

Glossary

Saccheri quadrilateral A rectangle with base angles A and B right angles, and with sides \overline{AC} and \overline{BD} the same length.

Sales price A reduced price usually offered to stimulate sales. It can be found by subtracting the discount from the original price, or by multiplying the original price by the complement of the markdown.

Sales tax A tax levied by government bodies that is based on the sale price of an item.

Sample A finite portion of a population.

Sample space The set of possible outcomes for an experiment.

Satisfy See *Equation* or *Inequality*.

Scalar A real number.

Scalar multiplication The multiplication of a real number and a matrix.

Scalene triangle A triangle with no two sides having the same length.

Scatter diagram A diagram showing the frequencies with which joint values of variables are observed. One variable is indicated along the x -axis and the other along the y -axis.

Scientific notation Writing a number as the product of a number between 1 and 10 and a power of 10: For any real number n , $n = m \cdot 10^c$, $1 \leq m < 10$, and c is an integer. Calculators often switch to scientific notation to represent large or small numbers. The usual notation is 8.234 05, where the space separates the number from the power; thus 8.234 05 means 8.234×10^5 .

Secant line A line passing through two points of a given curve.

Second component See *Ordered pair*.

Second-degree equation With one variable, an equation of the form $ax^2 + bx + c = 0$; with two variables, an equation of the form

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

Semiannual compounding In the compound interest formula, it is when $n = 2$.

Semicircle Half a circle.

Sequence An *infinite sequence* is a function whose domain is the set of counting numbers. It is sometimes called a *progression*. A *finite sequence* with n terms is a function whose domain is the set of numbers $\{1, 2, 3, \dots, n\}$.

Sequential voting A runoff election procedure that has one vote followed by another.

Series The indicated sum of a finite or an infinite sequence of terms.

Series circuit Two switches connected together so that the circuit is on only if both switches are on.

Set A collection of particular things, called the *members* or *elements* of the set. A set with no elements is called the *null set* or *empty set* and is denoted by the symbol \emptyset . All elements of a *finite set* may be listed, whereas the elements of an *infinite set* continue without end.

Set-builder notation A technical notation for defining a set. For example,

$$\{a \mid a \in \mathbb{Z}, 5 < a < 100\}$$

means “the set of all elements a such that a is an integer between 5 and 100.”

Set theory The branch of mathematics that studies sets.

SI system See *Metric system*.

Sieve of Eratosthenes A method for determining a set of primes less than some counting number n . Write out the consecutive numbers from 1 to n . Cross out 1, since it is not classified as a prime number. Draw a circle around 2, the smallest prime number. Then cross out every following multiple of 2, since each is divisible by 2 and thus is not prime. Draw a circle around 3, the next prime number. Then cross out each succeeding multiple of 3. Some of these numbers, such as 6 and 12, will already have been crossed out because they are also multiples of 2. Circle the next open prime, 5, and cross out all subsequent multiples of 5. The next prime number is 7; circle 7 and cross out multiples of 7. Continue this process until you have crossed out the primes up to \sqrt{n} . All of the remaining numbers on the list are prime.

Sigma notation Sigma, the Greek letter corresponding to S , is written Σ . It is used to indicate the process of summing the first to the n th terms of a set of numbers $s_1, s_2, s_3, \dots, s_n$, which is written as

$$\sum_{k=1}^n s_k$$

This notation is also called *summation notation*.

Signed number An integer.

Significance level Deviations between hypothesis and observations that are so improbable under the hypothesis as not to be due merely to sampling error or random fluctuations are said to be *statistically significant*. The significance level is set at an acceptable level for a deviation to be statistically significant.

Similar figures Two geometric figures are similar if they have the same shape, but not necessarily the same size.

Similar terms Terms that differ only in their numerical coefficients.

Similar triangle theorem Two triangles are similar if two angles of one triangle are equal to two angles of the other triangle. If the triangles are similar, then their corresponding sides are proportional.

Similar triangles Triangles that have the same shape.

Similarity Two geometric figures are *similar* if they have the same shape.

Simple curve A curve that does not intersect itself.

Simple event An event that contains only one element of the sample space.

Simple grouping system A numeration system is a grouping system if the position of the symbols is not important, and each symbol larger than 1 represents a group of other symbols.

Simple interest formula $I = Prt$

Simple statement A statement that does not contain a connective.

Simplify (1) A *polynomial*: combine similar terms and write terms in order of descending degree. (2) A fraction (a rational expression): Simplify numerator and denominator, factor if possible, and eliminate all common factors. (3) A square root: The *radicand* (the number under the radical sign) has no factor with an exponent larger than 1 when it is written in factored form; the radicand is not written as a fraction or by using negative exponents; there are no square root symbols used in the denominators of fractions.

Simulation Use of a computer program to simulate some real-world situation.

Simultaneous solution The solution of a simultaneous system of equations.

Sine In a right triangle ABC with right angle C ,

$$\sin A = \frac{\text{LENGTH OF OPPOSITE SIDE OF } A}{\text{LENGTH OF HYPOTENUSE}}$$

Singular matrix A matrix that does not have an inverse.

Sinking fund A financial problem in which the monthly payment must be found to obtain a known future value. The formula is

$$m = \frac{A\left(\frac{r}{n}\right)}{\left(1 + \frac{r}{n}\right)^{nt} - 1}$$

Skewed distribution A statistical distribution that is not symmetric, but favors the occurrence on one side of the mean or the other.

Slant asymptotes In graphing a hyperbola, the diagonal lines passing through the corners of the central rectangle.

Slope The slope of a line passing through (x_1, y_1) and (x_2, y_2) is denoted by m , and is found by

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{VERTICAL CHANGE}}{\text{HORIZONTAL CHANGE}} = \frac{\text{RISE}}{\text{RUN}}$$

Slope-intercept form $y = mx + b$

Slope point A point that is found after counting out the rise and the run from the y-intercept.

Software The routines, programs, and associated documentation in a computer system.

Software package A commercially available computer program that is written to carry out a specific purpose, for example, a database program or a word-processing program.

Solution The values or ordered pairs of values for which an equation, a system of equations, inequality, or system of inequalities is true. Also called *roots*.

Solution set The set of all solutions to an equation.

Solve a proportion To find the missing term of a proportion. Procedure: First, find the product of the means or the product of the extremes, whichever does not contain the unknown term; next, divide this product by the number that is opposite the unknown term.

Solve an equation To find the values of the variable that make the equation true.

Solve an inequality To find the values of the variable that make the inequality true.

Some A word used to mean *at least one*.

Spanning tree A tree that is created from another graph by removing edges while keeping a path to each vertex.

Sphere The set of all points in space that are a given distance from a given point.

Spreadsheet A rectangular grid used to collect and perform calculations on data. *Rows* are horizontal and are labeled with numbers and *columns* are vertical and are labeled with letters to designate *cells* such as A4, P604. Each cell can contain text, numbers, or formulas.

Square (1) A quadrilateral with all sides the same length and all angles right angles.
(2) In an expression such as x^2 , which is pronounced “ x -squared,” it means xx .

Square matrix A matrix with the same number of rows and columns.

Square number Numbers that are squares of the counting numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, ...

Square root See *Root of a number*.

Square unit A two-dimensional unit. It is the result of squaring a unit of measurement.

Stable marriage A pairing in which both partners are satisfied.

Standard deviation It is a measure of the variation of a data set. In particular, it is the square root of the mean of the squares of the deviations from the mean.

Standard divisor

$$\text{STANDARD DIVISOR} = \frac{\text{TOTAL POPULATION}}{\text{NUMBER OF SHARES}}$$

Standard form The standard form of the equation of a line is $Ax + By + C = 0$.

Standard quota

$$\text{STANDARD QUOTA} = \frac{\text{TOTAL POPULATION}}{\text{STANDARD DIVISOR}}$$

Statement A declarative sentence that is either true or false, but not both true and false.

Statistics Methods of obtaining and analyzing quantitative data.

Stem-and-leaf plot A procedure for organizing data that can be divided into two categories. The first category is listed at the left, and the second category at the right.

Sticker price In this book, it refers to the manufacturer's total price of a new automobile as listed on the window of the car.

Straight angle An angle whose rays point in opposite directions; an angle whose measure is 180° .

Straightedge A device used as an aid in drawing a straight line segment.

Straw vote A nonbinding vote taken before all the discussion has taken place. It precedes the actual vote.

Street problem A problem that asks the number of possible routes from one location to another along some city's streets. The assumptions are that we always move in the correct direction and that we do not cut through the middle of a block, but rather stay on the streets or alleys.

Subjective probability A probability obtained by experience and used to indicate a measure of “certainty” on the part of the speaker. These probabilities are not necessarily arrived at through experimentation or theory.

Subscript A small number or letter written below and to the right or left of a letter as a mark of distinction.

Subset A set contained within a set. There are 2^n subsets of a set with n distinct elements. A subset is *improper* if it is equivalent to the given set; otherwise it is *proper*.

Substitution method The method of solution of a system of equations in which one of the equations is solved for one of the variables and substituted into another equation.

Substitution property The process of replacing one quantity or unknown by another quantity. That is, if $a = b$, then a may be substituted for b in any mathematical statement without affecting the truth or falsity of the given mathematical statement.

Subtraction The operation of subtraction is defined by:

$$a - b = x \text{ means } a = b + x$$

Subtraction law of exponents To divide two numbers with the same base, subtract the exponents. That is,

$$\frac{b^m}{b^n} = b^{m-n}$$

Subtraction law of logarithms The log of the quotient of two numbers is the log of the numerator minus the log of the denominator. In symbols,

$$\log_b\left(\frac{A}{B}\right) = \log_b A - \log_b B$$

Subtraction of integers

$$a - b = a + (-b)$$

Subtraction of matrices $[M] - [N] = [S]$ if and only if $[M]$ and $[N]$ are the same order and the entries of $[S]$ are found by subtracting the corresponding entries of $[M]$ and $[N]$.

Subtraction of rational numbers

$$\frac{a}{b} - \frac{c}{d} = \frac{ad}{bd} - \frac{bc}{bd} = \frac{ad - bc}{bd}$$

Subtraction principle In reference to numeration systems, it is subtracting the value of some symbol from the value of the other symbols. For example, in the Roman numeration system IX uses the subtraction principle because the position of the I in front of the X indicates that the value of I (which is 1) is to be subtracted from the value of X (which is 10). $IX = 9$.

Subtraction property of equations The solution of an equation is unchanged by subtracting the same number from both sides of the equation.

Subtraction property of inequality See *Addition property of inequality*.

Successor In a sequence, the successor of an element a_n is the following element, a_{n+1} .

Sum The result of an addition.

Summation notation See *Sigma notation*.

Supercomputer A large, very fast mainframe computer used especially for scientific computations.

Superfluous constraint In a linear programming problem, a constraint that does not change the outcome if it is deleted.

Supermarket problem Set up the shelves in a market or convenience store so that it is possible to enter the store at one door and travel each aisle once (and only once) and leave by the same door.

Supplementary angles Two angles whose sum is 180° .

Supply The number of items that can be supplied at a given price.

Surface In mathematics, it is an undefined term. It is the outer face or exterior of an object; it has an extent or magnitude having length and breadth, but no thickness.

Surface area The area of the outside faces of a solid.

Syllogism A logical argument that involves three propositions, usually two premises and a conclusion, the conclusion necessarily being true if the premises are true.

Symbols of inclusion See *Grouping symbols*.

Symmetric property of equality If $a = b$, then $b = a$.

Symmetry (1) In geometry, a graph or picture is *symmetric with respect to a line* if the graph is a mirror reflection along the line. (2) In voting, it means that if one voter prefers A to B and another B to A , then the votes should cancel each other out.

Syntax error The breaking of a rule governing the structure of the programming language being used.

System of equations A set of equations that are to be solved *simultaneously*. A brace symbol is used to show the equations belonging to the system.

System of inequalities A set of inequalities that are to be solved simultaneously. The solution is the set of all ordered pairs (x, y) that satisfy all the given inequalities. It is found by finding the intersection of the half-planes defined by each inequality.