

Glossary

401(k) plan

A 401(k) plan is a retirement investment account set up by an employer. A portion of an employee's pay is invested into the account with the employer often matching a certain amount of it.

403(b) plan

A 403(b) plan is a retirement plan generally for public school employees or other tax exempt groups.

A

absolute value

The absolute value, or magnitude, of a number is its distance from zero on a number line.

Example

The absolute value of -3 is the same as the absolute value of 3 because they are both a distance of 3 from zero on a number line.



$$|-3| = |3|$$

account balance

Amount of money in an account at a given time.

Addition Property of Equality

The Addition Property of Equality states that if two values a and b are equal, when you add the same value c to each, the sums are equal.

Examples

$$12 = 12 \text{ and } 12 + 7 = 12 + 7$$

$$\text{If } a = b, \text{ then } a + c = b + c.$$

additive inverses

Two numbers with the sum of zero are called additive inverses.

Examples

$$-19 + 19 = 0 \quad a + -a = 0$$

additive reasoning

Additive reasoning focuses on the use of addition and subtraction for comparisons.

Examples

Vicki is 40 years old and Ben is 10 years old. In 5 years, Vicki will be 45 and Ben will be 15. Vicki will always be 30 years older than Ben. This is additive reasoning.

algebraic expression

An algebraic expression is a mathematical phrase that has at least one variable, and it can contain numbers and operation symbols.

Examples

$$a \quad 2a + b \quad xy \quad \frac{4}{p} \quad z^2$$

algorithm

An algorithm is a process or description of steps you can follow to complete a mathematical calculation.

Annual Percentage Yield (APY)

Annual Percentage Yield (APY) is a percentage that is paid to customers based on the account balance in an account for a year.

Example

For example, Yvonne opens a checking account with an average monthly balance of \$600. The account has a 2.5% APY.

$$(600)(0.025) = 15$$

Yvonne will earn \$15 on this checking account over the course of the year.

appreciation

Appreciation is an increase in price or value.

asset

Assets include the value of all accounts, investments, and things that you are own. They are positive and add to your net worth.

associate's degree

An associate's degree is a degree earned in a one-or two-year program in which students learn a specific skill or trade.

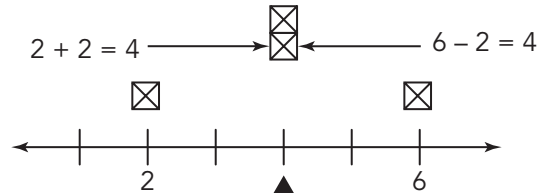
B

balance point

When you have all the points on a number line at the same value, the number line is balanced. The value where the number line is balanced is called the balance point.

Example

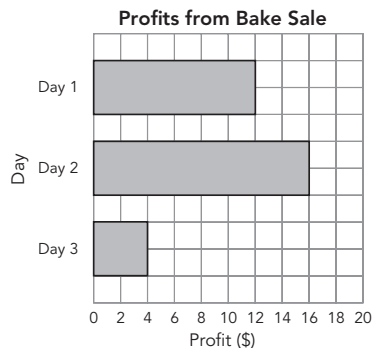
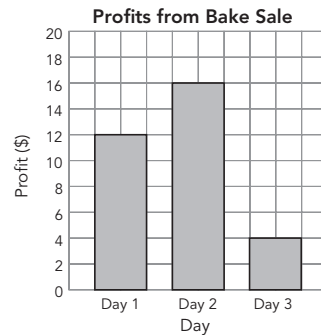
Consider the data set: 2, 6.



bar graph

A bar graph displays categorical data using either horizontal or vertical bars on a graph. The height or length of each bar indicates the value for that category.

Examples

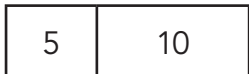
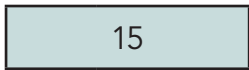
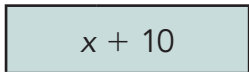
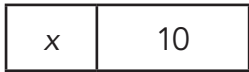


bar model

A bar model uses rectangular bars to represent known and unknown quantities.

Example

You can use a bar model to solve the equation $x + 10 = 15$.



The top bar can be split into two bars, x and 10. When this split happens in the bottom bar, with one bar containing 10, it shows that x is the same as 5, so $x = 5$.

bar notation

Bar notation is used to indicate the digits that repeat in a repeating decimal.

Example

In the quotient of 3 and 7, the sequence 428571 repeats. The numbers that lie underneath the bar are the numbers that repeat.

$$\frac{3}{7} = 0.4285714285714... = \overline{0.428571}$$

base

The base of a power is the factor that is multiplied repeatedly in the power.

Examples

$$\begin{array}{c} 2^3 = 2 \times 2 \times 2 = 8 \\ \uparrow \\ \text{base} \end{array}$$

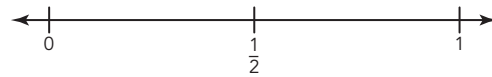
$$\begin{array}{c} 8^0 = 1 \\ \uparrow \\ \text{base} \end{array}$$

benchmark fractions

Benchmark fractions are common fractions you can use to estimate the value of fractions.

Example

The numbers 0, $\frac{1}{2}$, and 1 are some benchmark fractions.



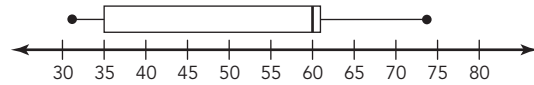
benchmark percents

A benchmark percent is a percent that is commonly used, such as 1%, 5%, 10%, 25%, 50%, and 100%.

box-and-whisker plot

A box-and-whisker plot, or just box plot, is a graph that displays the five-number summary of a data set: the median, the upper and lower quartiles (Q1 and Q3), and the minimum and maximum values.

Example



Data: 32, 35, 35, 53, 55, 60, 60, 61, 61, 74, 74

Minimum = 32

Q1 = 35

Median = 60

Q3 = 61

Maximum = 74

C

categorical data

Categorical data, or qualitative data, are data for which each piece of data fits into exactly one of several different groups or categories.

Examples

Animals: lions, tigers, bears, etc.

Colors: blue, green, red, etc.

check

A check is a written order to a bank to pay a specific amount of money to a person or company out of your checking account.

Example

Al Jebra
315 Liberty Avenue
Dallas, TX 75201
(214) 555-4567

DATE 5/22/20

0123
01-2345/6789

PAY TO THE ORDER OF Jody's Harley Shop \$ 211.46

Two hundred eleven and 46/100 DOLLARS

FOR helmet Al Jebra

Bank of Texas
2065 Eagle Drive
Austin, Texas 73344

⑆012345678⑆ 01234567890123⑆ 0123

Bank Routing Number Bank Account Number Check Number

checking account

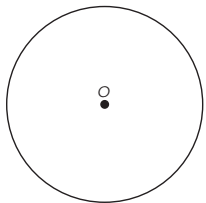
A checking account allows customers to safely store money in the bank and write checks.

circle

A circle is a collection of points on the same plane equidistant from the same point. The center of a circle is the point from which all points on the circle are equidistant. Circles are named by their center point.

Example

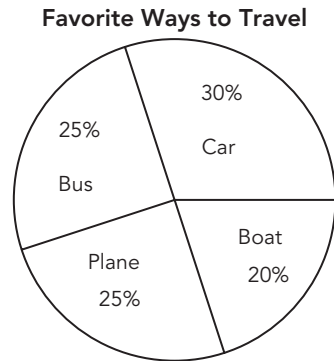
The circle shown is Circle O.



circle graph

A circle graph, often called a pie chart, displays categorical data using sectors, or "wedges," of a circle.

Example

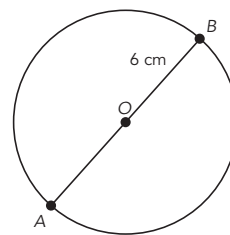


circumference

The distance around a circle is called the circumference of the circle. The circumference is calculated by the formula: $C = \pi(d)$.

Example

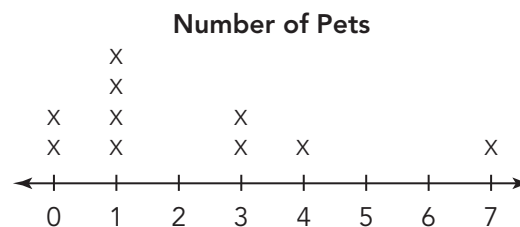
The diameter of Circle O is 12 centimeters. The circumference of Circle O is 12π .



clusters

Clusters are areas of the graph where data are grouped close together.

Example

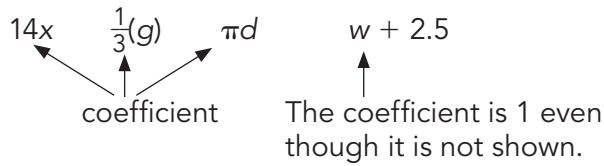


There are clusters of data from 0 to 1 and from 3 to 4.

coefficient

A number that is multiplied by a variable in an algebraic expression is called a coefficient.

Examples



commission

A **commission** is an amount of money a salesperson earns after selling a product. Many times, the commission is a certain percent of the product.

Example

5% commission on \$350

$$0.05 \times 350 = \$17.50 \leftarrow \text{commission}$$

common factor

A common factor is a number that is a factor of two or more numbers.

Example

factors of 60: **1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60**

factors of 24: 1, **2, 3, 4, 6, 8, 12, 24**

common factors of 60 and 24: 1, 2, 3, 4, 6, and 12

Commutative Property of Multiplication

The Commutative Property of Multiplication states that for any numbers a and b , the product $a \cdot b$ is equal to the product $b \cdot a$.

Examples

$$\begin{array}{r} 29 \\ \times 3 \\ \hline 87 \end{array} = \begin{array}{r} 3 \\ \times 29 \\ \hline 27 \\ + 60 \\ \hline 87 \end{array} \quad \begin{array}{r} \frac{1}{5} \times \frac{2}{3} = \frac{2}{15} \\ \frac{2}{3} \times \frac{1}{5} = \frac{2}{15} \end{array}$$

complex fraction

A complex fraction is a fraction that has a fraction in either the numerator, the denominator, or both the numerator and denominator.

Examples

$\frac{3}{4}, \frac{7}{2},$ and $\frac{\frac{1}{4}}{\frac{2}{3}}$ are all complex fractions.

complex ratio

A ratio in which one or both of the quantities being compared are written as fractions is a complex ratio.

Example

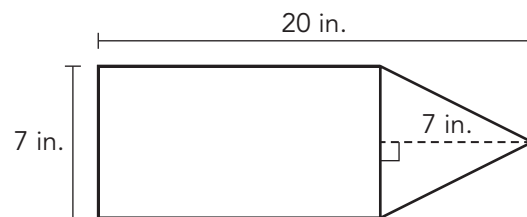
Traveling $\frac{1}{3}$ mile in $\frac{1}{2}$ hour represents a ratio of fractions, or a complex ratio.

composite figure

A figure that is made up of more than one geometric figure.

Example

A composite figure shown is composed of a rectangle and a triangle.



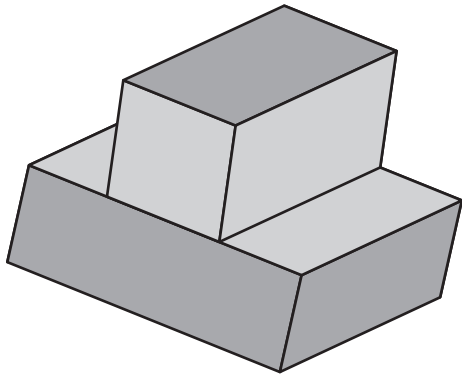
compound interest

Compound interest is a percentage of the principal and the interest that is added to the principal over time.

composite solid

A composite solid is made up of more than one geometric solid.

Example

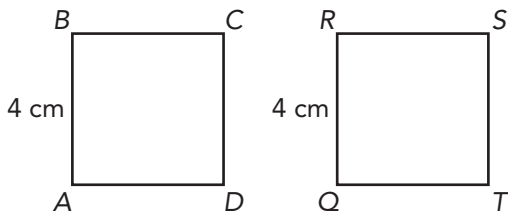


congruent

Congruent means to have the same size, shape, and measure.

Example

Square $ABCD$ is congruent to Square $QRST$.



constant of proportionality

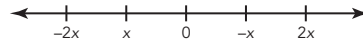
In a proportional relationship, the ratio of all y -values to their corresponding x -values is constant. This specific ratio, $\frac{y}{x}$, is called the constant of proportionality. Generally, the variable k is used to represent the constant of proportionality.

constraint

A constraint is a condition that a solution or problem must satisfy. A constraint can be a restriction set in advance of solving a problem or a limit placed on a solution or graph so the answer makes sense in terms of a real-world scenario.

Example

The expressions 0 , x , $2x$, $-x$, and $-2x$ are graphed on a number line using the constraint $x < 0$.



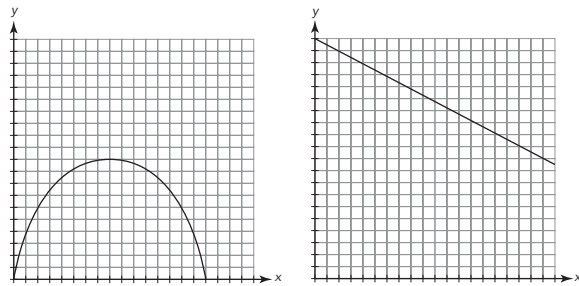
continuous data

When quantitative data are a measurement of something and can have values that are between two counting numbers, the data are called continuous data.

continuous graph

A continuous graph is a graph with no breaks in it.

Examples



convert

To convert a measurement means to change it to an equivalent measurement in different units.

Example

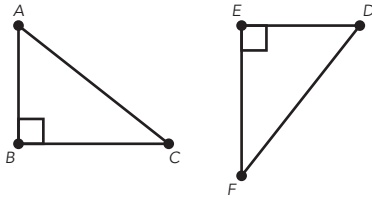
To convert 36 inches to feet, you can multiply:

$$\begin{aligned} 36 \text{ in.} \left(\frac{1 \text{ ft.}}{12 \text{ in.}} \right) &= \frac{36 \text{ ft.}}{12} \\ &= 3 \text{ ft.} \end{aligned}$$

corresponding

Corresponding means to have the same relative position in geometric figures, usually referring to sides and angles.

Example



Sides AB and FE are corresponding sides.

Angle B and Angle E are corresponding angles.

coupon

A coupon is a detachable part of a ticket or advertisement that entitles the holder to a discount.

credit card

A card that allows a person to borrow a certain amount of money and pay the borrowed money back at a later time.

credit history

Credit history includes a record of all loans, credit card debt, late payments etc.

credit report

A credit report is a detailed listing of an individual's credit history.

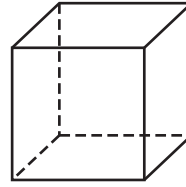
credit score

A credit score is a number used by lenders to rate how likely it is that a person will repay their debts.

cube

A cube is a polyhedron that has congruent squares as faces.

Example



D

data

Data are categories, numbers, or observations gathered in response to a statistical question.

Examples

favorite foods of sixth graders, heights of different animals at the zoo

debit

A debit occurs when money is taken out of the account automatically through the use of a debit card.

debit card

A card that allows a bank's customer to pay for goods using money from their account.

Density Property

The Density Property states that between any two rational numbers there is another rational number.

dependent quantity

The dependent quantity is the quantity that depends on another in a problem situation.

Example

Max just got a new hybrid car that averages 51 miles to the gallon. How far does the car travel on 15 gallons of fuel?

$$\text{number of gallons} \cdot \frac{\text{miles}}{\text{gallon}} = \text{miles traveled}$$

The dependent quantity is the total miles traveled. The number of miles traveled depends on the gallons of fuel.

dependent variable

The variable that represents the dependent quantity is called the dependent variable.

Example

Max just got a new hybrid car that averages 51 miles to the gallon. How far does the car travel on 15 gallons of fuel?

$$\text{number of gallons} \cdot \frac{\text{miles}}{\text{gallon}} = \text{miles traveled}$$

$$g \cdot m = t$$

The dependent quantity is the total miles traveled. Since t represents total miles traveled in the equation, t is the dependent variable.

deposit

A deposit is money put into the account. Deposits may come in the form of cash, checks, or transfers.

depreciation

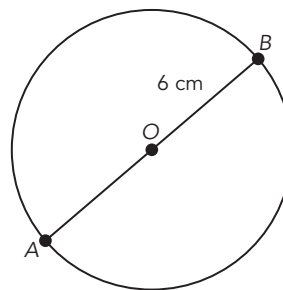
Depreciation is a decrease in price or value

diameter

The diameter of a circle is a line segment formed by connecting two points on the circle such that the line segment passes through the center point.

Example

In Circle O , segment AB is a diameter. The length of diameter AB is two times the length of radius OA . The length of radius OA is 6 centimeters, so the length of diameter AB is 12 centimeters.



direct variation

A situation represents a direct variation if the ratio between the y -value and its corresponding x -value is constant for every point. The quantities are said to vary directly.

Example

If Melissa earns \$8.25 per hour, then the amount she earns is in direct variation with the number of hours she works. The amount \$8.25 is the constant of proportionality.

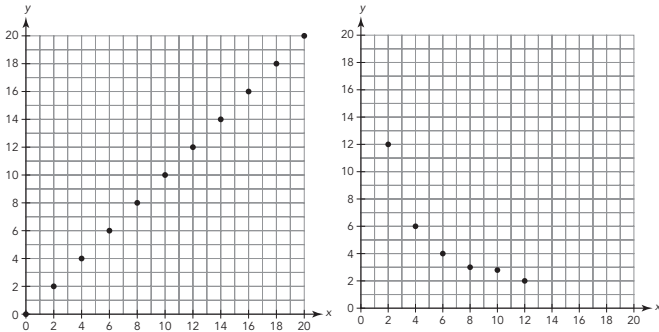
discrete data

Discrete data can only take on specific, individual values. Common examples of discrete data include the number of students in a class or shoe sizes.

discrete graph

A discrete graph is a graph of isolated points.

Examples



distribution

The overall shape of a graph is called the distribution of data. A distribution is the way in which the data are spread out.

Distributive Property

The Distributive Property states that for any numbers a , b , and c , $a(b + c) = ab + ac$.

Examples

$$\begin{aligned}4(2 + 15) &= 4 \cdot 2 + 4 \cdot 15 \\ &= 8 + 60 \\ &= 68\end{aligned}$$

Division Property of Equality

The Division Property of Equality states that when you divide equal values a and b by the same value c and $c \neq 0$, the quotients are equal.

Examples

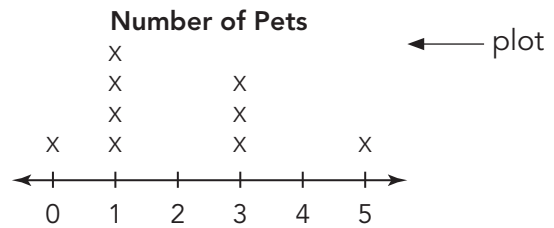
$$12 = 12 \text{ and } 12 \div 7 = 12 \div 7$$

$$\text{If } a = b \text{ and } c \neq 0, \text{ then } \frac{a}{c} = \frac{b}{c}.$$

dot plot

A dot plot (sometimes called a line plot) is a data display that shows discrete data on a number line with dots, Xs, or other symbols.

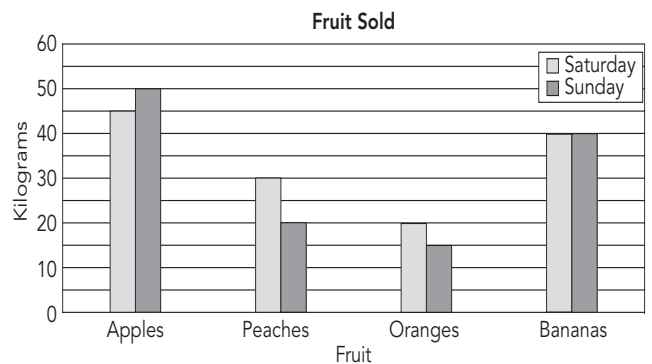
Example



double bar graph

A double bar graph is used when each category contains two different data sets. The bars may be vertical or horizontal.

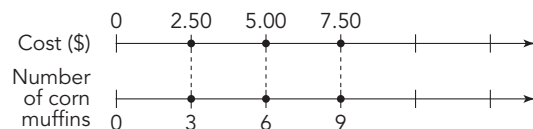
Example



double number line

A double number line is a model that is made up of two number lines used together to represent the ratio between two quantities.

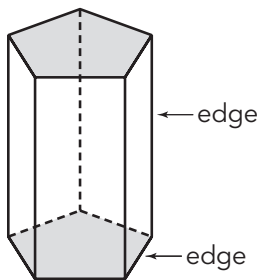
Example



edge

An edge is the intersection of two faces of a three-dimensional figure.

Example



ellipsis

An ellipsis is a set of three periods used to represent infinity in a number set.

Example

{..., -2, -1, 0, 1, 2, ...}

↑ ↑

ellipsis ellipsis

equation

An equation is a mathematical sentence that uses an equals sign to show that two quantities are the same as one another.

Examples

$$y = 2x + 4$$

$$6 = 3 + 3$$

$$2(8) = 26 - 10$$

$$\frac{1}{4} \cdot 4 = \frac{8}{4} - \frac{4}{4}$$

equivalent expressions

Two algebraic expressions are equivalent expressions if, when any values are substituted for variables, the results are equal.

Example

$$(x + 10) + (6x - 5) = 7x + 5$$

$$12 + 7 = 14 + 5$$

$$19 = 19$$

equivalent fractions

Fractions that represent the same part-to-whole relationship are equivalent fractions.

equivalent ratios

Equivalent ratios are ratios that represent the same part-to-part or part-to-whole relationship.

evaluate an algebraic expression

To evaluate an algebraic expression means to determine the value of the expression for a given value of each variable.

Example

Evaluate the expression $\frac{4x + (2^3 - y)}{p}$ for $x = 2.5$, $y = 8$, and $p = 2$.

- First replace the variables with numbers: $\frac{4(2.5) + (2^3 - 8)}{2}$.
- Then calculate the value of the expression: $\frac{10 + 0}{2} = \frac{10}{2} = 5$.

evaluate a numeric expression

To evaluate a numeric expression means to rewrite the expression as a single numeric value.

Example

$$19 - 4 \times 3$$

$$19 - 12$$

$$7$$

experiment (statistics)

An experiment is one method of collecting data in which a researcher imposes a condition and observes the results.

Example

A researcher conducts an experiment to investigate if 6th graders perform better on an assessment if they read a textbook or watch a video about the material. The researcher randomly assigns half the students to read the text and half the students to watch the video. All students would be given the same assessment and the scores of the students in the two groups would be compared.

exponent

The exponent of the power is the number of times the base is used as a factor.

Examples

$$2^3 = 2 \times 2 \times 2$$

↑
exponent

$$8^4 = 8 \times 8 \times 8 \times 8$$

↑
exponent

extremes

In a proportion that is written $a : b = c : d$, the two values on the outside, a and d , are the extremes.

Example

7 books : 14 days = 3 books : 6 days



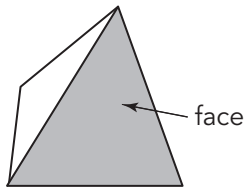
extremes

F

face

A face is one of the polygons that makes up a polyhedron.

Example



factor

To factor an expression means to rewrite the expression as a product of factors.

Example

$$5(12) + 5(9) = 5(12 + 9)$$

Family Budget Estimator

The Family Budget Estimator is an online tool that allows residents to determine the cost of raising a family in each of Texas' major metropolitan areas. This resource is accessible via www.familybudgets.org

fixed expenses

Fixed expenses are expenses that don't change from month to month.

frequency

A frequency is the number of times an item or number occurs in a data set.

Example

Number Rolled	Tally	Frequency
2		7

The number 2 was rolled 7 times, so its frequency was 7.

frequency table

A table used to organize data according to how many times a data value occurs.

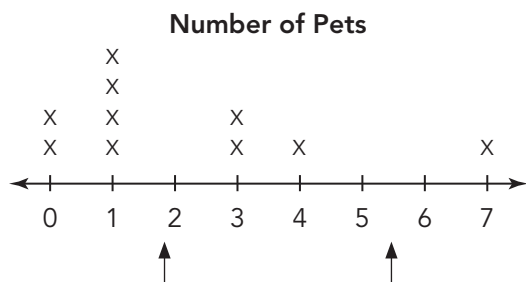
Example

Number of Roller Coasters at Major Theme Parks	
Number of Roller Coasters	Frequency (f)
7–9	6
10–12	4
13–15	7
16–18	2

gaps

Gaps are areas of the graph where there are no data.

Example

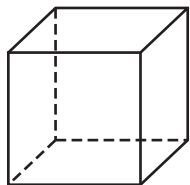


There are gaps between 1 and 3 and between 4 and 7.

geometric solid

A geometric solid is a bounded three-dimensional geometric figure.

Example



grant

A grant is money awarded to a person from the government or school to help pay tuition.

graph of an inequality

The graph of an inequality in one variable is the set of all points on a number line that make the inequality true.

Example



$$x \leq 3$$

greatest common factor (GCF)

The greatest common factor, or GCF, is the largest factor two or more numbers have in common.

Example

factors of 16: **1, 2, 4, 8, 16**

factors of 12: **1, 2, 3, 4, 6, 12**

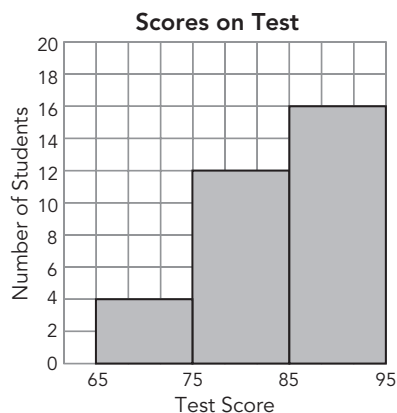
common factors: 1, 2, 4

greatest common factor: 4

histogram

A histogram is a graphical way to display quantitative or numerical data using vertical bars. The width of a bar represents an interval of data and is often referred to as a bin. The height of the bar indicates the frequency, or the number of data values included in any given bin.

Example



Identity Property of Addition

The Identity Property of Addition states that the sum of any number and 0 is the number.

Examples

$$6 + 0 = 6 \quad \frac{3}{4} + 0 = \frac{3}{4}$$

$$5^2 + 0 = 5^2 \quad 0.125 + 0 = 0.125$$

Identity Property of Multiplication

The Identity Property of Multiplication states that the product of any number and 1 is the number.

Examples

$$6 \times 1 = 6 \quad \frac{3}{4} \times 1 = \frac{3}{4}$$
$$5^2 \cdot 1 = 5^2 \quad 0.125(1) = 0.125$$

income tax

Income tax is a percentage of a person's or company's earnings that is collected by the government.

Example

If a person earns \$90,000 in one year and has to pay an income tax rate of 28%, then that person owes $90,000 \times 0.28$ or \$25,200 in income tax to the government.

independent quantity

The independent quantity is the quantity the dependent quantity depends on.

Example

Max just got a new hybrid car that averages 51 miles to the gallon. How far does the car travel on 15 gallons of fuel?

$$\text{number of gallons} \cdot \frac{\text{miles}}{\text{gallon}} = \text{miles traveled}$$

The independent quantity is the number of gallons. The other quantity (miles traveled) is dependent upon this quantity.

independent variable

The variable that represents the independent quantity is called the independent variable.

Example

Max just got a new hybrid car that averages 51 miles to the gallon. How far does the car travel on 15 gallons of fuel?

$$\text{number of gallons} \cdot \frac{\text{miles}}{\text{gallon}} = \text{miles traveled}$$

$$g \cdot m = t$$

The independent quantity is the number of gallons. Since g represents the number of gallons in the equation, g is the independent variable.

inequality

An inequality is any mathematical sentence that has an inequality symbol.

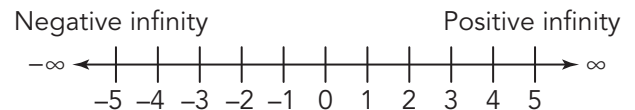
Examples

$$8 > 2 \quad a \leq b \quad 6.051 > 6.009 \quad 2x + 4 \geq 16$$

infinity

Infinity, represented by the symbol ∞ , means a quantity with no end or bound.

Example



integers

Integers are the set of whole numbers with their opposites.

Example

The set of integers can be represented as $\{\dots -3, -2, -1, 0, 1, 2, 3, \dots\}$

interest

Interest is an additional charge for borrowing money, usually a percentage of the amount borrowed.

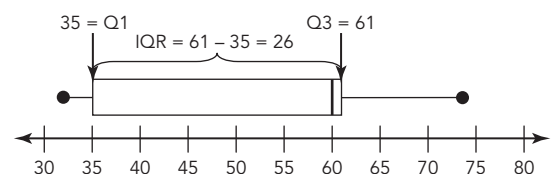
interest rate

The interest rate is the percentage of the balance on the credit card that is added to the cost of the purchase.

interquartile range (IQR)

The interquartile range, abbreviated IQR, is the difference between the third quartile, Q_3 , and the first quartile, Q_1 . The IQR indicates the range of the middle 50 percent of the data.

Example



inverse operations

Inverse operations are pairs of operations that reverse the effects of each other.

Examples

Addition and subtraction are inverse operations:
 $351 + 25 - 25 = 351$.

Multiplication and division are inverse operations:
 $351 \times 25 \div 25 = 351$.

isolate the variable

When you isolate the variable in an equation, you perform an operation, or operations, to get the variable by itself on one side of the equals sign.

Example

In the equation $\frac{a}{b} = \frac{c}{d}$, you can multiply both sides by b to isolate the variable a .

$$b \cdot \frac{a}{b} = b \cdot \frac{c}{d} \rightarrow a = \frac{bc}{d}$$

K

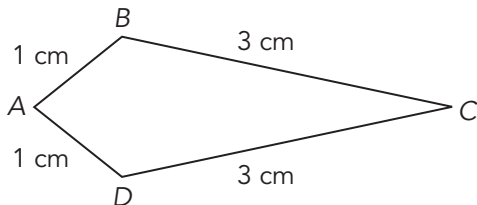
key

A key explains how each data set is represented by a color or a pattern in the graph.

kite

A kite is a quadrilateral with two pairs of consecutive congruent sides where opposite sides are not congruent.

Example



least common multiple (LCM)

The least common multiple, or LCM, is the smallest multiple (other than zero) that two or more numbers have in common.

Example

multiples of 60: 60, **120**, 180, **240**, 300, 360, 420, 480 . . .

multiples of 24: 24, 48, 72, 96, **120**, 144, 168, 192, 216, **240** . . .

some common multiples of 60 and 24: 120, 240 . . .

least common multiple of 60 and 24: 120

liability

A liability is a financial obligation, or debt, that you must repay. It is negative and take away from your net worth

like terms

In an algebraic expression, like terms are two or more terms that have the same variable raised to the same power.

Examples

like terms

$$4x + 3p + x + 2 = 5x + 3p + 2$$

like terms

$$24a^2 + 2a - 9a^2 = 13a^2 + 2a$$

no like terms

$$m + m^2 - x + x^3$$

linear expression

A linear expression is any expression in which each term is either a constant or the product of a constant and a single variable raised to the first power.

Examples

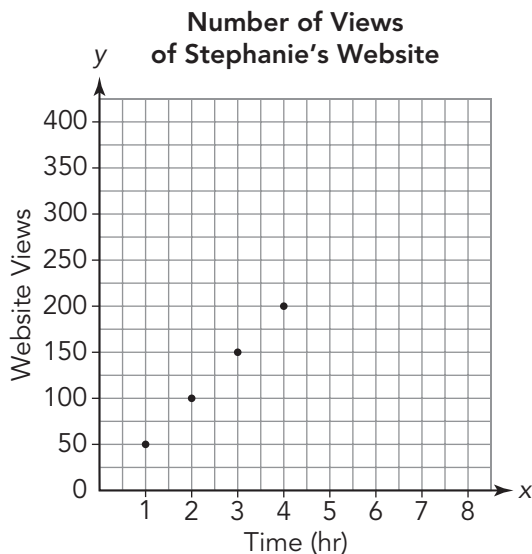
$$\frac{1}{2}x + 2, -3 + 12.5x, -1 + 3x + \frac{5}{2}x - \frac{4}{3}$$

linear relationship

When a set of points graphed on a coordinate plane forms a straight line, a linear relationship exists.

Example

The points graphed show a linear relationship.



literal equation

A literal equation is an equation in which the variables represent specific measures.

Examples

$$A = lw \quad A = \frac{1}{2}bh \quad d = rt$$

M

markdown

When businesses sell an item at a lower price than the original price, it is called a markdown.

markup

To make money, businesses often buy products from a wholesaler or distributor for one amount and add to that amount to determine the price they use to sell the product to their customers. This is called a markup.

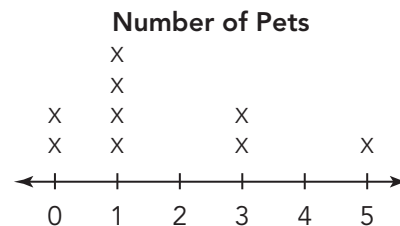
master's degree

A master's degree is a one- or two-year degree beyond an undergraduate degree.

mean

The mean is the arithmetic average of the numbers in a data set.

Example



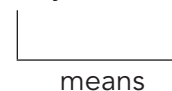
$$\begin{aligned} \text{Mean} &= \frac{0 + 0 + 1 + 1 + 1 + 1 + 3 + 3 + 5}{9} \\ &= \frac{15}{9} = 1\frac{2}{3} \text{ pets} \end{aligned}$$

means

In a proportion that is written $a : b = c : d$, the two values in the middle, b and c , are the means.

Example

7 books : 14 days = 3 books : 6 days



measure of center

A measure of center tells you how the data values are clustered, or where the "center" of a graph of the data is located.

Examples

Mean, median, and mode are each a measure of center for data.

measure of variation

A measure of variation describes the spread of data values.

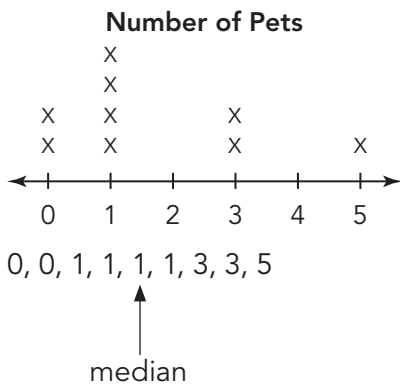
Example

Range is a measure of variation for data.

median

The median is the middle number in a data set when the values are placed in order from least to greatest or greatest to least.

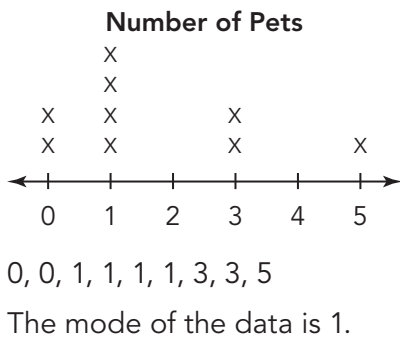
Example



mode

The mode is the value or values that occur most frequently in a data set.

Example

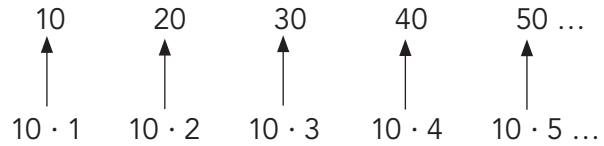


multiple

A multiple is the product of a given whole number and another whole number.

Example

multiples of 10:



Multiplication Property of Equality

The Multiplication Property of Equality states that if two values a and b are equal, when you multiply each by the same value c , the products are equal.

Examples

$$12 = 12 \text{ and } 12(7) = 12(7)$$

$$\text{If } a = b, \text{ then } ac = bc.$$

multiplicative inverse

The multiplicative inverse of a number $\frac{a}{b}$ is the number $\frac{b}{a}$, where a and b are nonzero numbers. The product of any nonzero number and its multiplicative inverse is 1.

Examples

$$\text{The multiplicative inverse of } \frac{3}{7} \text{ is } \frac{7}{3}: \frac{3}{7} \times \frac{7}{3} = \frac{21}{21} = 1$$

$$\text{The multiplicative inverse of } 5 \text{ is } \frac{1}{5}: \frac{5}{1} \times \frac{1}{5} = \frac{5}{5} = 1$$

multiplicative reasoning

Multiplicative reasoning focuses on the use of multiplication and division.

Example

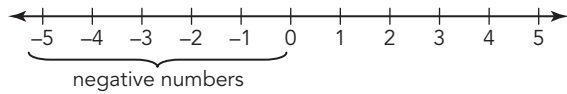
Vicki is 40 years old and Ben is 10 years old. Vicki is 4 times as old as Ben. In 5 years, Vicki will be 3 times as old as Ben.

This is multiplicative reasoning.

negative numbers

The values to the left of zero on a number line are called negative numbers.

Example

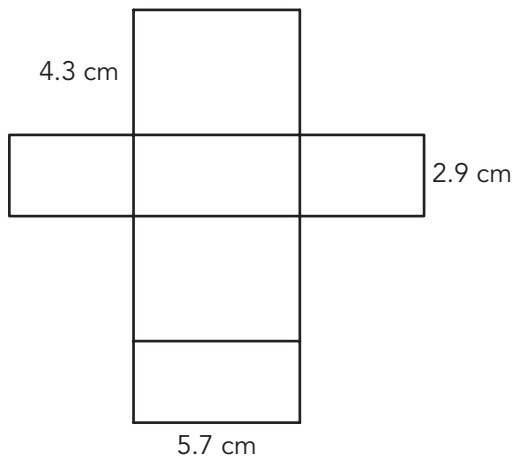


net

A net is a two-dimensional representation of a three-dimensional geometric figure. A net can be cut out as a single piece. All of the faces of the geometric solid are represented in the net. The faces of the geometric solid are drawn so that they share common edges.

Example

This is a net of a rectangular prism.



net worth

Your net worth is basically a calculation of the value of everything that you own minus the amount of money that you owe.

non-repeating decimals

A non-repeating decimal continues without terminating and without repeating a sequence of digits. Non-repeating decimals are not rational numbers.

Examples

$$\sqrt{3} = 1.73205080757\dots \quad \pi = 3.14159265359\dots$$

non-terminating decimal

A non-terminating decimal is a decimal that continues on infinitely without ending in a sequence of zeros.

Examples

$$0.333\dots \quad 1.7272\dots \quad 3.14159\dots$$

numeric expression

A numeric expression is a mathematical phrase that contains numbers and operations.

Example

$$5 \times 4 - 9$$

O

observational study

An observational study is one method of collecting data in which a researcher collects data by observing the variable of interest.

Example

A researcher is interested in whether or not more men or women prefer a certain store. The researcher observes the number of men and women who visit the store over a number of hours and compares the values of the two groups.

one-step equation

A one-step equation is an equation that can be solved using only one operation.

Order of Operations

The Order of Operations is a set of rules that ensures the same result every time an expression is evaluated.

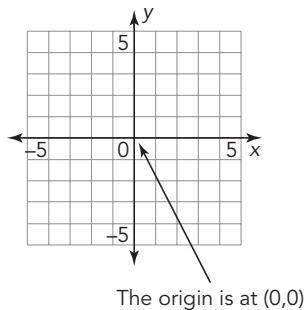
Example

$$\begin{array}{r}
 44 + (6 - 5) - 2 \times 75 \div 5^1 \quad \text{Parentheses} \\
 \downarrow \\
 44 + 1 - 2 \times 75 \div 5^1 \quad \text{Exponents} \\
 \downarrow \\
 44 + 1 - 2 \times 75 \div 5 \quad \text{Multiplication and} \\
 \downarrow \quad \text{Division} \\
 44 + 1 - 150 \div 5 \quad \text{(from left to right)} \\
 \downarrow \\
 44 + 1 - 30 \quad \text{Addition and} \\
 \downarrow \quad \text{Subtraction} \\
 45 - 30 \quad \text{(from left to right)} \\
 \downarrow \\
 15
 \end{array}$$

origin

The origin is a point on a graph with the ordered pair $(0, 0)$.

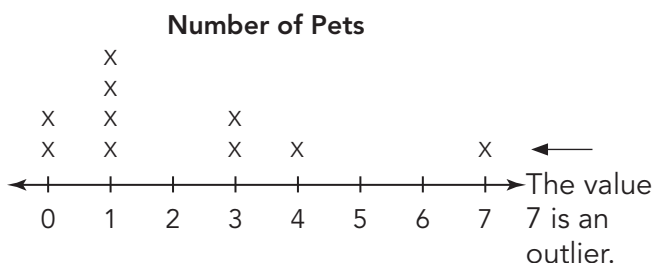
Example



outliers

Outliers are data values that lie a large distance from the other data in a graph. Outliers usually accompany gaps in data.

Example



overdraft

An overdraft occurs when money is withdrawn from a bank account and the balance goes below zero. Most banks will charge a fee every time this happens.

P

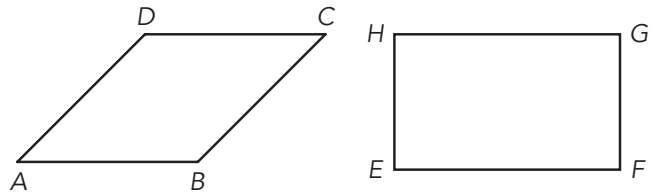
parallelogram

A parallelogram is a four-sided figure with two pairs of parallel sides and opposite sides that are equal in length.

Examples

In parallelogram $ABCD$, opposite sides AB and CD are parallel and equal in length; opposite sides AD and BC are parallel and equal in length.

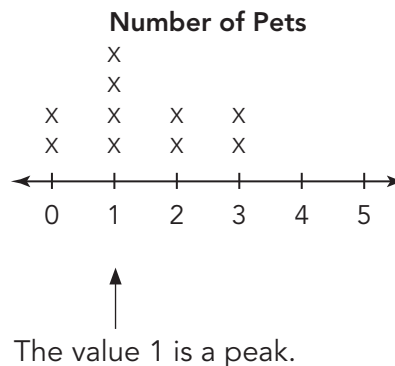
In parallelogram $EFGH$, opposite sides EF and GH are parallel and equal in length; opposite sides FG and EH are parallel and equal in length.



peaks

Peaks are values on a graph that contain more data points than the values on either side of it.

Example



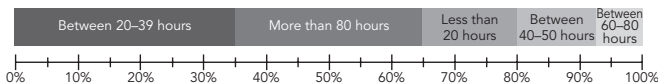
percent

A percent is a part-to-whole ratio where the whole is equal to 100. Percent is another name for hundredths. The percent symbol “%” means “per 100,” or “out of 100.”

percent bar graph

A percent bar graph shows a single bar that represents 100%, with sections that represent the frequency of each category. You can display a percent bar graph horizontally or vertically.

Example



percent decrease

A percent decrease occurs when the new amount is less than the original amount. It is a ratio of the amount of decrease to the original amount.

Example

The price of a \$12 shirt has decreased to \$8.

$$\frac{12 - 8}{12} = \frac{4}{12} = 0.3 = 33.3\%$$

The percent decrease is 33.3%

percent error (estimation)

Calculating percent error is one way to compare an estimated value to an actual value. To compute percent error, determine the difference between the estimated and actual values and then divide by the actual value.

Example

An airline estimates that they will need an airplane that sits 320 passengers for a flight. An actual 300 tickets were booked for the flight.

$$\text{Percent Error} = \frac{300 - 320}{300} = \frac{-20}{300} \approx -6.7\%$$

percent equation

A percent equation can be written in the form $\text{percent} \times \text{whole} = \text{part}$, where the percent is often written as a decimal.

Example

$$\begin{array}{ccccccc} 40\% \text{ of } 25 & = & 10 \\ (0.40)(25) & = & 10 \\ \uparrow & & \uparrow & & \uparrow \\ \text{Percent} & & & & \text{Part} \\ & & \text{Whole} & & \end{array}$$

percent increase

A percent increase occurs when the new amount is greater than the original amount. It is a ratio of the amount of increase to the original amount.

Example

The price of a \$12 shirt has increased to \$13.20.

$$\frac{13.20 - 12}{12} = \frac{1.20}{12} = 0.1 = 10\%$$

The percent increase is 10%.

perfect cube

A perfect cube is the cube of an integer.

Example

64 is a perfect cube: $4 \times 4 \times 4 = 64$

perfect square

A perfect square is the square of an integer.

Examples

9 is a perfect square: $3 \times 3 = 9$

25 is a perfect square: $5 \times 5 = 25$

personal budget

A personal budget is an estimate of the amount of money that a person or family will need for specific financial items. It generally includes current expenses as well as savings for anticipated future expenses.

pi

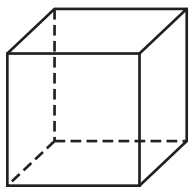
The number pi (π) is the ratio of the circumference of a circle to its diameter. That is $\pi = \frac{C}{d}$, where C is the circumference of the circle, and d is the diameter of the circle.

polyhedron

A polyhedron is a three-dimensional solid figure that has polygons as faces.

Example

A cube is a polyhedron. It has six square faces.



population

A population is an entire set of items from which data are collected.

Example

If you wanted to determine the average height of the students at your school, the number of students at the school would be the population.

post-secondary education

Post-secondary education refers to education beyond high school.

power

A power has two elements: the base and the exponent.

Example

base $\rightarrow 6^2 \leftarrow$ exponent
power

principal

A principal is the term for an original amount of money on which interest is calculated

private school

Colleges and universities are either public or private. A private school does not receive funding from the state. They raise funds from tuition and donations.

Properties of Inequalities

The Properties of Inequalities allow you to solve inequalities involving any numbers.

Examples

- Addition Property of Inequalities
If $a < b$, then $a + c < b + c$.
If $a > b$, then $a + c > b + c$.
- Subtraction Property of Inequalities
If $a < b$, then $a - c < b - c$.
If $a > b$, then $a - c > b - c$.
- Multiplication Property of Inequalities
If $a < b$, then $a \cdot c < b \cdot c$, for $c > 0$.
If $a > b$, then $a \cdot c > b \cdot c$, for $c > 0$.
If $a < b$, then $a \cdot c > b \cdot c$, for $c < 0$.
If $a > b$, then $a \cdot c < b \cdot c$, for $c < 0$.
- Division Property of Inequalities
If $a < b$, then $\frac{a}{c} < \frac{b}{c}$, for $c > 0$.
If $a > b$, then $\frac{a}{c} > \frac{b}{c}$, for $c > 0$.
If $a < b$, then $\frac{a}{c} > \frac{b}{c}$, for $c < 0$.
If $a > b$, then $\frac{a}{c} < \frac{b}{c}$, for $c < 0$.

proportion

A proportion is an equation that states that two ratios are equal.

Example

$$\frac{1}{2} = \frac{4.5}{9}$$

proportional relationship

A proportional relationship is one in which the ratio of the inputs to the outputs is constant. For a relationship to illustrate a proportional relationship, all the ratios $\frac{y}{x}$ or $\frac{x}{y}$, must represent the same constant.

public school

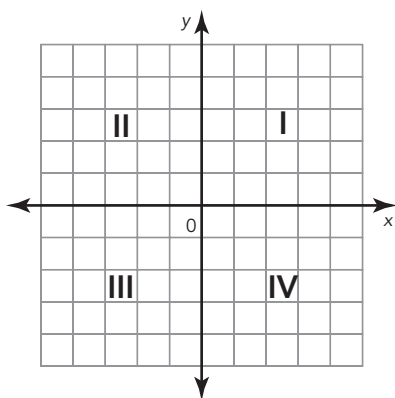
Colleges and universities are either public or private. A public school receives funding from the state government to offset the costs of running the university. The tuition to public universities is generally much less than the tuition to private schools.

Q

quadrants

The x- and y-axes divide the coordinate plane into four regions called quadrants. These quadrants are numbered with Roman numerals from one (I) to four (IV), starting in the upper right-hand quadrant and moving counterclockwise.

Example



quantitative data

Quantitative data, or numerical data, are data for which each piece of data can be placed on a numerical scale and compared.

Examples

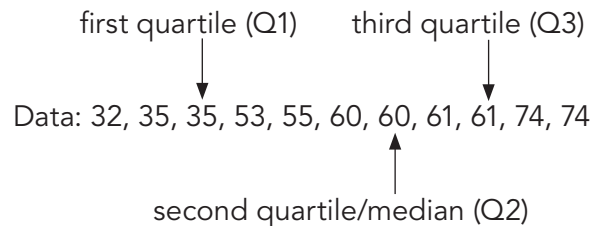
The zoo has 4 lions, 3 tigers, and 6 bears.

In 2006, Los Angeles had a population of about 3,849,378. In the same year, Atlanta had a population of about 429,500.

quartiles

Quartiles are a set of values that describe variation in a data set. When data in a set are arranged in order, quartiles are the numbers that split data into quarters (or fourths).

Example



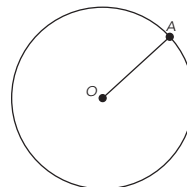
R

radius

The radius of a circle is a line segment formed by connecting a point on the circle and the center of the circle.

Example

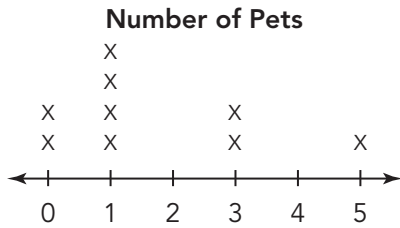
In the circle, O is the center and segment OA is the radius.



range

The range is the difference between the maximum and minimum values of a data set.

Example



0, 0, 1, 1, 1, 1, 3, 3, 5

$$5 - 0 = 5$$

The range of the data is 5.

rate

A rate is a ratio that compares two quantities that are measured in different units.

Example

The speed of 60 miles in two hours is a rate:

$$\frac{60 \text{ mi}}{2 \text{ h}} = \frac{30 \text{ mi}}{1 \text{ h}}$$

ratio

A ratio is a comparison of two quantities that uses division.

Examples



The ratio of stars to circles is $\frac{3}{2}$, or 3:2, or 3 to 2.

The ratio of circles to stars is $\frac{2}{3}$, or 2:3, or 2 to 3.

rational numbers

Rational numbers are the set of numbers that can be written as $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

Examples

-4 , $\frac{1}{2}$, $\frac{2}{3}$, 0.67 , and $\frac{22}{7}$ are examples of rational numbers.

rebate

A rebate is a refund of part of the amount paid for an item.

reciprocal

The reciprocal of a number is also known as the multiplicative inverse of the number. (See *multiplicative inverse*.)

Examples

The reciprocal of $\frac{3}{7}$ is $\frac{7}{3}$: $\frac{3}{7} \times \frac{7}{3} = \frac{21}{21} = 1$

The reciprocal of 5 is $\frac{1}{5}$: $\frac{1}{5} \times \frac{5}{1} = \frac{5}{5} = 1$

Reflexive Property of Equality

The Reflexive Property of Equality says that when both sides of an equation look exactly the same, their values are equal.

Examples

$$7 = 7$$

$$a = a$$

relative frequency table

A relative frequency table displays the ratio or percent of occurrences within a category to the total of the category.

Example

Test Scores for Mr. Watson's Math Test		
Test Score	Frequency	Relative Frequency
61–70	4	$\frac{4}{28} \approx 0.143 = 14.3\%$
71–80	7	$\frac{7}{28} = 0.25 = 25\%$
81–90	9	$\frac{9}{28} \approx 0.321 = 32.1\%$
91–100	8	$\frac{8}{28} \approx 0.286 = 28.6\%$

relatively prime

Two numbers that do not have any common factors other than 1 are called relatively prime.

Examples

Positive whole number pairs that have a difference of 1 (4 and 5, 10 and 11, 15 and 16) are always relatively prime.

repeating decimal

A repeating decimal is a decimal in which a digit, or a group of digits, repeat(s) infinitely. Repeating decimals are rational numbers.

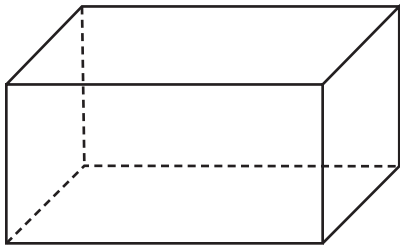
Examples

$$\frac{1}{9} = 0.111\dots \quad \frac{7}{12} = 0.58333\dots$$
$$\frac{22}{7} = 3.142857142857\dots$$

right rectangular prism

A right rectangular prism is a polyhedron with three pairs of congruent and parallel rectangular faces.

Example



S

sale

A sale is an event at which products are sold at reduced prices.

sales tax

Sales tax is a percentage of the selling price of a good or service which is added to the price.

Example

You want to purchase an item for \$8.00 in a state where the sales tax is 6.25%, therefore you will pay 8×0.0625 or \$0.50 in sales tax. You will pay a total of \$8.50 for the item.

sample

A sample is a selection from a population.

Example

If you wanted to determine the average height of the students in your school, you could choose a certain number of students and measure their heights. The heights of the students in this group would be your sample.

scale

A scale is a ratio that compares two measures.

Example

1 cm : 4 cm

scale factor

The scale factor is the factor that you multiply or divide both parts of a ratio by to scale up or scale down to an equivalent ratio.

scale drawing

A scale drawing is a representation of a real object or place that is in proportion to the real object or place it represents.

Examples

A map or a blueprint is an example of a scale drawing.

scaling down

Scaling down means to divide both parts of the ratio by the same factor greater than 1, or multiply both parts of the ratio by the same factor less than 1.

Example

$$\begin{array}{c} \div 3 \\ \begin{array}{c} \downarrow \\ \frac{3}{6} = \frac{1}{2} \\ \uparrow \\ \div 3 \end{array} \end{array}$$

scaling up

Scaling up means to multiply both parts of a ratio by the same factor greater than 1.

Example

$$\begin{array}{c} \times 3 \\ \begin{array}{c} \downarrow \\ \frac{1}{2} = \frac{3}{6} \\ \uparrow \\ \times 3 \end{array} \end{array}$$

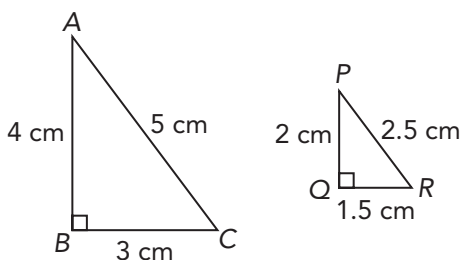
scholarship

A scholarship is money awarded to a person from the college or private institution to help a student pay for school. Scholarships may be academic, athletic, based on financial need, or awarded from private organizations for a variety of reasons.

similar figures

Figures that are proportional in size, or that have proportional dimensions, are called similar figures.

Example



Triangle ABC and Triangle PQR are similar figures.

simple interest

Simple interest is a type of interest that is a fixed percent of the principal. Simple interest is paid over a specific period of time—either twice a year or once a year, for example. The formula for simple interest is $I = P \times r \times t$, where I represents the interest earned, P represents the amount of the principal, r represents the interest rate, and t represents the time that the money earns interest.

Example

Kim deposits \$300 into a savings account at a simple interest rate of 5% per year. The formula can be used to calculate the simple interest Kim will have earned at the end of 3 years.

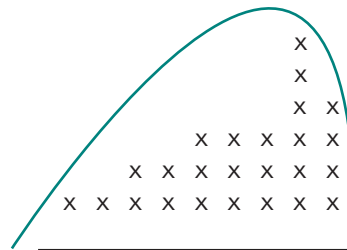
$$\text{Interest} = \text{Principal} \times \text{rate} \times \text{time}$$

$$\begin{aligned} \text{Interest} &= (300)(0.05)(3) \\ &= \$45 \end{aligned}$$

skewed left distribution

In a skewed left distribution of data the peak of the data is to the right side of the graph. There are only a few data points to the left side of the graph.

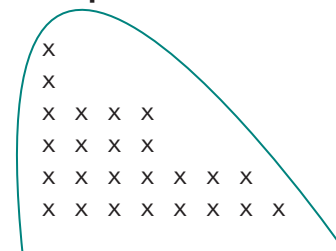
Example



skewed right distribution

In a skewed right distribution of data the peak of the data is to the left side of the graph. There are only a few data points to the right side of the graph.

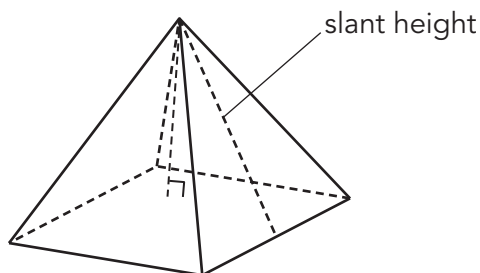
Example



slant height

A slant height of a pyramid is the distance measured along a triangular face from the vertex of the pyramid to the midpoint, or center, of the base.

Example



solution

A solution to an equation is any value for a variable that makes the equation true.

Example

The solution to the equation $2x + 4 = 8$ is $x = 2$.

solution set of the inequality

The set of all points that make an inequality true is the solution set of the inequality.

Examples

$$x < 7$$

The solution set for $x \geq 7$ is all the numbers greater than or equal to 7.

solve a proportion

To solve a proportion means to determine all the values of the variables that make the proportion true.

solve an inequality

To solve an inequality means to determine the values of the variable that make the inequality true.

Example

$$2x + 4 \geq 16$$

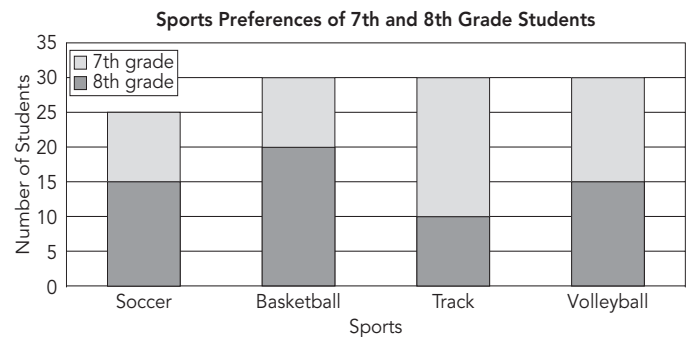
$$2x \geq 12$$

$$x \geq 6$$

Any value for x that is greater than or equal to 6 will make the inequality true.

stacked bar graph

A stacked bar graph is a graph that stacks the frequencies of two different groups for a given category on top of one another so that you can compare the parts to the whole.



statement

A statement is a summary of the account balance. A statement includes every transaction that occurred throughout the month including deposits, withdrawals, debits, and transfers.

statistical process

The statistical process has four components:

- Formulating a statistical question.
- Collecting appropriate data.
- Analyzing the data graphically and numerically.
- Interpreting the results of the analysis.

statistical question

A statistical question is a question that anticipates an answer based on data that vary.

Example

“What sport is the most popular in your school?” is a statistical question because it anticipates that the answers will vary since not everyone at your school is likely to have the same favorite sport.

“How many students are in Chess Club?” is NOT a statistical question because there is only one answer to the question.

stem-and-leaf plot

A stem-and-leaf plot is a graphical method used to represent ordered numerical data. Once the data are ordered, the stem and leaves are determined. Typically, the stem is all the digits in a number except the rightmost digit, which is the leaf.

Example

**Books Read in
Mr. Brown’s Class**

0	3, 6
1	0, 1, 5
2	
3	9, 9
4	0, 0, 0

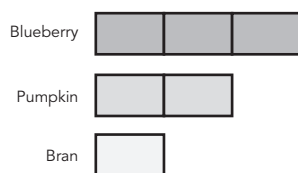
Key: 1 | 0 = 10.

strip diagram

A strip diagram illustrates number relationships by using rectangles to represent ratio parts.

Example

A bakery sells packs of muffins in the ratio of 3 blueberry muffins : 2 pumpkin muffins : 1 bran muffin. The strip diagram represents the ratio of each type of muffin.



student loan

A student loan is money borrowed in order to pay for college or trade school.

Subtraction Property of Equality

The Subtraction Property of Equality states that when you subtract the same value c from equal values a and b , the differences are equal.

Examples

$$12 = 12 \text{ and } 12 - 7 = 12 - 7$$

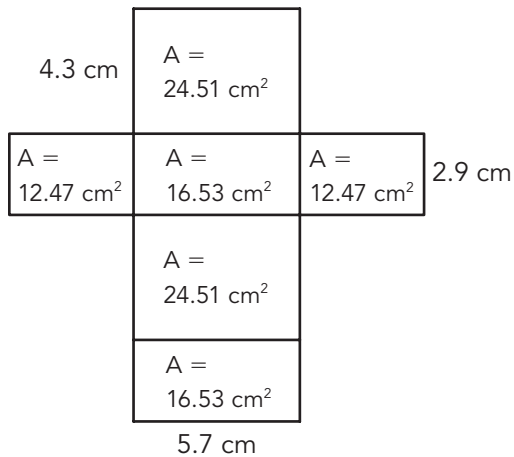
$$\text{If } a = b, \text{ then } a - c = b - c.$$

surface area

The surface area of a three-dimensional geometric figure is the total area of all its two-dimensional faces.

Examples

For example, you can use the net to calculate the surface area of the right rectangular prism. Determine the area of each unique face. Calculate the sum of all faces of the right rectangular prism



The surface area of the right rectangular prism is 107.02 cm².

survey

A survey is one method of collecting data in which people are asked one or more questions.

Example

A restaurant may ask its customers to complete a survey with the following question:

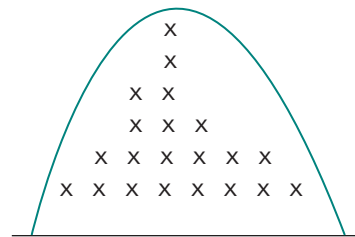
On a scale of 1–10, with 1 meaning “poor” and 10 meaning “excellent,” how would you rate the food you ate?

1 2 3 4 5 6 7 8 9 10

symmetric distribution

In a symmetric distribution of data the left and right halves of the graph are mirror images of each other. The peak is in the middle because there are many data values in the center.

Example



Symmetric Property of Equality

The Symmetric Property of Equality states that if $a = b$, then $b = a$.

Example

$x = 3$ is the same as $3 = x$.

T

term

A term of an algebraic expression is a number, variable, or product of numbers and variables.

Example

The expression has four terms.

$$3y + 5xy + \frac{1}{2}x + 6$$

terms

terminating decimal

A terminating decimal has a finite number of digits, meaning that after a finite number of decimal places, all following decimal places have a value of 0. Terminating decimals are rational numbers.

Examples

$$\frac{9}{10} = 0.9 \quad \frac{15}{8} = 1.875 \quad \frac{193}{16} = 12.0625$$

transfer

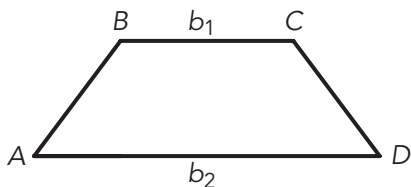
A transfer occurs when money is moved from one account to another.

trapezoid

A trapezoid is a quadrilateral with two bases that are parallel to each other, often labeled b_1 and b_2 .

Example

Quadrilateral ABCD is a trapezoid. Side BC is parallel to side AD.



Triangle Inequality Theorem

The Triangle Inequality Theorem states that the sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Triangle Sum Theorem

The Triangle Sum Theorem states that the sum of the measures of the interior angles of a triangle is 180° .

tuition

Tuition is the fee paid in order to receive instruction at a school.

U

undergraduate degree

An undergraduate degree is a four-year degree from a college or university.

unit cube

A unit cube is a cube whose sides are all 1 unit long.

unit fraction

A unit fraction is a fraction that has a numerator of 1 and a denominator that is a positive integer.

unit rate

A unit rate is a comparison of two different measurements in which the numerator or denominator has a value of one unit.

Example

The speed 60 miles in 2 hours can be written as a unit rate:

$$\frac{60 \text{ mi}}{2 \text{ h}} = \frac{30 \text{ mi}}{1 \text{ h}}$$

The unit rate is 30 miles per hour.

unit rate of change

The unit rate of change describes the amount the dependent variable changes for every unit the independent variable changes.

variability

In statistics, variability means that the value of the attribute being studied can change from one person or thing to another.

variable

A variable is a letter or symbol that is used to represent a number.

Examples

$$3x = 81 \quad \frac{4}{p} \quad z^2$$

variables

variable expenses

Variable expenses are expenses that can be different from month to month

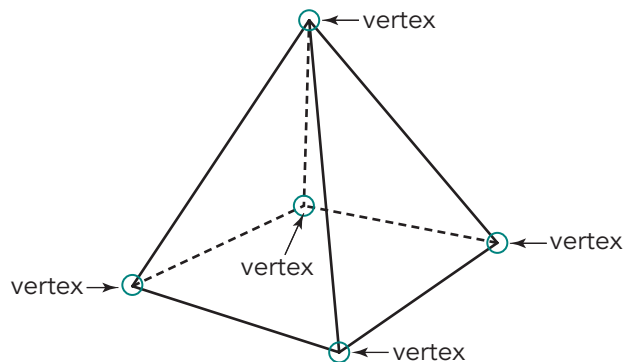
variable expenses

Variable expenses are expenses that can be different from month to month

vertex

A vertex of a polyhedron is a point at which three or more of its edges meet.

Example



vocational school

A vocational school is a school in which students are taught the skills needed to perform a particular job.

volume

Volume is the amount of space occupied by an object. Volume is measured in cubic units.

withdrawal

A withdrawal occurs when money is taken out of an account, usually from a check, online payment, or Automated Teller Machine (ATM).

work-study program

A work-study program is a plan set up by the college that allows a student to work while in school to earn money.

zero pair

A positive counter and a negative counter together make a zero pair, since the total value of the pair is zero.

Example

$$\oplus + \ominus = 0$$

Zero Property of Multiplication

The Zero Property of Multiplication states that the product of any number and 0 is 0.

Examples

$$6 \times 0 = 0$$

$$\frac{3}{4} \times 0 = 0$$

$$5^2 \cdot 0 = 0$$

$$0.125(0) = 0$$