Math Definitions: Introduction to Numbers

Word	Definition	Examples	Not Examples
Natural Numbers	The numbers that we use when we are counting or ordering	{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 …}	
Whole Numbers	The numbers that include natural numbers and zero. Not a fraction or decimal.	{0, 2, 3, 4, 5 6, 7, 8, 9, 10, 11 …}	
Integer	A counting number, zero, or the negative of a counting number. No fractions or decimals	{… -3, -2, -1, 0, 1, 2, 3 …}	2/3, 1.72, -8.33, 0.51
Decimal Number	Any number that contains a decimal point	0.256 or 1.2	
Rational Numbers	Can be expressed as a fraction. Include integers and fractions or decimals	1/2 , 2/3 , 4/7, 0.5, 6.7	
Irrational Numbers	Cannot be expressed as a fraction	$\Pi, \sqrt{2}$ …	
Positive	Greater than 0. x is positive if x > 0.	1, 17, 13.44, π, 18/3	0, -15, -8.22, -19/4
Negative	Less than 0. x is negative if x < 0.	-17, -18.892, -1981, -π	0, 12, π, 17.63, 892471
Non-Negative	Greater than **or equal to** 0. x is non-negative if x ≥ 0.	0, 1, π, 47812, 16/3, 189.53	-11, -82.7, -998.001
Non-Positive	Includes negative numbers and 0.		
Even	An integer that is divisible by 2.	0; 2; -16; -8; 99837222	1; -7; π; 16.4
Odd	An integer that is **NOT** divisible by 2.	1; 7; 19; -17	0; 8; -15.2

Place Value	It is the value of where the digit is in the number. Examples are units, tens, hundreds, thousands, ten thousands, hundred thousands, millions,…		
Equivalent	Equal (=)	½ and 0.5 are equivalent	
Distinct	Not equal. x and y are distinct if $x \neq y$.	2 and 3 are distinct. 0 and 11 are distinct. π and 3 are distinct.	4 and 4 are not distinct. 11.4 and 11.4 are not distinct.
Constant	A number that does not change		
Consecutive (Evenly spaced)	In a row; without any missing; numbers or objects are consecutive if none of them are skipped.	1, 2, 3, and 4 are consecutive integers. 4, 6, 8, and 10 are consecutive even integers. 2008, 2009, and 2010 are consecutive years.	3, 4, and 6 are not consecutive integers, because 5 was skipped.

Math Definitions: Basic Operations

Word	Definition	Examples
Simplify	To make as short as possible	$\frac{5+3}{4}$ can be simplified to 2
Evaluate	To solve for a certain value	5x + 3 evaluated for x = 2 gives us 13
Plus (Add)	To increase a number by another number (+)	5 plus 2 = 5 + 2 = 7
Sum	The result of adding (+) two numbers. Also $\sum$	5 is the sum of 2 and 3, since 2+3 = 5
Minus (Subtract, Difference)	To decrease a number by another number (-)	6 minus 2 = 6 – 2 = 4
Difference	The positive result of subtracting (-) two numbers.	The difference between 6 and 2 = 6 - 2 = 4
Fewer than	To decrease by the original number (-)	5 fewer than 9 = 9 – 5 = 4
Multiply (Times)	To add a number to itself a certain number of times (x or •)	3 times 4 = 3•4 = 12
Product	The result of multiplying (× or •) two numbers.	18 is the product of 6 and 3, since 6•3 = 18.
Coefficient	A number in front of, or multiplying, a variable.	4 is the coefficient of 4x
Divide by	To cut up a number into a certain number of smaller parts (÷)	8 divided by 4 = 8 ÷ 4 = 8/4 = 2
Divided into	To use a number to cut another number into smaller parts (÷)	3 divided into 12 = 12/3 = 4
Divisor	The second number in a division; the number you are dividing by; the bottom number when division is written as a fraction.	In 8 ÷ 4, the divisor is 4
Quotient	The result of dividing (÷ or /) two numbers.	6 is the quotient of 54 and 9, since 54/9 = 6.

Numerator	The top number in a fraction.	The numerator of 6/7 is 6
Denominator	The bottom number in a fraction.	The denominator of 6/7 is 7
Reciprocal	Switch the numerator and denominator of a fraction. The reciprocal of an integer n is the fraction 1/n.	The reciprocal of 2/3 is 3/2. The reciprocal of 7 is 1/7. The reciprocal of 1/9 is 9/1, or just 9.
Factor	A number that can be added to itself to reach another number. x is a factor of y if y/x is an integer.	2 is a factor of 4 (since 4/2 = 2, which is an integer)
Greatest Common Factor	The largest factor that each number has.	The greatest common factor of 24 and 36 is 12
Multiple	The result when a number is added to itself. x is a multiple of y if x/y is an integer.	27 is a multiple of 3 (since 27/3 = 9, which is an integer)
Least Common Multiple	The smallest number that is a multiple of each number.	The least common multiple of 25 and 10 is 50
Prime	A positive integer that is divisible by **exactly** two positive numbers, 1 and itself. 1 is **not** a prime number, because it is divisible by only one positive number (itself).	2, 3, 5, 7, 11, 13, 17, 19, 23 …
Prime Factorization	Reducing a number into only its prime factors.	The prime factorization of 72 is $2^3 * 3^2$

Power (Exponent, Base)	An exponent tells you to multiply something by itself a particular number of times, in the same way that multiplication tells you to add something to itself a particular number of times. The number being multiplied by itself is called the **base**, and the number of times you multiply it is called the **exponent** or the **power**. Sometimes written as 2^5	$2\wedge5=2^5=2*2*2*2*2=32$ In this case, 5 is the exponent and 2 is the base. We would say 2^5 out loud as "two to the fifth power" (or sometimes just "two to the fifth").
Squared	To square a number is to multiply it by itself. A number x squared is written x^2. Squaring a number means to raise it to the second power.	3 squared is 9, since 3•3=9. (-6) squared is 36, since (-6)•(-6) = 36.
Cubed	To cube a number is to multiply it by itself three times. A number x cubed is written x^3. Cubing a number means to raise it to the third power.	2 cubed is 8, since 2•2•2 = 8.
Root	The root of x is a number that when multiplied by itself a number of times will result in x. The number of times is the **degree** of the root. Another way to understand it is as an exponent that is a fraction. $\sqrt{}$ When the degree of a root is even, there are two solutions: a positive one and a negative one. If x is a negative number and the degree of the root is an even number, then there are no roots.	The 3rd root of $8 = 8^{1/3} = \sqrt{8} = 2$ The 2nd root of $25 = 25^{1/2} = \sqrt{25} = 5$ or -5 The 2nd root of $-4 = (-4)^{1/2} = \sqrt{-4} = $ no roots
Perfect Square	A number whose square root is an integer	64 is a perfect square because $\sqrt{64} = 8$
Polynomial	An expression with more than one algebraic term	$4x^3 + 2x^2 + 6x + 3$
Quadratic Equation	An equation with a variable to the second power	$3x^2 + 8x + 2 = 0$
Absolute Value	The distance from 0. Always positive	$\|3\| = 3 \qquad \|7.34444\| = 7.34444$ $\|0\| = 0 \qquad \|-7\| = 7$

Inequality	A relation between two values that are different instead of equal	> means greater than < means less than ≥ means greater than or equal to ≤ means less than or equal to
(	A way to express a range, but the point is not included	$1 < x < 3$ is the same as (1, 3)
[	A way to express a range, but the point is included	$1 \leq x \leq 3$ is the same as [1, 3]
Percent	Another way of writing a fraction. x% is equal to the fraction $\frac{x}{100}$.	50% is equal to 50/100, or 1/2. 75% is equal to 75/100, or 3/4.
Average (Arithmetic Mean)	The result of adding all numbers and then dividing by the number of items.	The average of 10 and 12 $= \frac{10 + 12}{2} = 11$
Median	The middle number of an ordered number of items. Make sure to put the list in order first. If there is no middle number, take the average of the two numbers in the middle.	The median of 1, 10, and 11 = 10. The median of -1, 2, 0, 8, 4, 5, and 1 = the median of -1, 0, 1, 2, 4, 5, and 8 (ordered) = 2.
Mode	The most common occurrence. There can be more than one mode if each occurs an equal number of times.	The mode of 1, 2, 2, 3, 5, 5, 5 = 5 The modes of 1, 1, 2, 2, 4 = 1 and 2
Standard Deviation	This is a measure of the spread of the data (i.e. how far away it is from the mean)	
Ratio	A relationship between two amounts. This shows how many times bigger one is over the other. The ratio should be in the same order as the words. Expressed with : A ratio can be simplified by dividing each side by the same number. Because of this, it doesn't always equal the actual number.	If there are 12 blue cars and 3 red cars, the ratio of blue to red cars is 12:3 or 4:1 If the ratio of red to blue is 3:4, the actual numbers of red and blue cars could be 3 and 4 or it could be 6 and 8, and so on.
Proportion	When two ratios are equal	If the ratio of blue cars to red cars is 4:3, how many red cars are there if there are 8 blue cars? $$\frac{4}{3} = \frac{8}{x}$$

Math Definitions: Geometry

Word	Definition	Examples
Point	One single location. Usually a ●	
Line	Connects two points and continues forever in both directions	
Ray	Starts from one point and continue forever in only one direction	
Line Segment	Connects two points but does not continue beyond those points	
Endpoint	The end of a line segment or ray	
Midpoint	The point on a line that is of exactly equal distance from both endpoints	
Angle	The space between two intersecting lines. Usually measured in **degrees** or **radians**	
Degree of an Angle	The measurement of an angle. Usually between 0° and 360°	
Right Angle	An angle with a measure of 90°	
Acute	An angle with a measure of less than 90°	
Obtuse	An angle with a measure of more than 90°	
Complementary	Two angles whose sum is 90°	
Supplement	Two angles whose sum is 180°	
Bisect	To cut an angle or line exactly in half	
Tangent	To touch at only one point	
Parallel	Two lines that never touch	
Perpendicular	Two lines that touch and form four 90° angles	
To Scale	When a picture is drawn as it looks. If something is not drawn to scale, it might not correctly represent the actual picture.	

Polygon	An enclosed figure with 3 or more lines	
Vertex	Where two lines of a polygon touch	
Quadrilateral	A four-sided polygon. The sum of interior angles is 360°	
Parallelogram	A four-sided polygon such that opposite sides are parallel	
Rhombus	A four-sided polygon such that all sides are equal and such that opposite angles are equal	
Rectangle	A four-sided polygon such that opposite sides are equal, such that opposite sides are parallel, and such that all angles equal 90°	
Square	A four-sided figure such that all sides are equal, such that opposite sides are parallel, and such that all angles equal 90°	
Trapezoid	A quadrilateral with two sides that are parallel	
Triangle	A three-sided figure. The sum of interior angles is 180°	
Isosceles Triangle	A triangle with 2 equal sides. The angles opposite the equal sides are equal.	
Equilateral Triangle	A triangle with 3 equal sides. Each angle is 60°	
Right Triangle	A triangle with one 90° angle	
Hypotenuse	The longest side of a right triangle (opposite the right angle).	
Pythagorean Theorem	An equation for the relationship of the sides of a right triangle	$a^2 + b^2 = c^2$
Similar Triangles	Triangles that have equal angle measures. Usually the triangles are of different size, but the ratios of each side of one triangle to the matching side of the other triangle are the same.	
Congruent	Identical	

Perimeter	Distance around the edges. Add all of the sides	b a ▭ a + a + b + b
Area	Amount of space inside. Usually multiply two sides that form a right angle.	b a ▭ (a)(b)
Circle	Round figure – all of the outside is the same distance from the center	○
Radius	The distance from the center of a circle to the outside (plural: radii)	○
Diameter	The distance between two points on a circle that passes through the center	⊖
Chord	A line that connects two points on the circle. It does not have to pass through the center.	⊖
Circumference	The measure of the distance around the outside of a circle	
Arc	A part of the circumference	○
Sector	Part of the area of a circle enclosed by two radii. Looks like a piece of pizza.	◑
Central Angle	The angle at the center of a circle that is enclosed by two radii (angle of a sector)	
Cube	A 3-dimensional square – all sides are equal.	▱
Rectangular Solid	A 3-dimensional rectangle.	▱
Cylinder	A circle with height – like a can of soda	⬗
Sphere	A 3-dimensional circle – like a ball	
Volume	The space inside a 3-dimensional figure	
Surface Area	The area of the outside of a 3-dimensional figure	
Inscribed	When a figure is drawn inside another such that their boundaries touch	◻

Math Definitions: Coordinate Geometry

Word	Definition	Examples
Coordinate Plane	A graph in which each point can be represented by a set of coordinates	
Axis	The lines that make up a coordinate plane. (plural: axes) There is usually an x and a y axis	
Ordered Pair	A set of numbers that indicates location on a graph (x, y)	(1,2)
Intercept	The point at which a line goes through another line or axis	
Y-Intercept	The point at which a line crosses the y-axis. (0, y)	(0, 5)
X-Intercept	The point at which a line crosses the x-axis. (x, 0)	(2, 0)
Slope	The gradient or steepness of a line. It is how far the line moves up whenever the line moves one to the right.	$\dfrac{y_2 - y_1}{x_2 - x_1}$
Domain	The set of numbers that are allowed in a function or line on a graph	(-∞, ∞)
Range	The potential output of a function or line on a graph	[5, ∞)
Parallel (graphing)	Two lines with the same slope	
Perpendicular (graphing)	Two lines with slopes that are negative reciprocals of each other	
Translation	Movement of a line or shape such that the result is the same but in a different location	
Rotation	To turn an object in a circular motion around a fixed point	
Reflection	To flip a line or shape over a line (axis)	
Symmetry	When rotating or reflecting a shape results in the same shape	

Common Symbols

Symbol	Definition	Examples	How to Say it
$	Dollars. U.S. money	$5.00	Five dollars
+	Addition. Usually read as "plus"	$2 + 7$	Two plus seven
-	Subtraction. Usually read as "minus"	$5 - 2$	Five minus two
*	Multiplication. Usually read as "times"	$3 * 4$	Three times four
÷	Division. Usually read as "divided by"	$8 \div 2$	Eight divided by two
/	Division. Usually read as "divided by"	$6 / 3$	Six divided by three
=	Equals	$1 + 1 = 2$	One plus one equals two
≈	Approximately (almost equals)	$9.95 \approx 10$	
<	Less than	$2 < 4$	Two is less than four
>	Greater than	$5 > 3$	Five is greater than three
≤	Less than or equal to	$x \leq 10$	x is less than or equal to ten
≥	Greater than or equal to	$x \geq 2$	x is greater than or equal to two
^	Exponents. Usually read as "to the power of"	$3\char`\^2 = 3^2 = 9$	x to the power of two
$\sqrt{}$	Root	$\sqrt{4} = 2$	The square root of four is two
%	Percent	$50\% = \dfrac{50}{100}$	Fifty percent
∞	Infinity		
∏	Pi	3.14159…	
∑	Summation	$\sum\limits_{i=1}^{3} 2i = 2(1) + 2(2) + 2(3) = 11$	
{ … }	Set	{ 2, 3, 5, 7, 11, 13, …}	The set of ___ numbers
[,]	Defines an inclusive range	$[5, \infty)$	$x \geq 5$
(,)	Defines an exclusive range or a coordinate point on a graph	$(-\infty, 2)$	$x < 2$