Arizona's Draft Standards
Mathematics

Glossary: Mathematical Terms, Tables, & Illustrations

Arizona Mathematics Standards – Glossary: Mathematical Terms, Tables, & Illustrations

OVERALL, THIS "GLOSSARY" ISN'T MERELY BAD IT IS HORRIBLE! I'VE GIVEN CORRECTIONS FOR THE ITEMS ON THE FIRST FEW PAGES, BUT I JUST DIDN'T HAVE THE ENERGY TO CORRECT ALL THE ENTRIES.

The purpose of this glossary is to help the user better understand and implement the Arizona Mathematics Standards. The glossary is **not** a comprehensive list of all mathematics terms and properties experienced in the K-12 classroom. It is possible that two different definitions exist for a mathematical term or action. Please work with your educational site to decide on the common definition understood by learners. For assessment purposes, a definition that is in bold in the glossary will be the accepted assessment definition of the term or property (i.e., trapezoid). The definitions in the glossary are general in nature.

addition	The total quantities of two or more amounts combined. NO
algorithm	A set of instructions/steps used to solve a problem or obtain a desired result in every case. THIS IS NOT ACCURATE. AT A MINIMUM, there has to be a finiteness condition. THE PROCESS TERMINATES AFTER A FINTE NUMBER OF STEPS.
array	A rectangular arrangement of objects or elements organized into rows and columns, or a set of objects or elements organized into a specific pattern. REVERSE. An array is a set of elements organized into a specific pattern. For example, a rectangular array is ….
associative property	Addition: changing the grouping of terms in a sum without changing the sum. For any numbers *a, b,* and *c: (a + b) + c = a + (b + c)* NO. Given a binary operation, that is to say a function of two variables, f(a,b) = c, with a, b, and c all in the same set, the operation is said to be associative if f(f(a,b, c) = f(a, f(b,c)). For ordinary addition this takes the form (a + b) + c = a + (b + c). For ordinary multiplication it takes the form a*(b*c) = (a*b)*c. Multiplication: changing the grouping of factors in a product without changing the product. For any numbers *a, b,* and *c: (a · b)c = a(b · c)*
auxiliary line	A line or line segment added to a diagram to help in solving a problem or proving a concept. Usually found in geometry and is indicated by a dashed or dotted line to indicate they were not part of the original diagram. Whoever wrote these definitions would have done much, much better to look up the CORRECT definitions on the web. For an example, the correct definition of auxiliary line there is as follows: An **auxiliary line** (or helping **line**) is an extra **line** needed to complete a proof in plane geometry.
bivariate data	Pairs of linked numerical observations. Example: a list of heights and weights for each player on a football team.
box and whisker plot	A method of visually displaying distribution of data values by using the median, quartiles, and extremes of the data set. A box shows the middle 50% of the data.
categorical variable	Non-numerical categories used to describe data. (e.g., breed, color, cities) LOOKING UP THE CORRECT DEFINITIONS WE FIND: In statistics, a **categorical variable** is a variable that can take on one of a limited, and

	usually fixed, number of possible values, assigning each individual or other unit of observation to a particular group or nominal category on the basis of some qualitative property.
clustering	Collections of data elements in a data display that are in close proximity relative to the context.
commutative property	Addition: the addition of terms in any order obtains the same sum. For any numbers a and b: $a + b = b + a$ Multiplication: the multiplication of terms in any order obtains the same product. For any numbers a and b: $a \cdot b = b \cdot a$ *AS WAS THE CASE WITH ASSOCIATIVITY THIS IS ALSO FOULED UP. A correct definition is as follows. A binary operation (see associative law) is said to be commutative if f(a,b) = f(b,a) for every pair of values. For example, for addition this takes the form a + b = b + a, and for multiplication it takes the form a*b = b*a.*
complex fraction	A fraction that has a fractional numerator, denominator, or both (e.g., $\dfrac{\frac{7}{11x^2}}{31y^5x^6s}$)
complex number	A number that can be written in the form $a + bi$ where a and b are real numbers and i is an imaginary number., 2+3i which is equivalent to $2+\sqrt{-3}$) NO, "i" is not just an "imaginary number" it is a PARTICULAR imaginary number, a number for which i^2 = -1, (or a solution of x^2 + 1 = 0).
composite figure	A geometric figure that is composed of two or more simple polygons.
conic section	The four curves - circles, ellipses, parabolas, and hyperbolas. They are called conic sections because they can be formed by intersecting a right circular cone with a plane. When the plane is perpendicular to the axis of the cone, the resulting intersection is a circle. When the plane is slightly tilted, the result is an ellipse. When the plane is parallel to the side (one element) of the cone, it produces a parabola. When the plane cuts both extensions of the cone, it yields a hyperbola. VERY AWKWARD. A much better definition would be "any curve which is given as the set of all (x,y) in the coordinate plane that satisfy a particular equation of the form ax^2 + bxy + cy^2 + dx + ey + f= 0, where a, b, c, d, e and f are real numbers.
contextualize	To place (as a word or activity) in a context. NOT A TERM IN MATHEMATICS
decimal fraction	A fraction whose denominator is some power of 10, usually indicated by a decimal point written before the numerator. (e.g., 0.4 = 4/10)
decontextualize	To remove from a context. NOT A TERM IN MATHEMATICS
descriptive modeling	Describes the phenomena or summarizes it in a compact form. (e.g., graphs of observations) Certainly not correct. There is a definition on the web that is a little better: a mathematical process that describes real-

	world events and the relationships between factors responsible for them. The process is used by consumer-driven organizations to help them target their marketing and advertising efforts.
dilation	A transformation that moves each point along the ray through the point emanating from a fixed center, and multiplies distances from the center by a common scale factor.
digit	The ten symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, used in base ten numeration system
distributive property	Addition: if a, b, and c are any signed numbers: $a(b + c) = ab + ac$ Subtraction: if a, b, and c are any signed numbers: $a(b – c) = ab – ac$ *MORE ACCURATELY: suppose f(a,b) and g(a,b) are two binary operations on a set. Then they satisfy the distributive law with respect to (f, g), if f(a, g(b,c)) = g(f(a,b), f(a,c)). For example if f is multiplication and g is addition, then (f, g) satisfies the distributive law mean a*(b + c) = a*b + a*c. For all triples (a, b, c) in the set.*
Empirical Rule	For normal distributions – approximately 68% of the area under the curve falls within one standard deviation of the mean, approximately 95% within two standard deviations, and approximately 99.7% within three standard deviations.
equation	A mathematical statement divided by an equal symbol that states the two values or expressions have the same value.
expression	A combination of numbers, symbols, and operations to represent a certain quantity.
fluency	Fluently means *efficiently, accurately, flexibly, and appropriately*. Students are able to choose flexibly among methods and strategies to solve contextual and mathematical problems, they understand and are able to explain their approaches, and they are able to produce accurate answers efficiently.[1] • Efficiency—carries out easily, keeps track of sub-problems, and makes use of intermediate results to solve the problem. • Accuracy—reliably produces the correct answer. • Flexibility—knows more than one approach, chooses a viable strategy, and uses one method to solve and another method to double-check. • Appropriately—knows when to apply a particular procedure.
focus	A fixed point from which all other points are equidistant.
fraction	The quantity a/b formed by a parts of size $1/b$.
function (algebraic)	A rule that defines a relationship between two sets of numbers in that for each value of the independent variable set there is only one value in the dependent variable set.
identity property	Addition: For all numbers, a, when a is added to 0, that number (a) is left unchanged. ($a + 0 = a$)

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[1]   National Council of Teachers of Mathematics, Inc. (2014). *Principles to Actions: Ensuring Mathematical Success for All*. Reston, VA

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	Multiplication: For all numbers, a, when a is multiplied by 1, that number (a) is left unchanged. ($a \cdot 1 = a$)
interquartile range	A measure of variability, based on dividing a data set into quartiles.
irrational numbers	A set of real numbers that cannot be expressed as a ratio of two integers (i.e., $\pi, \sqrt{2}$)
iteration	The repetition of a pattern or sequence.
iterative pattern/ sequence	A pattern/sequence generated by using an initial value and repeatedly applying the same rule.
mathematical argument	The justification of a particular solution, algorithm, or method using logic, evidence, and mathematically sound reasoning.
mean absolute deviation	A simplified measure of the variability (spread) of a data set. See related measures, standard deviation and interquartile range.
negative association	A relationship in paired data in which one variable's values tend to increase when the other decreases, and vice-versa. In a scatterplot, negatively associated data tend to follow a pattern from the upper left to the lower right.
numeral	A conventional symbol that represents a number.
outlier	An observation that lies outside the overall pattern of a distribution.
pattern	A set or sequence of figures or numbers that are repeated in a predictable manner.
patterns of association	The association between two quantities described as clustering, outliers, positive or negative, linear and nonlinear.
positive association	A relationship in paired data in which the two sets of data tend to increase together or decrease together. In a scatterplot, positively associated data tend to follow a pattern from the lower left to the upper right.
problem solving	Mathematical tasks that have the potential to provide intellectual challenges for enhancing students' mathematical understanding and development.
properties of equality	Rules for producing equivalent expressions. (e.g., identity, transitive, reflexive, addition property of equality, to name a few)
properties of: operations, real number operations, real number system	Mathematical principles that are always true. (e.g., commutative, associative, distributive, identity, and inverse, to name a few)
quantitative variable	Represents a measurable quantity and is numerical. (e.g., population, height, weight.)
ratio	The relationship in quantity, amount or size between two or more things.
rational expression	The quotient of two polynomials in the form $\dfrac{A}{B}$, where A and B are polynomials. (e.g., $\dfrac{2x+1}{3x^2-9}, \ 3x^2 - 9 \neq 0$)

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reasoning (mathematical)	The justification of a particular solution, algorithm, or solution method using logical and mathematically sound arguments.
rectilinear figure	A polygon all of whose edges meet at right angles.
recursion	An inherently repetitive process by which the terms of a sequence can be computed from some or all of the preceding terms by an algorithmic procedure.
relative frequency	Conditional relative frequency: the ratio of a joint relative frequency and related marginal relative frequency. Joint relative frequency: the ratio f the frequency in a particular category and the total number of data values. Marginal relative frequency: the ratio of the sum of the joint relative frequency in a row or column and the total number of data values.
representation	Verb: the act of capturing a mathematical concept in some form. Noun: the form expressing a mathematical concept. (e.g., equation, graph, written description, sketch, table, construction, manipulative)
rigid motion	A transformation of points in space consisting of a sequence of one or more translations, reflections, and/or rotations. Rigid motions are assumed to preserve distances and angle measures.
rotation	The turning of an object or coordinate system about a fixed point.
scale factor	The ratio of any two corresponding lengths in two similar geometric figures. *Note: the ratio of areas of two similar figures is the square of the scale factor and the ratio of the volumes of two similar figures is the cube of the scale factor.*
similarity transformation	A rigid motion followed by a dilation.
standard deviation	A measure used to quantify the amount of variation or dispersion of a set of data values.

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subtraction	The operation of taking the difference of two numbers. The operation of taking the distance between two whole numbers.
system of equations	A set of two or more equations that must all be true for the same value(s). (note: also referred to as simultaneous equations).
translation	A transformation that moves every point on a figure a given distance in a given direction.
trapezoid	**A quadrilateral that has exactly one pair of parallel sides.**
unit fraction	A fraction $1/b$ formed by 1 part when a whole is partitioned into b equal parts, a fraction with a numerator of 1 and a denominator is a positive integer.
zeros of a function	The points at which the value of a function is zero. (note: also called the roots of a function and the solutions for a function)