Indiana Department of Education

Indiana Academic Standards for Mathematics – Adopted April 2014
Glossary and Vocabulary Words – Draft 5-29-14

Word or Symbol	Definition
"=" equal	the same value or the same in number
< less than	smaller value or less in number
> greater than	greater value or more in number
2-d	two dimensional
3-d	three dimensional
A	
AA	angle angle triangle congruence
absolute value	the distance of a number from zero; the positive value of a number
acute triangle	a triangle that has all angles less than 90°
addend	the numbers being added together
addition rule	when two events, a and b, are mutually exclusive, the probability that a or b will occur is the sum of the probability of each event p(a or b) = p(a) + p(b)
additive inverse	the additive inverse of any number x is the number that gives zero when added to x. the additive inverse of 5 is -5
adjacent angles	angles that share a common side
algorithmic	a set of rules for solving a problem with a specific number of steps
algorithmic approach	a step by step procedure is used in long division
alternate interior angles	angles that are on opposite sides of the transversal and on the inside of the given lines
analog clock	a time piece that has moving hands and hours marked from 1 to 12 to show the time
analytically	a limit can be calculated analytically by using algebra or calculus.
analyze	examine in detail
angle	the opening that is formed when two lines, line segments, or rays intersect
angle bisectors	a ray in the interior of an angle that divides the angle into 2 congruent angles
antiderivatives	an antiderviative is an integral
arc	a continuous part of a circle
arc length	the length of an arc or a portion of the circle
area	the measurement if square units of the interior region of a 2-dimensional figure
area models	models showing area squares
area of a sector	the region bounded by 2 radii of the circle and the arc they intercept
area of parallelogram	base times vertical height
area of trapezoid	1/2(length of side a + length of side b) times vertical height
area of triangle	1/2 base times height
array	items (such as objects, numbers, etc.) arranged in rows and columns
ASA	angle side angle triangle congruence
associative properties	denoting an operation is independent of grouping
associative properties of addition and multiplication	changing the groupins of addends or factors does not change the sum or product
associative property of addition and multiplication	the way in which numbers are grouped will not change the sum or product
attribute	a characteristic to describe an object usually within a pattern

average rates of change	the average rate of change of a function is defined as the change in x divided by the change in y
average value	$\frac{1}{b-a}\int^{b} f(x)dx$
axes	the "x" and "y" that cross at right angles on a coordinate plane
axiomatic system	a set of statements consisting of postulates and truths that can be derived from the postulates
axis	a reference line drawn on a graph
B	
bar graph	a graph drawn using (horizontal or vertical) rectangular bars to show how large each value is
base	the surface that a solid object stands on, or the bottom line of a shape such as a triangle or rectangle
base angles theorem	if 2 sides of a triangle are congruent, then the angles opposite them are congruent
biconditional statement	the conjunction of a conditional statement and its converse
binomial theorem	describes the algebraic expansion of powers of a binomial, "pascal's triangle"
bin-packing	objects of different volumes must be packed into a finite number of bins or containers each of volume v in a way that minimizes the number of bins used
bivariate	data that has two variables
box plot	a representation of data based on the minimum, first quartile, median, third quartile, and maximum
box plots	a graphical representation of the median, upper and lower quartiles, minimum and maximum data values using rectangles and lines
box-and-whisker plots	convenient way of graphically depicting groups of numerical data through their quartiles
C	
calculations	compute an answer
capacity	the amount a container can hold
categorical data	a set of data is sorted or divided into different categories, according to the attributes of the data
causation	causal relationship between conduct and result
centimeter	a centimeter (uk: centimeter) is a measure of length, there are 100 centimeters in a meter. 2.54 cm = 1 inch. the abbreviation is cm
central angle	vertex is the center of a circle and whose sides are the radii of the circle
central limit theorem	under certain conditions, the sum of many independent identically-distributed random variables, when scaled appropriately, converges in distribution to a standard normal distribution
chain rule	the chain rule is a formula for computing the derivative of the composition of two or more functions
chord	a segment whose endpoints are on a circle
chords in a sphere	a segment whose endpoints are on a sphere
circle	the locus/set of all points (x, y) that are the same distance from a fixed point (center, (h, k))
circle graph	a graph made of a circle divided into sectors. also called a pie chart or graph
circumference	the distance around the outside of a circle calculated by $2\pi r$ or πd
classify	to arrange in groups, by some property

closed interval	a closed interval is an interval that includes all of its limit points. if the endpoints of the interval are finite numbers a and b, then the interval {x: a<=x<=b } is denoted [a,b]. if one of the endpoints is +/-infinity, then the interval still contains all of its limit points (although not all of its endpoints), so [a, infinity) and (-infinity, b] are also closed intervals, as is the interval (-infinity, infinity)
clustering	when data seems to be "gathered" around a particular value
coefficient	the numerical factor of a term that contains a variable
column	an arrangement of figures, one above the other
combinations	a way of selecting members from a grouping, such that the order of selection does not matter
commutative properties	states that numbers can be added or multiplied in any order
commutative property of addition	the property that allows one to change the location of the addends while retaining the same sum; a+b = b+a
commutative property of multiplication	the property that allows one to change the location of the factors while retaining the same product; a●b = b●a
commutative property of addition and multiplication	the order in which numbers are added or multiplied does not change the sum or product
compare	to look at (two or more things) closely in order to see what is similar or different about them or in order to decide which one is better
comparisons	deciding if one number is greater than or less than, or equal to another number
complementary angles	two angles that add to 90 degrees
complementary events	those events where the probability of one event precludes the happening of the other event
complex shapes	a shape made by two or more basic shapes being put together
compliment	elements not in the set of question
compose	to create numbers by putting together smaller parts
composing	to put together
composite numbers	a composite number is a positive integer which has more factors than 1 and itself
composite shape	a shape that can be divided into more than 1 of the basic geometric figures. (triangle, parallelogram, circle, etc.)
compound events	consists of two or more simple events
compute	calculate; mathematically solve
concavity	the graph of f is concave upward on the interval if f' is increasing on the interval and concave downward on the interval if f' is decreasing on the interval
conditional probabilities	measures the probability of an event given that another event has occurred
conditional statement	a statement that can be written in the if-then form
cone	a three- dimensional solid with one curved surface and one flat, circular surface. the pointed end of a cone is its apex
confidence intervals	a type of interval estimate of a population parameter and is used to indicate the reliability of an estimate
congruent	having the same measure. congruent polygons have the same size and shape
congruent angles	having exactly the same measure in degrees
congruent concentric circles	2 or more coplanar circles that share the same center
congruent segments	having exactly the same measure of length
congruent triangles	having exactly the same side and angle measures
conjecture	opinion or conclusion formed on the basis of incomplete information
constant of proportionality	the constant value of the ratio of two proportional quantities x and y; usually written y = kx, where k is the factor (constant) of proportionality
constraint	limitation or restriction-a restriction on what answers are allowed

continuity	a function f is continuous at c if the following conditions are met: f(c) is defined, the limit of f(x) as x approaches c exists, and the limit of f(x) equals f(c) as x approaches c. continuity doesn't imply differentiability
contrapositive	the statement formed by negating both the hypothesis and conclusion of the converse of a conditional statement
converse	the statement formed by exchanging the hypothesis and conclusion of a conditional statement
conversion factors	an arithmetical multiplier for converting a quantity expressed in one set of units into an equivalent expressed in another
conversions	a change in the form of a measurement, different units, without a change in the size or amount
convert	change
coordinate plane	the flat surface determined by a horizontal number line, called the x-axis, and a vertical number line, called the y-axis, intersecting at a point called the origin
coordinate proof	involves a figure in the coordinate plane
coordinates	a set of values that show an exact position
correlation	a relation between two variables, does not imply causation
corresponding angles	when a transversal intersects 2 lines the angles formed on the same side of the transversal and on the same side of the given lines
count	to name or list the units of a group or collection one by one in order to determine a total
counterexample	an exception to a proposed rule
counting on	the addition strategy of beginning at the larger number and then counting on the other number
critical-path analysis	algorithm for scheduling a set of project activities
cross product	each element of one set is matched with the elements of another set
cross section	the intersection of a plane and solid
cube	a three- dimensional geometrical solid with six square faces
cumulative frequency distribution functions	describes the probability that a real-valued random variable x with a given probability distribution will be found to have a value less than or equal to x
cup	a measure of volume in the us and imperial systems of measurement. a cup equals a half pint or eight fluid ounces
cylinder	a three -dimensional solid with two circular bases that are opposite and parallel to each other
D	
data	a representation of a fact or figure. data can be the basis of graphs or observations
data distribution	an arrangement of values showing their frequency of occurrence
data sets	a collection of related information that is made of separate elements but can be manipulated as a unit
decimal expansion	the decimal expansion of a number is its representation in base-10 (i.e., in the decimal system) example the decimal expansion of 1/6 is the answer to 1÷6in decimal form
decimal number	a numeral that contains a decimal point
decimal point	a symbol used to separate the ones place from the tenths place in a decimal number (or dollars from cents in money)
decompose	the process of separating numbers into smaller components
decomposing	deconstructing; taking apart piece by piece
decomposing a number	breaking apart a number to aide in addition or subtraction

decreasing behavior of f and the sign of f'	if f' is negative, the slope of f is decreasing
defining attribute	a feature of a shape that is true for all instances of that shape
demoivre's theorem	$z_1^n = r^n(\cos(n\vartheta) + i\sin(n\vartheta))$
denominator	the number below the fraction bar which describes the number of equal parts into which the whole has been divided
dependent events	two events are dependent if the outcome or occurrence of the first affects the outcome or occurrence of the second so that the probability is changed
dependent variable	a variable in an expression, equation, or function that has its value determined by the choice of value(s) if the other variables
dependent variable	a value that changes or depends on the independent variable
describe	to say what something or someone is like
determinant	a value associated with a square matrix. it can be computed from the entries of the matrix by a specific arithmetic expression
deviation	the amount a single measurement differs from a fixed value
diameter	a straight line going through the center of a circle connecting two points on the circumference
difference	the answer in a subtraction problem
differentiability	differentiability implies continuity
digit	a symbol used to make numerals 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are the ten digits we use in everyday numbers.
digital clock	a clock or watch that shows the time using numbers, not hands
dilation	a transformation in which a similar image is formed by enlarging or reducing its preimage
dilation	a type of transformation that results from the reduction or enlargement of a figure
dime	10 cents
directed graph	a graph, or set of nodes connected by edges, where the edges have a direction associated with them
distance	the space between two points
distribution	the way data is spread over an area center: average of the data or the statistical center of the data (median)
distributive	to multiply a sum by a number, multiply each addened by the number outside the parentheses
distributive property	the sum of two addends multiplied by a number is the sum of the product of each addend and the number. for example, a(b+c)= ab + ac
dividends	the number that is divided by another number in a division operation
division	an operation that tells how many equal groups there are or how many are in each group
divisor	a number by which another number is divided. in a / b = c, b is the divisor
double number line diagram	a method of showing unit rates and rates using two number lines set equal to each other
E	
edge	a line segment where 2 faces of a polyhedron meet
election theory	the mathematical treatment of the process by which democratic societies or groups resolve the many and conflicting opinions of the members of the group into a single choice of the group
element	the distinct objects in a set
endpoint	the last point on a segment or ray
english measure	a standard system of measurements based on the inch, pound, and fahrenheit degrees

equal	exactly the same amount or value
equal sign	the symbol = shows that what is on the left of the sign is equal in value or amount to what is on the right of the sign
equal-sized groups	groups of the same quantity
equation	a mathematical sentence that uses the equal sign (=) to show that two expressions are equal
equilateral triangle	a triangle with all three sides of equal length and the three angles will be 60°
equivalence	state of having the same value, function, meaning
equivalent	two or more sets that name the same amount
equivalent expressions	algebraic or numerical expressions with the same value
equivalent form	a number represented in a way that has the same value
equivalent fraction	an equivalent fraction has an equal value or area. it does not have to be the same shape to be equivalent
equivalent linear expressions	expressions which are equal and make straight lines when graphed
equivalent ratios	two ratios which have the same value when simplified
estimate	a close guess of the actual value, usually with some thought or calculation involved
evaluate	to determine an amount
even	any integer that can be divided exactly by 2. the last digit will be 0, 2, 4, 6 or 8
even function	for every (x, y) there exists (-x, y)
expanded form	the numbers written as the sum of the values of each of its digits
experiment	a test or investigation
exponents	a mathematical notation that implies the number of times a number is to be multiplied by itself. "x" in the expression a^x
expression	a mathematical phrase containing only numbers and operational symbols; no equal sign is present
extend	to continue in a specified direction
exterior angle	formed at the side of a polygon and an extension of an adjacent side
exterior angle theorem	the measure of an exterior angle of a triangle is equal to the sum of the measures of the 2 nonadjacent interior angles
extrapolation	an estimation of a value based on extending a known sequence of values or facts beyond the area that is certainly known
extreme value theorem	if f is continuous on a closed interval [a, b], then f has both a minimum and maximum on the interval. relative minimum is the least possible value of f over an open interval. relative maximum is the greatest possible value of f over an open interval. the absolute minimum is the least possible value on the entire function f. the absolute maximum is the greatest possible value on the entire function f
F	
face	a plane figure that serves as 1 side of a solid figure
factor	is when whole numbers other than zero are multiplied together, each number is a factor of the product. an integer that divides into another integer exactly
factoring	taking a number or an algebraic expression and breaking it apart into its factor
find mentally	determine the answer without pencil, paper, or calculator
finite-sample distribution	is the probability distribution of a given statistic based on a random sample
flowchart	a type of diagram that represents an algorithm, workflow, or process showing steps and their order

fluency	"computational fluency refers to having efficient and accurate methods for computing. students exhibit computational fluency when they demonstrate flexibility in the computational methods they choose, understand and can explain these methods, and produce accurate answers efficiently." nctm principles and standards for school mathematics
fluently	easily
foot	foot or feet is the customary unit of length. feet` is the plural of `foot'. 1 foot = 12 inches feet are abbreviated as `ft.'
formula	numbers and symbols that show how to work something out or a special type of equation that shows the relationship between different variables
formulate	state systematically and in an organized way
fourths and quarters	four equal parts of a whole
fraction	a part of a whole, usually expressed in the form a/b a symbol, such as 1/2 or 2/3, that names equal parts of a whole. the numerator tells how many equal parts are being described and is the number above the fraction bar. the denominator indicates the total number of equal parts into which the whole has been divided. it is the number below the fraction bar
frequency data	how often an event occurs or a number appears
frequency polygons	graphical device for understanding the shapes of distributions, serve the same purpose of histograms
frequency table	a table that lists items and uses tally marks to record and show the number of times they occur. a way of organizing data in columns and rows
function	a relation in which each element of the input is paired with exactly one element of the output according to a specified rule
G	
geometric distribution	either of two discrete probability distributions: the probability distribution of the number x of bernoulli trials needed to get one success, supported on the set { 1, 2, 3, ...} the probability distribution of the number y = x − 1 of failures before the first success, supported on the set { 0, 1, 2, 3, ... }
geometric mean	a type of mean or average, which indicates the central tendency or typical value of a set of numbers by using the product of their values. in the proportion a/m = m/b; m is the positive number
geometrically	a derivative f'(x) can be found geometrically by calculating the slope of line tangent to f(x) at x
graph	a diagram of values, usually shown as lines or bars
graphical representation	a picture of the data in an organized way (could use coordinate plane, charts, or plots
graphing 3-d distance	a system of locating a point in space by its distance from the origin along 3 mutually perpendicular lines (x, y, and z axes)
great circles	formed by the intersection of a sphere and a plane that includes the center of a the sphere
greater than	bigger. the symbol > means greater than (the symbol < means less than)
greatest common factor	the largest number that divides exactly into two or more numbers
H	
half	one of two equal parts of a whole
half-hour	one half of an hour is 30 minutes, sometimes called half past or half past the hour
halves	two equal parts of a whole
hamiltonian path	a path in an undirected or directed graph that visits each vertex exactly once

harmonic mean	one of several kinds of average. typically, it is appropriate for situations when the average of rates is desired
hexagon	a 6-sided flat shape with straight sides
hierarchy	a series of ordered groupings within a system
hinge theorem	if 2 sides of 1 triangle are congruent to 2 sides of another triangle and the included angle of the 1st triangle is larger than the included angle of the 2nd then the 3rd side of the 1st is longer than the 3rd side of the second
histograms	a graphical display of data. the data is grouped into ranges, and then plotted as bars. similar to a bar graph, but each bar represents a range of data
hundredths	one out of one hundred equal parts
hypotenuse	the side opposite the right angle
hypothesis test	method of statistical inference using data from a scientific study
I	
identical wholes	wholes that are the same size and shape
identify	to know, to find out, or to show what something is
identity matric	the unit matrix of size n
identity properties	a number that can be added to (or multiplied by) any second number without changing the second number
identity properties of addition and multiplication	the sum of 0 and 'a' is always 'a' and the product of 1 and 'a' is always 'a'. when adding the inverse of an integer the sum is '0'
identity property of addition	zero can be added to a number and it will keep its identity
identity property of multiplication	one can be multiplied to a number and it will keep its identity
implicitly-defined functions.	differentiation is taking place with respect to x for every variable, which means that when you differentiate a term involving y, you must apply the chain rule
improper fraction	a fraction with a numerator greater than or equal to the denominator
inch	an inch is a measure of length. there are 12 inches in a foot, and 36 inches in a yard. the abbreviation: in. or sometimes the double quote mark "
increasing behavior of f and the sign of f'	if f' is positive, the slope of f is increasing
independent events	two events, a and b, are independent if the fact that a occurs does not affect the probability of b occurring
independent variable	a variable in an equation, whose values are freely chosen regardless of the values of other variables
indirect proof	assumption that what you are trying to prove is false and this assumption leads to a contradiction
inductive reasoning	reasoning in which the premises seek to supply strong evidence for (not absolute proof of) the truth of the conclusion
inequality	a mathematical sentence that contains the symbol for 'less than', 'greater than', 'less than or equal to', 'greater than or equal to', or 'not equal to'
inequality in one triangle theorem	if 2 sides of 1 triangle are congruent to 2 sides of another triangle and the included angle of the 1st triangle is larger than the included angle of the 2nd then the 3rd side of the 1st is longer than the 3rd side of the second
infinitely	the possible solutions are endless
inscribed	a figure whose vertices are part of another figure. a circle inscribed in a polygon touches each side of the polygon at exactly 1 point
inscribed angle	vertex is on circle whose sides are chords of the circle
instantaneous rates of change	the instantaneous rate of change is the slope at one point on a curve
integer exponents	in a power, the exponent is the number of times a base is used as a factor. in 3^4, 4 is the exponent. in this case, only integers are used as exponents

integer number system	a set of real numbers including natural numbers and their additive inverses and zero
integers	the set of numbers containing zero, the natural numbers, and all the negatives of the natural numbers
integrals	integrals are used to find the area of a region. an approximation can be made by using the sum of the areas of the rectangle(s) contained within function and the x- or y- axis
integration by substitution (or change of variable)	integration by substitution allows changing the basic variable of an integrand (usually x at the start) to another variable (usually u or v). the relationship between the 2 variables must be specified, such as u = 9 - x2. the hope is that by changing the variable of an integrand, the value of the integral will be easier to determine
interior angle	on the inside of a polygon, formed by the sides of the polygon
intermediate value theorem	intermediate value theorem: if f is continuous on the closed interval [a, b] and k is any number between f(a) and f(b), then there is at least one number, c, in [a, b] such that f(c) = k
interpolation	an estimation of a value within two known values in a sequence of values
interpret	describe what you found out. explain
interquartile range	the difference between the lower 25% and the lower 75%, the range the middle 50% lies. also called the midspread or middle fifty, is a measure of statistical dispersion, being equal to the difference between the upper and lower quartiles
intersection	the set of elements common to different sets
interval	space between two points
inverse	the statement formed by negating both the hypothesis and conclusion of a conditional statement. the quantity which cancels out a given quantity
inverse functions.	a function g is the inverse function of f if: f(g(x)) = x for each x in the domain of g and g(f(x)) = x for each x in the domain of f
inverse operation	an operation that undoes another (ex: subtraction is the inverse operation of addition)
inverse properties	an number combined with its inverse equals the identity
inverse relationship	multiplication and division have an inverse relationship
investigate	to try to get information about
investigation	formal examination or research
irrational number	a number that cannot be written as a ratio of two numbers this includes non-terminating and non-repeating decimals, as well as π
isosceles triangle	a triangle with two equal sides and the angles opposite the equal sides are also equal
J	
justify	to show an answer is correct using support and mathematical fact
L	
law of large numbers	a theorem that describes the result of performing the same experiment a large number of times
least	the smallest in size, amount, degree, etc.
least common multiple	the smallest number that is a multiple of two or more numbers
least squares regression	mathematical procedure for finding the best-fitting curve to a given set of points by minimizing the sum of the squares of the offsets) of the points from the curve
length	distance. how far from end to end
less than	smaller. the symbol < means less than (the symbol > means greater than)
like terms	terms that contain the same variable

limits	a limit is the function value as the x-value gets arbitrarily close to a single number from both the positive and negative directions
line	is made up of points, it has no thickness or width
line graph	a graph that uses points connected by lines to show how something changes in value (as time goes by, or as something else happens)
line plot	shows data on a number line with x or other marks to show frequency
line segment	a part of a line with two distinct endpoints. it has a starting point and stopping point
linear	relating to a line; straight
linear association	linear relationships can be expressed in a graphical format where the variable and the constant are connected via a straight line or in a mathematical format where the independent variable is multiplied by the slope coefficient, added by a constant, which determines the dependent variable
linear equation	a first order equation involving two variables: its graph is a straight line in the cartesian coordinate system
linear expression	a expression with a constant and a variable which defines a finite number of solutions to the variable
linear function	a function defined by an equation of the formf(x) = y = mx+b. a function whose graph is a straight line
linear inequality	a mathematical sentence that contains ≤, ≥, <, or >
linear transformation	a mapping v ↦ w between two modules (including vector spaces) that preserves the operations of addition and scalar multiplication
local linear approximation.	local linear approximation is using the tangent line at a point to approximate relative points
logarithmic differentiation.	using logarithmic properties to simplify differentiation involving products, quotients and power of the second derivative is positive in a given interval, then the graph in that interval is concave up. if the second derivative is negative in a given interval, then the graph in that interval is concave down
M	
magnitude	ordering or ranking of a number
making ten	the addition strategy of decomposing one of the addends so that 10 can be made and then adding the remaining number left
margin of error	a statistic expressing the amount of random sampling error in a survey's results
markov chains	mathematical system that undergoes transitions from one state to another on a state space. it is a random process usually characterized as memory less: the next state depends only on the current state and not on the sequence of events that preceded it
mass	is a measure of how much matter is in an object. an object's mass will remain the same no matter where it is
matrices	plural of matric, a rectangular array of numbers, symbols, or expressions
mean	the average of a data set found by finding the sum and dividing by the number of addends
mean absolute deviation	the average distance between each data value and the mean
mean value theorem	if f is continuous on the closed interval [a, b] and differentiable on the open interval (a, b), there exists a number c such that f'(c) = [f(b) - f(a)]/(b - a)
measure	to find a number that shows the size or amount of something. usually the number is in reference to some standard measurement, such as a meter or kilogram
measure of an arc	the measure of the angle formed by 2 radii with endpoints at the endpoints of the arc
measurement system	a set of unit (measures) which can be used to measure

median	the middle number of an ordered data set or the average of the two middle numbers in an ordered data set with an even number of data
median fit	the line of best fit, used to indicate a relation or trend in data sets
mentally	producing correct answers quickly
meter	the basic unit of length (or distance) in the metric system. the abbreviation is m
metric measure	a decimal system of weights and measures based on the meter as a unit of length, the kilogram as a unit of mass, and the liter as a unit of volume
metric system	in the metric system, centimeters/meters/kilometers, grams/kilograms, and milliliters/liters/kiloliters are used
midpoint	the point on a line segment that divides it into 2 congruent segments
midsegment theorem	the segment connecting the midpoints of 2 sides of a triangle is parallel to the 3rd side and half its length
minimal spanning tree	given a connected, undirected graph, a spanning tree of that graph is a subgraph that is a tree and connects all the vertices together
minuend	the number from which another number (subtrahend) is subtracted
mixed numbers	a number that has a whole number part and a fractional part
mode	the most frequently occurring number in a data set. there can be more than one or no mode
model	something that is made to be like another thing. usually it is smaller and tries to copy details well
models	representing real life situations through equations or inequalities
modulus	the absolute value | a + bi | = sqrt (a^2 + b^2)
monotonicity	monotonitcity means either always increasing or always decreasing. let f be differentiable on an open interval
multiplicative inverse	reciprocal for a number x, denoted by 1/x or x−1, is a number which when multiplied by x yields the multiplicative identity, 1
multi-digit number	having more than one digit
multi-digit whole numbers	whole numbers containing more place values then the 1's place value
multiple	the product of that number and any other whole number
multiple of a whole number	is the product of the number and any nonzero whole number
multiple variables	more than one letter that stands for a number
multiplication	a mathematical operation that gives the total number when you join equal groups. factors are the numbers being multiplied
multiplication counting principle	if there are a ways for one activity to occur, and b ways for a second activity to occur, then there are a • b ways for both to occur
multiplication rule	a method for finding the probability that both of two events occur
mutually exclusive events	two events are mutually exclusive if they cannot occur at the same time (i.e., they have no outcomes in common)
N	
negative association	a negative association exists when as one variable decreases, the other variable also decreases
negative number	any real number less than zero
net	a 2-d pattern that can be folded to form a solid 3-d
nickel	5 cents
no tangents	no tangents implies the function is not differentiable at that point
non-defining attributes	attributes that do not define the shape such as color and size
nonlinear association	graph does not represent a straight line. in this case, no line of best fit can be found
nonlinear function	a function whose graph is not a straight line

nonnegative rational numbers	any number that can be made by dividing one integer by another and is to the right of 0 on the number line
non-overlapping	not extending over and covering a part
nonstandard unit	measuring in units other than english or metric units. (e.g.. cubes, paper clips, bears, etc.)
normal distribution	a very commonly occurring continuous probability distribution—a function that tells the probability that any real observation will fall between any two real limits or real numbers, as the curve approaches zero on either side
notation	system or written symbols used to represent numbers, amounts, or elements
number line	a line with numbers placed in their correct position
number line	a straight line on which there is indicated a one-to-one correspondence between points on the line and the set of real numbers
number of observations	the number of times a observation occurs in a data set
number pattern	a list of numbers that follow a certain sequence or pattern
number sense	refers to a person's understanding of number concepts, operations, and applications of numbers and operations
numeral	a symbol or name that stands for a number - digits 0,1,2,3,4,5,6,7,8,9
numerator	the number above the fraction bar that describes how many equal parts are indicated or described
numeric expression	mathematical phrase that only contains numbers and operators (like add, subtract, multiply, and divide)
numerical data	data expressed in numbers rather than letters
numerical data set	a set of data which consists of digits
numerical expressions	an expression with only numbers and operation symbols
numerically	a limit can be estimated numerically by constructing a table of values
O	
observations	carefully watching something or someone in order to gain information
obtuse triangle	a triangle that has an angle greater than 90°
odd	any integer that cannot be divided exactly by 2. the last digit will be 1, 3, 5, 7 or 9
odd function	for every (x, y) there exists (-x, y)
ones place	the number to the left of the decimal
one-sided limits.	looking at the function value from either the positive direction (from the right) or from the negative direction (from the left)
operation	a mathematical process including addition, subtraction, multiplication, and division
optimization	optimization is an application of calculus involving the determination of the maximum or minimum values using a primary equation and a secondary equation
order of operations	the rules that tell which operation to perform first when more than one operation is used
ordered pairs	identifies the location of a point on the coordinate plane. the x-coordinate shows the point's position left or right of the y-axis. the y-coordinate shows the point's position up or down from the x-axis
ordered set	a group of objects or items placed in a specific arrangement
ordinal numbers	a number that tells the position of something in a list
origin	the point on a coordinate plane in which the x and y axes intersect; the ordered pair for the origin is (0, 0)
outcome	the result of a single trial of an experiment
outlier	a value that "lies outside" (is much smaller or larger than) most of the other values in a set of data

outliers	a value that "lies outside" (is much smaller or larger than) most of the other values in a set of data
P	
parabola	the set of all points that are the same distance from a fixed point (focus) as they are from a fixed line (directrix)
parallel	always the same distance apart
parallel lines	two lines on a plane that never meet; they are always the same distance apart
parallelogram	a quadrilateral in which both pairs of opposite sides are parallel
parentheses	the symbols “(” and “)” are generally used in grouping
partition	dividing into parts, pieces or portions
partitioned	divided
parts of a set	a part of a collection
parts of a whole	the semantic relation that holds between a part and the whole
pattern	a set of numbers or objects in which all the members are related with each other by a specific rule
patterned arrangements	the way that things are arranged in a particular order or pattern
penny	1 cent
pentagon	a 5-sided flat shape with straight sides
percent	one part in every hundred - a fraction or ratio in which the denominator is assumed to be 100
perimeter	the distance around a two-dimensional shape
periodicity	the cycle repeats itself with each rotation around the circle
permutations	rearranging, members of a set into a particular sequence or order
perpendicular	intersecting to form right angles
perpendicular bisector	a line, line segment, ray, or plane that is perpendicular to a segment at its midpoint
perpendicular lines	lines that intersect to form a right angle
pictograph	is a graph that uses pictures or symbols to show data. typically each picture or symbol represents a specific amount of data which is explained by a key
pint	a measure of volume in the us and imperial systems of measurement. equal to 16 fluid ounces, or about half a liter
place value	the value of where the digit is in the number, such as units, tens, hundreds, etc.
plane	flat surface made up of points that has no depth and extends indefinitely
plot	to draw on a number line, graph or map
points	an exact location. it has no size, only position
polygon	a closed, plane figure formed by line segments that meet only at their endpoints
population parameters	numerical characteristic of a population
positive association	a positive association exists when as one variable increases, the other variable also increases
positive decimal	numbers that have digits in the tenths place and beyond and are greater than zero
positive decimals	decimals which are to the right of zero on the number line
positive fraction	a number used to name a part of a whole and is greater than zero
positive number	any real number greater than zero
positive rational number	a number greater than zero that can be expressed as a fraction (p/q) with the denominator (q) not equal to zero
powers of 10	the exponent (or index or power) of a number says how many times to multiple 10

predict	to say that (something) will or might happen in the future
prediction	a reasonable guess as to what will happen
prime factorization	writing an integer as a product of powers of prime numbers
prime numbers	a prime number can be divided evenly only by 1, or itself and it must be a whole number greater than 1
prism	a polyhedron that has 2 congruent and parallel faces called bases joined by faces that are parallelograms
probability	the chance that something will happen - how likely it is that some event will happen. sometimes you can measure a probability with a number: "10% chance of rain", or you can use words such as impossible, unlikely, possible, even chance, likely and certain
probability distribution	assigns a probability to each measurable subset of the possible outcomes of a random experiment, survey, or procedure of statistical inference
product	the result obtained after multiplying two or more numbers
proof	a logical argument in which each statement you make is supported by a statement that is accepted as true
properties of operations	basic rules of calculating numerical answers in a problem. these include how numbers are grouped and the order in which operations are carried out. (additive identity - adding zero to a number leaves it unchanged; commutative property – you may switch the order of numbers in an addition problem and still find the same sum)
property of 0 in division	zero divided by any number (except 0) is zero. zero cannot be a divisor
property of 1 in division	any number (except 0) divided by itself is equal to 1. any number divided by 1 is that number
proportional	two quantities are proportional if they have a constant ratio or rate
proportional equation	equation stating that two ratios or rates are equivalent
proportional relationship	when two ratios are equal, they are said to have a proportional relationship
proportionality	having equivalent ratios
pyramids	a solid figure where the base is a polygon and the sides are triangles which meet at the top (the apex)
pythagorean theorem	in a right triangle the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs
Q	
quadrant	any of the four areas into which a plane is divided by the reference axes in a cartesian coordinate system, designated first, second, third, and fourth, counting counterclockwise from the area in which both coordinates are positive
quadrilateral	a polygon with 4 sides
quantitative measures	a measurement that is related to a number or quantity
quantities	a specified or indefinite number or amount
quantity	amount of something
quartiles	the quartiles of a ranked set of data values are the three points that divide the data set into four equal groups, each group comprising a quarter of the data
quotients	when one number (dividend) is divided by another number (divisor), the result obtained is known as quotient. answers to division problems
R	
radius	a segment or distance from the center of a circle to a point on the circle
random sample	a selection that is chosen randomly (purely by chance, with no predictability)

range	the difference between the greatest number and the least number in a data set
rate	ratio that compares two quantities of different units
ratio	a numerical representation which shows the relative size of two or more values
rational approximation	shortening an irrational number to a useable rational number example: using 3.14 for π
rational number	a number that can be written as a fraction or as the quotient of two numbers a/b where b≠0
rational number bases	in a power, the base is the number used as a factor. in 3^4, 3 is the base. in this case, only rational numbers are used as bases
rational number coordinates	using rational numbers to indicate the position of a point, line, or plane
ray	a part of a line that begins at a point and continues without end in one direction
real numbers	positive and negative integers, fractions, decimals
real-world problem	problems that arise from a wide variety of human experiences and applications. problems with context relatable to real-world events
reasonable	fair and sensible. exhibiting native good judgment
rectangle	a 4-sided flat shape with straight sides where all interior angles are right angles (90°). also opposite sides are parallel and of equal length
rectangles	a quadrilateral with four right angles and opposite sides being equal in length
rectangular prism	a solid figure where all sides are rectangles and all sides meet perpendicular; a brick or a shoebox is a rectangular prism
referent	the thing that a word or phrase denotes or stands for
reflection	a type of transformation in which a mirror image is produced by flipping a figure over a line
related rates	to find the rate of change of two or more related variables that are changing with respect to time
relationship between addition and subtraction	part-part-whole relationships can be expressed by using number sentences like a + b = c or c – b = a, where a and b are the parts and c is the whole
relative frequency	how often something happens divided by all outcomes
relative size	comparative amount
remainders	the amount left over after division when one divisor does not divide the dividend exactly
represent	an explanation of the meaning of a word, phrase, etc. to stand for; symbolize
result	to come about as an effect, consequence, or conclusion
rhombus	a parallelogram with 4 congruent sides
riemann sums	a riemann sum is a method for approximating the total area underneath a curve on a graph, otherwise known as an integral
right rectangular prism	a prism that has two bases, one directly above the other, and that has its lateral faces as rectangles. in a right prism, the edges of the lateral faces are perpendicular to the bases
right triangle	a triangle with one angle measuring 90 degrees
rigid motion	a transformation that creates an image that is congruent to the original figure
rotation	a transformation when the image is formed by turning its preimage about a point
rotations	spinning a figure around a determined location (axis, origin, point, etc.)
rounding	process to find the multiple of 10, 100, and so on, closest to a given number
row	things lying side-by-side. objects, people, numbers, etc. in a horizontal line
rule	is a consistent mathematical relationship between two numbers
S	

sample space	the set of all possible outcomes of that experiment
sampling distributions	finite-sample distribution is the probability distribution of a given statistic based on a random sample
SAS	side angle side triangle congruence
scalar	a real number in linear algebra
scale drawings	a drawing that shows a real object with accurate sizes except they have all been reduced or enlarged by a certain amount (called the scale)
scale factor	the ratio of the length of a segment in the preimage to the length of the corresponding segment in the image
scaled bar graphs	ratio between each space on the graph and the number it represents
scaled picture graphs	ratio between the picture and the number it represents
scalene triangle	a triangle with all sides of different lengths
scatter plot	a graph in which the values of two variables are plotted along two axes, the pattern of the resulting points revealing any correlation present
scattered configuration	the way that the different parts of something form a particular shape; the way in which the different parts of something are arranged
scientific notation	a method for expressing a given quantity as a number having significant digits necessary for a specified degree of accuracy, multiplied by 10 to the appropriate power, as 1385.62 written as 1.386 × 10^3
secant	a line that intersects a circle in 2 points
set	a collection of distinct objects
set of data	a collection of several values and quantities
side	one of the lines that make a flat (2-dimensional) shape. or one of the surfaces that make a solid (3-dimensional) object
similar figures	polygons that have the same shape. figures have proportional corresponding linear measures
similar triangles	have proportional corresponding and angles
similarity	the corresponding sides of polygons have a proportional relationship
simple event	an event that consists of exactly one outcome
simplex method	dantzig's simplex algorithm is a popular algorithm for linear programming
simulation	the imitation of the operation of a real-world process or system
slope	the rate of change between any two points on a line; the ratio of vertical change to horizontal change
sohcahtoa	sine opposite/hypotenuse; cosine adjacent/hypotenuse; tangent opposite/adjacent
solid figure	a three dimensional object: width, depth and height
solution	the value or values that make an equation true
solution to a system	the values that satisfy all the equations in a system
special right triangle (30-60-90)	the hypotenuse is twice as long as the shorter leg and the longer leg is radical 3 times as long at the shorter leg
special right triangle (45-45-90)	the hypotenuse is radical 2 times as long as each leg
sphere	a 3-dimensional figure made up of all points that are equally distant from a point called the center
spread	the difference between the largest and smallest numerical data
square	a 4-sided 2-dimensional shape with straight sides where: all sides have equal length, and every angle is a right angle (90°). it is a quadrilateral and a regular polygon
square root	the square root of x is the number that, when multiplied by itself, gives the number, x
square units	usually some standard unit, like a square meter, a square foot, or a square inch
SSS	side side side triangle congruence

standard algorithm	a specific method of computation, which is conventionally taught, for solving particular mathematical problems. in this case, the rules for computing with rational numbers
standard deviation	shows how much variation or dispersion from the average exists
standard form	a general term meaning "written down in the way most commonly accepted"
standard unit of measurement in the metric system for length	is the meter, for capacity is the liter, and for mass is the gram
standard units of measurement in the customary english system for length	are the inch, foot, yard, and mile; for capacity they are the ounce, cup, pint, and gallon; and for weight they are the ounce, pound, and ton
statistical question	one that can be answered by collecting data and where there will be variability in the data. a question that you may get several possible answers
statistics	the science of collecting, organizing, and analyzing data
stem and leaf plot	a special table where each data value is split into a "leaf" (usually the last digit) and a "stem" (the other digits)
subset	a set contained in another set
substitution	putting one value in for another
subtrahend	the number which is being subtracted from the minuend (whole)
sum	the answer when adding two or more addends together
supplementary angles	two angles with measures whose sum is 180 degrees
surface area	the sum of the areas of the faces and any curved surfaces of a solid
survey	a term in statistics for the method of collecting information by asking people questions
symmetry	a figure has symmetry if a reflection or rotation maps it onto itself. correspondence in size and shape on either side of a dividing line
system of equations	a set of two or more equations with the same variables
T	
table of equivalent ratios	a two column table used to show equivalent ratios
tally chart	is a frequency table
tangent	a line in the plane of a circle that intersects the circle in exactly 1 point
tape diagram	visual models that use rectangles to represent the parts of a ratio
ten	a group of ten ones
third angles theorem	if 2 angles of 1 triangle are congruent to 2 angles of a 2nd triangle then the 3rd angles are also congruent
thirds	being one of three equal parts
thousandths	a thousandth part, especially of one (1/1000)
three-dimensional	a solid figure that has length, width, and height
three-dimensional shape	an object that has height, width and depth, like any object in the real world
time	time is the ongoing sequence of events taking place. the past, present and future. we measure time using seconds, minutes, hours, days, weeks, months and years. clocks measure time
tools	may include rulers, yardsticks or meter sticks, balance or scales, beakers, graduated cylinders, and thermometers
traceable path	is a path in an undirected or directed graph that visits each vertex exactly once
transformation	moving a shape so that it is in a different position, but still has the same size, area, angles and line lengths. an operation that creates an image from an original figure or preimage
translation	a type of transformation in which a figure is slid horizontally, vertically, or both
transversal	a line that intersects 2 or more lines in a plane at different points

trapezoid	a quadrilateral with exactly 1 pair of parallel sides
tree diagram	shows all the possible outcomes of an event
triangle	a 3-sided, closed polynomial whose angles measure 180 degrees. a polygon with 3 vertices and 3 sides or edges made up of line segments
triangle inequality theorem	the sum of the lengths of any 2 sides of a triangle is greater than the length of the 3rd side
triangle sum theorem	the sum of the measures of the interior angles of a triangle is 180 degrees
trig ratios	ratios that compare the lengths of 2 sides of a right triangle
twice	two times as many
two-dimensional	a shape with only length and width
two-dimensional shape	a shape that only has two dimensions (such as width and height) and no thickness. squares, circles, triangles, etc. are two dimensional objects. also known as "2d"
two-step problems	problems in which one must first solve one problem. then one must use the answer from the first problem in order to determine the final solution
two-way frequency tables	a visual representation of the possible relationships between two sets of categorical data
two-way table	a table in which one category is represented by rows and the other category is represented by columns
U	
undirected graph	graph in which edges have no orientation
union	set of all distinct elements in the collection
unit	a particular amount of length, time, money, etc., that is used as a standard for counting or measuring
unit fraction	a fraction where the top number (the "numerator") is 1
unit of measurement	a unit of measurement includes inches/feet/yards, ounces/pounds, or cups/pints/quarts/gallons in the customary english system of measurement
unit rate	the ratio of two measurements in which the second term is 1
univariate data	data involving a single variable
unknown number	how much money something is worth the amount or total
unknown whole number	must make the relationship between the three numbers true
US\English standard measurements	liquids: fluid ounces, cups, pints, quarts and d70; mass: ounces, pounds and tons; length: inches, feet, yards and miles; temperature: fahrenheit
V	
$V = l \times w \times h$	volume equals length times width times height
V= b x h	volume equals base times height
validity	the extend to which a concept, conclusions, or measurement is well-founded
value	how much money something is worth the amount or total
variability	change, differences; the extent to which data points differ from each other
variable	a symbol, usually a letter, used to represent a number
variables	a symbol for a number we don't know yet. it is usually a letter like x or y
variance	measures how far a set of numbers is spread out. a variance of zero indicates that all the values are identical
venn diagram	diagram that shows all possible logical relations between a finite collection of sets
vertex edge graph	diagram consisting of a set of points (called vertices) along with segments or arcs (called edges) joining some or all of the points adjacency matrix- a means of representing which vertices of a graph are adjacent to which other vertices
vertical angles	2 nonadjacent angles formed by 2 intersecting lines

vertical tangents	a line tangent to a graph that is vertical and has no slope is a vertical tangent
vertices	the corners of a plane polygon or of a prism
volume	the number of cubic units needed to fill the space occupied by a solid
W	
waiting-time distribution	the probability distribution that describes the time between events in a poisson process, i.e. a process in which events occur continuously and independently at a constant average rate
weight	the measure of the heaviness of an object
weight of an object	depends on its mass and the amount of gravitational force being exerted on it
weighted mean	similar to an arithmetic mean, where instead of each of the data points contributing equally to the final average, some data points contribute more than others
weighted voting	systems based on the idea that not all voters are equal
whole	the whole is a region, set, or segment that is being divided. the whole must be understood before the fraction can be determined
whole number	a number (such as 0, 1, 2, 3, 4, 5, etc.) that is not a negative and is not a fraction
word form	a number written in words
Y	
yard	is the customary unit of length. 1 yard=3 feet
y-intercept	the value of y where the graph crosses the y-axis
Z	
zero matrix	the null matrix, all entries being zero
zero property	when you multiply a number and 0, the product equals 0