice.html
Scientific notation	A shorthand method of writing very large or very small numbers using exponents in which a number is expressed as the product of a power of 10 and a number that is greater than or equal to one and less than 10.	Smarter Balanced Mathematics Glossary	$4.23 \times 10^6 = 4{,}230{,}000$

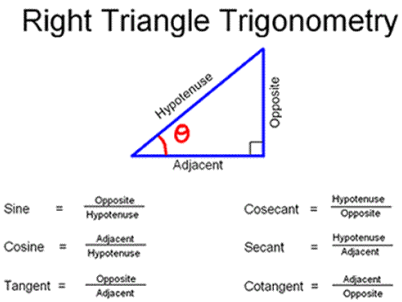
Sector of a circle	A part of the interior of the circle whose boundary consists of two radii.	MDH, page 359	A sector is shaded in the circle below. 
Sequence	An ordered list of numbers with either a constant difference (arithmetic) or a constant ratio (geometric).	Smarter Balanced Mathematics Glossary	2, 4, 6, 8, . . .
Simultaneous linear equations (or system of linear equations)	A group of two or more linear equations that are related to the same situation and share variables. The solution to a system of equations is an ordered number set that makes all of the equations true.	Smarter Balanced Mathematics Glossary	$2x + y = 11$ $4x - 3y = 7$ The solution is (4, 3).
Sine of an angle	The ratio of the lengths of the side of the triangle opposite the angle and the hypotenuse.	http://mathworld.wolfram.com/Sine.html	$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$. http://mathworld.wolfram.com/Sine.html

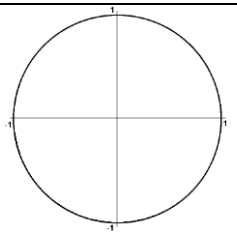
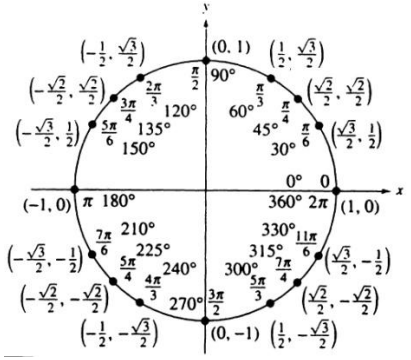
Slope	The ratio of change in the vertical axis (*y*-axis) to each unit change in the horizontal axis (*x*-axis) in the form rise/run or $\Delta x/\Delta y$. Also, the constant, *m*, in the linear equation for the slope-intercept form, $y=mx + b$.	Smarter Balanced Mathematics Glossary	The slope of the line is ½. 
Sphere	A three-dimensional figure in which all points on the figure are equidistant from a center point.	Smarter Balanced Mathematics Glossary	 http://math-help.info/2006/04/volume-sphere/
Square root	A positive real number that can be multiplied by itself to produce a given number.	Smarter Balanced Mathematics Glossary	The square root of 49 is 7 or $\sqrt{49} = 7$.
Standard deviation	A measure of the dispersion (i.e., the degree to which data are spread out) of a set of data relative to the mean.	http://www.platinumgmat.com/gmat_study_guide/statistics_standard_deviation	

Step function	A step function is a special type of function whose graph is a series of line segments. The graph of a step function looks like a series of small steps.	http://www.icoachmath.com/math_dictionary/Step_Function.html	 http://www.algebra-class.com/step-functions.html
Symmetry (reflectional)	A term describing the result of a line drawn through the center of a figure such that the two halves of the figure are reflections of each other across the line.	Smarter Balanced Mathematics Glossary	The lines are lines of symmetry. The fourth figure has no lines of symmetry.  http://en.wikipedia.org/wiki/Reflection_symmetry

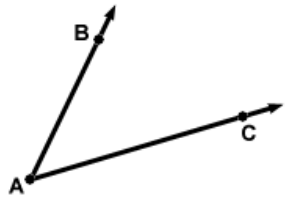
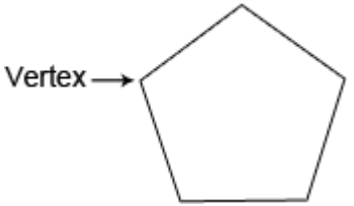
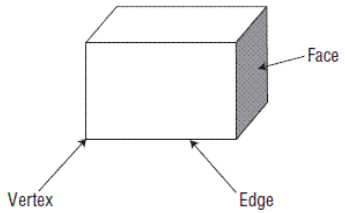
System of equations or inequalities	A group of two or more equations or inequalities that are related to the same situation and share the same variables. The solution to a system of equations or inequalities is an ordered number set that makes all of the equations or inequalities true	Smarter Balanced Mathematics Glossary	2x + 3y = 16 3y + 2x = 19 The solution to both equations is (5, 2).
Tangent	1) Tangent circles: Circles that touch each other at one point. 2) Tangent to a curve: A line that touches a curve at one point. 3) Tangent of an angle: In a right triangle the ratio of the side lengths opposite to the angle and adjacent the angle.	MDH, page 407 http://mathworld.wolfram.com/Tangent.html	1.  http://etc.usf.edu/clipart/72400/72481/72481_circles.htm 2. The line is tangent to the circle at point B.  http://library.thinkquest.org/C006354/9_1.html 3. $\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$. http://mathworld.wolfram.com/Tangent.html

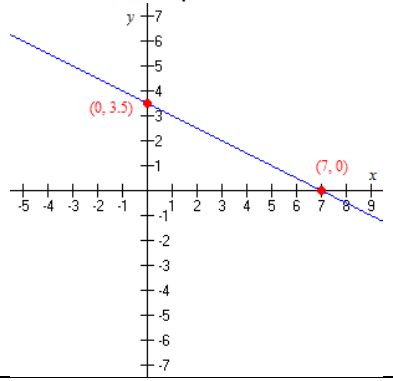
Translation	A transformation in which every point in a figure is moved in the same direction and by the same measure.	Smarter Balanced Mathematics Glossary	 http://www.learner.org/courses/learningmath/geometry/session7/part_c/index.html
Transversal	A line that intersects two or more lines at different points.	Smarter Balanced Mathematics Glossary	 http://images.yourdictionary.com/transversal
Trapezoid	A quadrilateral with exactly one pair of parallel sides. (Some sources define a trapezoid as having at least one pair of parallel sides.)	MDH, page 415	 http://www.sparknotes.com/math/geometry2/measurements/section4.rhtml
Trigonometric functions	A function whose independent variable is an angle measure, usually in degrees or radians.		f(x) = sin x

Trigonometric ratios	The ratios of the lengths of pairs of sides in a right triangle. There are six basic trigonometric ratios used in trigonometry: sine (sin), cosine (cos), tangent (tan), secant (sec), cosecant (csc), and cotangent (cot).	MDH, page 419	 http://htmartin.myweb.uga.edu/6190/quickreview3a.html
Uniform probability model	A probability model in which all outcomes have equal probabilities.	CCSS-M, page 51	When you roll a die, the probabilties of rolling any of the numbers from 1 through 6 are equal.
Unit	Of measurement, a scale used to measure.		Degrees, feet, inches, and pounds are units of measurement.

Unit circle	A circle whose radius is 1 unit in length.	MDH, page 424	 http://www.mathmistakes.info/facts/TrigFacts/learn/uc/uc.html  http://doallthemath.tumblr.com/
Variability	The extent to which data points in a statistical distribution or data set diverge from the average or mean value. Variability also refers to the extent to which these data points differ from each other. The commonly used measures of variability: range, mean, variance, mean absolute deviation, and standard deviation.	http://www.investopedia.com/terms/v/variability.asp#axzz21y4mwdpp	
Variable	Any symbol, usually a letter, that could represent a number.	Smarter Balanced Mathematics Glossary	In the equation $2x + y = 9$, x and y are variables.
Vector	A quantity that has both magnitude and direction.		Physical quantities such as velocity and force.

Vector quantities	Vectors (quantities) are represented by directed line segments. They have both direction and magnitude ("length," "distance" see also modulus for a similar concept) with units (see quantification).		 http://www.universetoday.com/83741/momentum
Velocity	Speed in a specific direction. To describe velocity, both the direction and speed are needed.	MDH, page 429	A car traveling east at 30 mph has a velocity of 30 mph E.

Vertex (vertices)	1) Of an angle: A point common to the two sides of an angle. 2) Of a polygon: A point common to two sides of the polygon. 3) Of a polyhedron: A point common to the edges of a polyhedron.	MDH, page 432	A is the vertex of the angle.  http://www.sparknotes.com/math/geometry1/constructions/section1.rhtml http://www.formyschoolstuff.com/school/math/glossary/V.htm  http://www.formyschoolstuff.com/school/math/glossary/V.htm  http://www.education.com/study-help/article/three-dimensional-figures/

x-coordinate	The first number of an ordered pair of numbers that corresponds to a point in a coordinate system.	MDH, page 439	In the ordered pair (2, 3), 2 is the *x*-coordinate.
x-intercept	The value of *x* at the point where a line or graph intersects the *x*-axis. The value of *y* is zero at this point.	Smarter Balanced Mathematics Glossary	The point with the coordinates (7,0) is the x-intercept. 
y-coordinate	The second number of an ordered pair of numbers that corresponds to a point in a coordinate system.	MDH, page 441	In the ordered pair (2, 3), 3 is the *y*-coordinate.
y-intercept	The value of *y* at the point where a line or graph intersects the *y*-axis. The value of *x* is zero at this point.	Smarter Balanced Mathematics Glossary	The point with the coordinates (0, 3.5) is the y-intercept.