Click to prove you're human

In mathematics, we tend to equate two items or expressions when we show the equality between the two expressions. The equal sign in math is a sign that shows the equality between two expressions.  In simple words, the meaning of equal sign is that there is an equality between the values, or expressions written on both the sides. The symbol that represents the equal sign is given by two small parallel horizontal lines. The symbol “$=$” represents that the expression that is on the left side of the sign is exactly the same amount or value of the expression that is on the right side of the sign. We place an equal sign between two things that are the same or equal. For example:  If it is written $2 + 2 = 4$, it means that $2 + 2$ is equal to $4$. $\$1 = 10$ dimes, which means that 1 dollar is equivalent to 10 dimes.  The History of the Equal Sign Robert Recorde, a Welsh physician and mathematician, invented the equal sign (=) and also introduced the pre-existing plus sign (+) to English speakers in 1557. More Worksheets An equation is a statement of equality between two mathematical expressions that contains variables and constants. In every equation, the expression given on the left-hand side (LHS) is equal to the expression given on the right-hand side (RHS).  For example: $5 + 3 = 8$ This means that the LHS is $5 + 3$ and it is equal to the RHS, which is 8.  If we have an equation $2x + 3 = 7$. It means that $2x + 3$, i.e., the expression given on LHS is equal to 8, i.e., the expression given on RHS.  Then we can deduce that $x=2$. The amount or quantity or length of any object is shown by measurement.  For example, Oliver is given the task of measuring the length of a spoon. He uses a centimeter scale to measure its length. He finds out the distance between the start and the endpoint of the spoon.  The length of the spoon $= 16$ cm. It means that the length of the spoon “is equal” to 16 cm.  Fractions tell us about the part of a whole. In fractions, the equal sign between two fractions represent that they are equivalent fractions or the fractions cover equal parts of a whole. For example: $\frac{1}{5}=\frac{2}{10}$ means that $\frac{1}{5}$ is equivalent to $\frac{2}{10}$. The equal sign with two lines means two expressions are equal. For example: $a = 4, b = 12$.  On the other hand, the equal sign given with the three lines means two things are identical. It is similar to but not necessarily the same as an equal sign.  The equal sign with slash means that it is the unequal sign, i.e.,$eq$ . It is used when two expressions are not equal.  For example: $5 eq 8$ means that 5 is not equal to 8. 1. The product of two numbers a and b is exactly 12. How can you represent it mathematically? Solution: The given statement is “The product of two numbers a and b is exactly 12.” It can be represented mathematically using the equal sign. Therefore, ab $= 12$ is the required equation. 2. What is the value of y if $3y+7=28$? Solution: $3y+7=28$ $3y=28\;-\;7$ $3y=21$ $y=7$ 3. How would you write that $xy-3=10$ in words?Solution: The difference of the product of x and y and 3 is equal to 10. Attend this quiz & Test your knowledge.Height of Jack = Height of JillAge of Jack = Age of JillWeight of Jack = Weight of JillCorrect answer is: Age of Jack = Age of JillSince Jack and Jill are twins so their ages will be equal.$\frac{3}{4}$ and $\frac{9}{10}$$\frac{3}{5}$ and $\frac{9}{10}$$\frac{3}{5}$ and $\frac{9}{15}$$\frac{5}{6}$ and $\frac{15}{24}$Correct answer is: $\frac{3}{5}$ and $\frac{9}{15}$When the fraction 35 is multiplied by 3 in both the numerator and denominator, we get $\frac{9}{15}$. Thus, they are equivalent fractions.Correct answer is: $\frac{p}{q}= 4 + p$The remainder of p and q is $\frac{p}{q}$. Therefore, $\frac{p}{q} = 4 + p.$ What does the “$\approx$” sign mean? The sign “$\approx$” means “approximately equal to.” For example, $298 \approx 300$. What is the difference between equal sign and equivalent sign? The equal sign is used to show that the values on either side of it are the same. It is denoted by $=$, whereas the equivalent sign means identical to. It is denoted by $\equiv$. What does the “less than equal to” sign mean? The “less than equal to” sign means that an expression can be either less than or equal to another expression. For example: $x \le 5$ means $x$ can take any value less than 5 or 5. List of all mathematical symbols and signs - meaning and examples. Basic math symbols Symbol Symbol Name Meaning / definition Example = equals sign equality 5 = 2+3 5 is equal to 2+3 ≠ not equal sign inequality 5 ≠ 4 5 is not equal to 4 ≈ approximately equal approximation sin(0.01) ≈ 0.01 x ≈ y means x is approximately equal to y > strict inequality greater than 5 > 4 5 is greater than 4 < strict inequality less than 4 < 5 4 is less than 5 ≥ inequality greater than or equal to 5 ≥ 4 x ≥ y means x is greater than or equal to y ≤ inequality less than or equal to 4 ≤ 5 x ≤ y means x is less than or equal to y ( ) parentheses calculate expression inside first 2 × (3+5) = 16 [ ] brackets calculate expression inside first [(1+2)×(1+5)] = 18 + plus sign addition 1 + 1 = 2 − minus sign subtraction 2 − 1 = 1 ± plus - minus both plus and minus operations 3 ± 5 = 8 or -2 ± minus - plus both minus and plus operations 3 ∓ 5 = -2 or 8 * asterisk multiplication 2 * 3 = 6 × times sign multiplication 2 × 3 = 6 · multiplication dot multiplication 2 · 3 = 6 ÷ division sign / obelus division 6 ÷ 2 = 3 / division slash division 6 / 2 = 3 — horizontal line division / fraction mod modulo remainder calculation 7 mod 2 = 1 . period decimal point, decimal separator 2.56 = 2+56/100 ab power exponent 23 = 8 a^b caret exponent 2 ^ 3 = 8 √a square root √a · √a  = a √9 = ±3 ∛a cube root ∛a · ∛a  · ∛a  = a ∛8 = 2 ∜a fourth root ∜a · ∜a  · ∜a  · ∜a  = a ∜16 = ±2 n√a n-th root (radical)  for n=3, n√8 = 2 % percent 1% = 1/100 10% × 30 = 3 ‰ per-mille 1‰ = 1/1000 = 0.1% 10‰ × 30 = 0.3 ppm per-million 1ppm = 1/1000000 10ppm × 30 = 0.0003 ppb per-billion 1ppb = 1/1000000000 10ppb × 30 = 3×10-7 ppt per-trillion 1ppt = 10-12 10ppt × 30 = 3×10-10 Symbol Symbol Name Meaning / definition Example ∠ angle formed by two rays ∠ABC = 30° measured angle  ABC = 30° spherical angle  AOB = 30° ∟ right angle = 90° α = 90° ° degree 1 turn = 360° α = 60° deg degree 1 turn = 360deg α = 60deg ′ prime arcminute, 1° = 60′ α = 60°59′ ″ double prime arcsecond, 1′ = 60″ α = 60°59′59″ line infinite line  AB line segment line from point A to point B  ray line that start from point A  arc arc from point A to point B = 60° ⊥ perpendicular perpendicular lines (90° angle) AC ⊥ BC ∥ parallel parallel lines AB ∥ CD ≅ congruent to equivalence of geometric shapes and size ΔABC ≅ ΔXYZ ~ similarity same shapes, not same size ΔABC ~ ΔXYZ Δ triangle triangle shape ΔABC ≅ ΔBCD |x-y| distance distance between points x and y | x-y | = 5 π pi constant π = 3.141592654... is the ratio between the circumference and diameter of a circle c = π·d = 2·π·r rad radians radians angle unit 360° = 2π rad c radians radians angle unit 360° = 2π c grad gradians / gons grads angle unit 360° = 400 grad g gradians / gons grads angle unit 360° = 400 g Symbol Symbol Name Meaning / definition Example x x variable unknown value to find when 2x = 4, then x = 2 ≡ equivalence identical to  ≜ equal by definition equal by definition  := equal by definition equal by definition  ~ approximately equal weak approximation 11 ~ 10 ≈ approximately equal approximation sin(0.01) ≈ 0.01 ∝ proportional to proportional to y ∝ x when y = kx, k constant ∞ lemniscate infinity symbol  ≪ much less than much less than 1 ≪ 1000000 ≫ much greater than much greater than 1000000 ≫ 1 ( ) parentheses calculate expression inside first 2 * (3+5) = 16 [ ] brackets calculate expression inside first [(1+2)*(1+5)] = 18 { } braces set  ⌊x⌋ floor brackets rounds number to lower integer ⌊4.3⌋ = 4 ⌈x⌉ ceiling brackets rounds number to upper integer ⌈4.3⌉ = 5 x! exclamation mark factorial 4! = 1*2*3*4 = 24 | x | vertical bars absolute value | -5 | = 5 f (x) function of x maps values of x to f(x) f (x) = 3x+5 (f ∘ g) function composition (f ∘ g) (x) = f (g(x)) f (x)=3x,g(x)=x-1 ⇒(f ∘ g)(x)=3(x-1) (a,b) open interval (a,b) = {x | a < x < b} x∈ (2,6) [a,b] closed interval [a,b] = {x | a ≤ x ≤ b} x ∈ [2,6] Δ delta change / difference Δt = t1 - t0 Δ discriminant Δ = b2 - 4ac  ∑ sigma summation - sum of all values in range of series ∑ xi= x1+x2+...+xn ∑∑ sigma double summation ∏ capital pi product - product of all values in range of series ∏ xi=x1•x2•...•xn e e constant / Euler's number e = 2.718281828... e = lim (1+1/x)x , x→∞ γ Euler-Mascheroni constant γ = 0.5772156649...  φ golden ratio golden ratio constant  π pi constant π = 3.141592654... is the ratio between the circumference and diameter of a circle c = π·d = 2·π·r Symbol Symbol Name Meaning / definition Example · dot scalar product a · b × cross vector product a × b A⊗B tensor product tensor product of A and B A ⊗ B inner product  [ ] brackets matrix of numbers  ( ) parentheses matrix of numbers  | A | determinant determinant of matrix A  det(A) determinant determinant of matrix A  || x || double vertical bars norm  AT transpose matrix transpose (AT)ij = (A)ji A† Hermitian matrix matrix conjugate transpose (A†)ij = (A)ji A* Hermitian matrix matrix conjugate transpose (A*)ij = (A)ji A -1 inverse matrix A A-1 = I  rank(A) matrix rank rank of matrix A rank(A) = 3 dim(U) dimension dimension of matrix A dim(U) = 3 Symbol Symbol Name Meaning / definition Example P(A) probability function probability of event A P(A) = 0.5 P(A ⋂ B) probability of events intersection probability that of events A and B P(A⋂B) = 0.5 P(A ⋃ B) probability of events union probability that of events A or B P(A⋃B) = 0.5 P(A | B) conditional probability function probability of event A given event B occured P(A | B) = 0.3 f (x) probability density function (pdf) P(a ≤ x ≤ b) = ∫ f (x) dx  F(x) cumulative distribution function (cdf) F(x) = P(X≤ x)  μ population mean mean of population values μ = 10 E(X) expectation value expected value of random variable X E(X) = 10 E(X | Y) conditional expectation expected value of random variable X given Y E(X | Y=2) = 5 var(X) variance variance of random variable X var(X) = 4 σ2 variance variance of population values σ2 = 4 std(X) standard deviation standard deviation of random variable X std(X) = 2 σX standard deviation standard deviation value of random variable X σX  = 2 median middle value of random variable x cov(X,Y) covariance covariance of random variables X and Y cov(X,Y) = 4 corr(X,Y) correlation correlation of random variables X and Y corr(X,Y) = 0.6 ρX,Y correlation correlation of random variables X and Y ρX,Y = 0.6 ∑ summation summation - sum of all values in range of series ∑∑ double summation double summation Mo mode value that occurs most frequently in population  MR mid-range MR = (xmax+xmin)/2  Md sample median half the population is below this value  Q1 lower / first quartile 25% of population are below this value  Q2 median / second quartile 50% of population are below this value = median of samples  Q3 upper / third quartile 75% of population are below this value  x sample mean average / arithmetic mean x = (2+5+9) / 3 = 5.333 s 2 sample variance population samples variance estimator s 2 = 4 s sample standard deviation population samples standard deviation estimator s = 2 zx standard score zx = (x-x) / sx  X ~ distribution of X distribution of random variable X X ~ N(0,3) N(μ,σ2) normal distribution gaussian distribution X ~ N(0,3) U(a,b) uniform distribution equal probability in range a,b  X ~ U(0,3) exp(λ) exponential distribution f (x) = λe-λx , x≥0  gamma(c, λ) gamma distribution f (x) = λ c xc-1e-λx / Γ(c), x≥0  χ 2(k) chi-square distribution f (x) = xk/2-1e-x/2 / ( 2k/2 Γ(k/2) )  F (k1, k2) F distribution  Bin(n,p) binomial distribution f (k) = nCk pk(1-p)n-k  Poisson(λ) Poisson distribution f (k) = λke-λ / k!  Geom(p) geometric distribution f (k) =  p(1-p) k  HG(N,K,n) hyper-geometric distribution  Bern(p) Bernoulli distribution  Symbol Symbol Name Meaning / definition Example n! factorial n! = 1·2·3·…·n 5! = 1·2·3·4·5 = 120 nPk permutation 5P3 = 5! / (5-3)! = 60 nCk combination 5C3 = 5!/[3!(5-3)!]=10 Symbol Symbol Name Meaning / definition Example { } set a collection of elements A = {3,7,9,14},B = {9,14,28} A ∩ B intersection objects that belong to set A and set B A ∩ B = {9,14} A ∪ B union objects that belong to set A or set B A ∪ B = {3,7,9,14,28} A ⊆ B subset A is a subset of B. set A is included in set B. {9,14,28} ⊆ {9,14,28} A ⊂ B proper subset / strict subset A is a subset of B, but A is not equal to B. {9,14} ⊂ {9,14,28} A ⊄ B not subset set A is not a subset of set B {9,66} ⊄ {9,14,28} A ⊇ B superset A is a superset of B. set A includes set B {9,14,28} ⊇ {9,14,28} A ⊃ B proper superset / strict superset A is a superset of B, but B is not equal to A. {9,14,28} ⊃ {9,14} A ⊅ B not superset set A is not a superset of set B {9,14,28} ⊅ {9,66} 2A power set all subsets of A  power set all subsets of A  A = B equality both sets have the same members A={3,9,14},B={3,9,14},A=B Ac complement all the objects that do not belong to set A  A \ B relative complement objects that belong to A and not to B A = {3,9,14},B = {1,2,3},A-B = {9,14} A - B relative complement objects that belong to A and not to B A = {3,9,14},B = {1,2,3},A-B = {9,14} A Δ B symmetric difference objects that belong to A or B but not to their intersection A = {3,9,14},B = {1,2,3},A Δ B = {1,2,9,14} A ⊖ B symmetric difference objects that belong to A or B but not to their intersection A = {3,9,14},B = {1,2,3},A ⊖ B = {1,2,9,14} a∈A element of,belongs to set membership A={3,9,14}, 3 ∈ A x∉A not element of no set membership A={3,9,14}, 1 ∉ A (a,b) ordered pair collection of 2 elements  A×B cartesian product set of all ordered pairs from A and B A×B = {(a,b)|a∈A , b∈B} |A| cardinality the number of elements of set A A={3,9,14}, |A|=3 #A cardinality the number of elements of set A A={3,9,14}, #A=3 | vertical bar such that A={x|3" was flipped over to "