Glossary

A

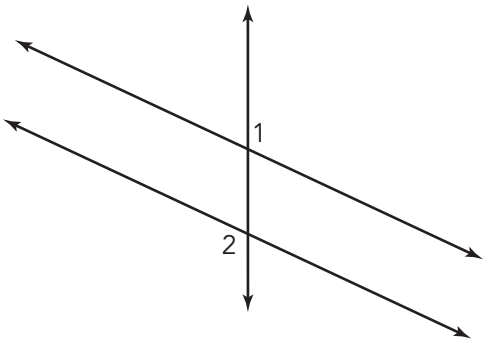
absolution deviation

The deviation of a data value indicates how far that data value is from the mean. The absolute value of each deviation is called the absolute deviation.

alternate exterior angles

Alternate exterior angles are angles formed when a transversal intersects two other lines. These angle pairs are on opposite sides of the transversal and are outside the other two lines.

Example

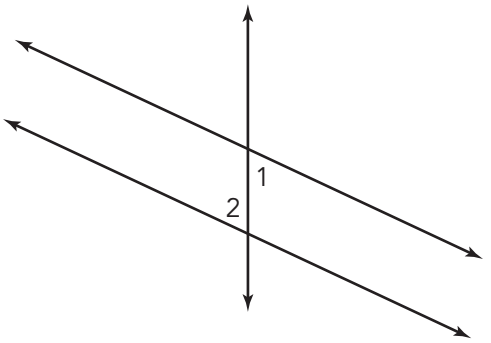


Angles 1 and 2 are alternate exterior angles.

alternate interior angles

Alternate interior angles are angles formed when a transversal intersects two other lines. These angle pairs are on opposite sides of the transversal and are between the other two lines.

Example

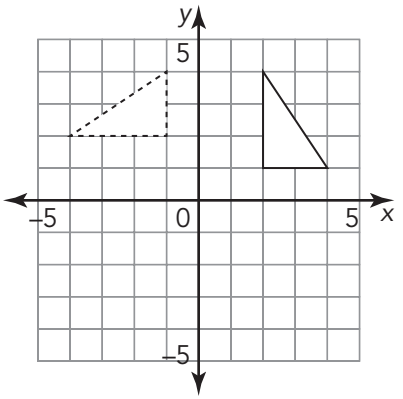


Angles 1 and 2 are alternate interior angles.

angle of rotation

The angle of rotation is the amount of rotation, in degrees, about a fixed point, the center of rotation.

Example



The angle of rotation is 90° counterclockwise about the origin (0, 0).

Angle-Angle Similarity Theorem

The Angle-Angle Similarity Theorem states that if two angles of one triangle are congruent to the corresponding angles of another triangle, then the triangles are similar.

association

A pattern or relationship identified in a scatterplot of a two-variable data set is called an association.

B

bar notation

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

Example

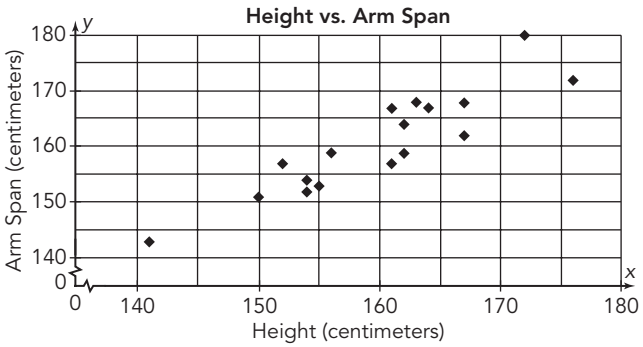
In the quotient of 3 and 7, the sequence 428571 repeats. The numbers that lie underneath the bar are the numbers that repeat.

$\frac{3}{7} = 0.4285714285714... = 0.\overline{428571}$

bivariate data

When you collect information about two separate characteristics for the same person, thing, or event, you have collected bivariate data. When you look for a relationship in bivariate data, often you are interested in whether one variable causes a change in the other variable.

Example



The scatterplot represents bivariate data with height as the x-coordinate and arm span as the y-coordinate.

break-even point

When one line represents the cost of an item and the other line represents the income from selling the item, the point of intersection is called the break-even point.

C

cash advance

A cash advance is a service provided by credit card companies that allows their customers to take out money directly from a bank or ATM. Consumers should be cautious of cash advances from credit cards, a percentage is immediately added to the loan and a high interest rate is applied.

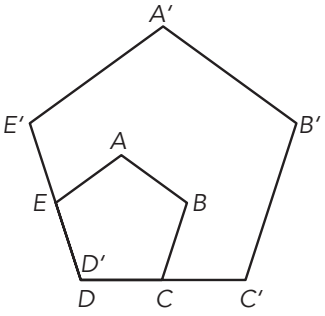
census

A census is the data collected from every member of a population.

center of dilation

The point from which a dilation is generated is called the center of dilation.

Example

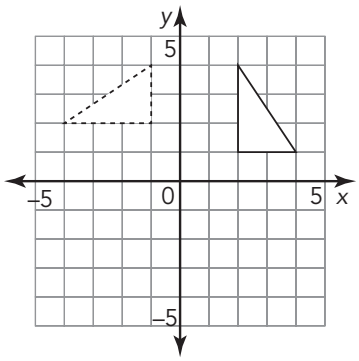


The center of dilation is point *D*.

center of rotation

The center of rotation is the point around which a figure is rotated. The center of rotation can be a point on the figure, inside the figure, or outside the figure.

Example



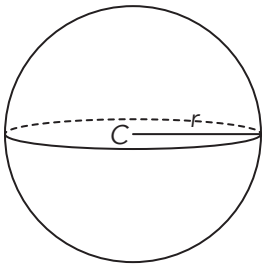
The figure has been rotated 90° counterclockwise about the center of rotation, which is the origin (0, 0)

center of a sphere

The given point from which the set of all points in three dimensions are the same distance is the center of the sphere.

Example

Point *C* is the center of the sphere.



characteristic

In the expression $a \times 10^n$, the variable n is called the characteristic.

Example

$6.1 \times 10^5 = 610{,}000$

↑

characteristic

closed

A set of numbers is said to be closed under an operation if the result of the operation on two numbers in the set is a defined value also in the set.

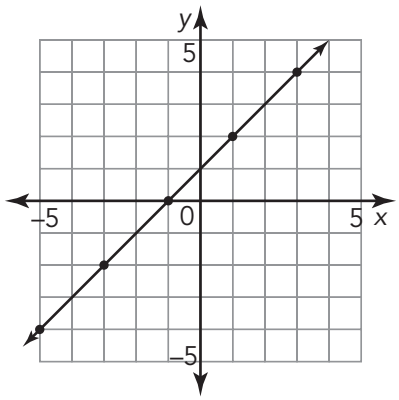
Example

The set of integers is closed under the operation of addition because for every two integers *a* and *b*, the sum $a + b$ is also an integer.

collinear points

Collinear points are points that lie in the same straight line.

Example



All the points on the graph are collinear points.

compound interest

Compound interest is a percentage that is paid on the principal and interest after each time period. The formula for compound interest is $B = P_0(1 + r)^t$, where B is the account balance, or total value of the account, P_0 is the original amount invested, or principal, r is the interest rate, and t is the time invested in years.

Example

Compound interest on \$200 at 2.5% interest rate for 18 years.

$B = 200(1 + 0.025)^{16}$

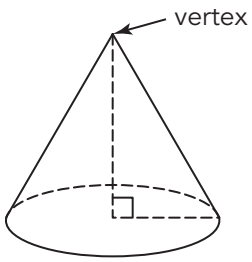
$B = 311.93$

The account balance will be \$311.93 after 18 years.

cone

A cone is a three-dimensional object with a circular or oval base and one vertex.

Example



congruent angles

Congruent angles are angles that are equal in measure.

congruent figures

Figures that have the same size and shape are congruent figures. If two figures are congruent, all corresponding sides and all corresponding angles have the same measure.

congruent line segments

Congruent line segments are line segments that have the same length.

consistent system

Systems that have one or an infinite number of solutions are called consistent systems.

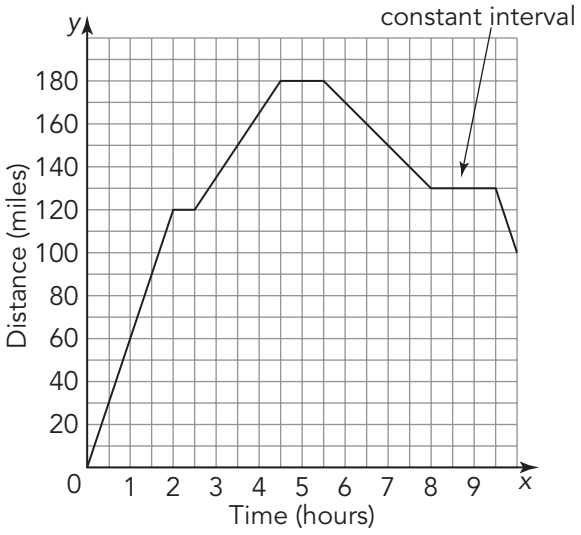
constant function

When the *y*-value of a function does not change, or remains constant, the function is called a constant function.

constant interval

When a function is constant for some values of the independent variable, it is said to have a constant interval.

Example



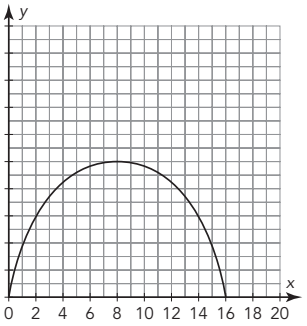
constant of proportionality

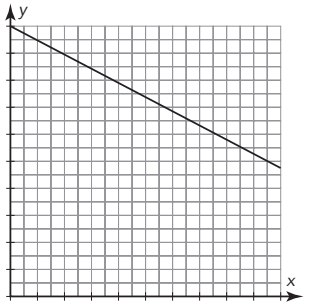
In a proportional relationship, the ratio of all *y*-values to their corresponding *x*-values is constant. This specific ratio, $\frac{y}{x}$, is called the constant of proportionality. Generally, the variable *k* is used to represent the constant of proportionality.

continuous

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

Examples





converse

The converse of a theorem is created when the if-then parts of that theorem are exchanged.

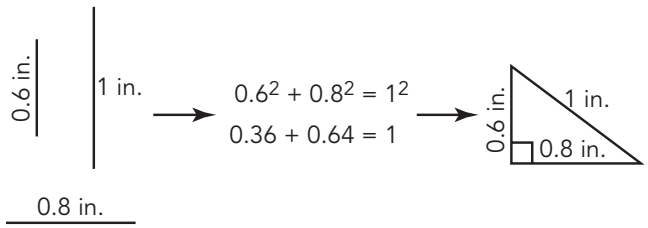
Example

Triangle inequality Theorem:	Converse of Triangle Inequality Theorem:
If a polygon is a triangle, then the sum of any two of its side lengths is always greater than the length of the third side.	If you have three side lengths, and the sum of any two of the side lengths is greater than the third side length, then the side lengths can form a triangle.

Converse of the Pythagorean Theorem

The Converse of the Pythagorean Theorem states that if the sum of the squares of the two shorter sides of a triangle equals the square of the longest side, then the triangle is a right triangle.

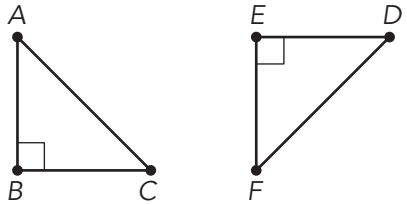
Example



corresponding angles

Corresponding angles are angles that have the same relative positions in geometric figures.

Example

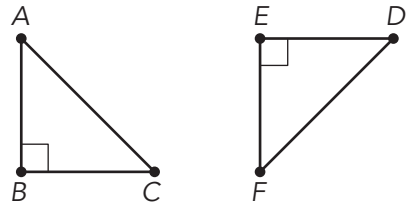


Angle *B* and Angle *E* are corresponding angles.

corresponding sides

Corresponding sides are sides that have the same relative positions in geometric figures.

Example

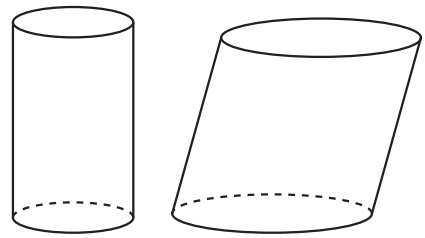


Sides *AB* and *DE* are corresponding sides.

cylinder

A cylinder is a three-dimensional object with two parallel, congruent circular bases.

Examples



D

data

When information is collected, the facts or numbers gathered are called data.

decreasing function

When the value of a dependent variable decreases as the independent variable increases, the function is called a decreasing function.

deferment

A deferment is a period of time, usually up to two years, in which students delay paying the principal and interest on their loan.

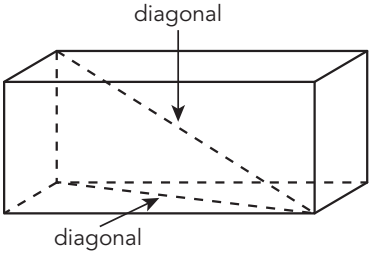
deviation

The deviation of a data value indicates how far that data value is from the mean. To calculate the deviation, subtract the mean from the data value: Deviation = data value - mean.

diagonal

In a three-dimensional figure, a diagonal is a line segment connecting any two non-adjacent vertices.

Example



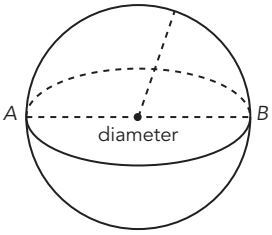
diagonal of a square

A diagonal of a square is a line segment connecting opposite vertices of the square.

diameter of the sphere

A segment drawn between two points on the sphere that passes through the center of the sphere is a diameter of the sphere.

Example

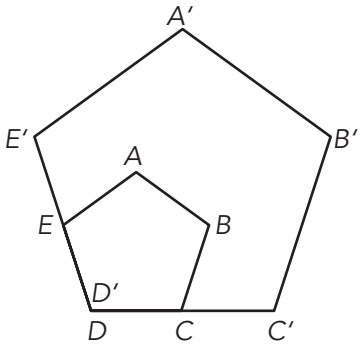


The diameter of the sphere is labeled.

dilation

A dilation is a transformation that produces a figure that is the same shape as the original figure, but not necessarily the same size.

Example

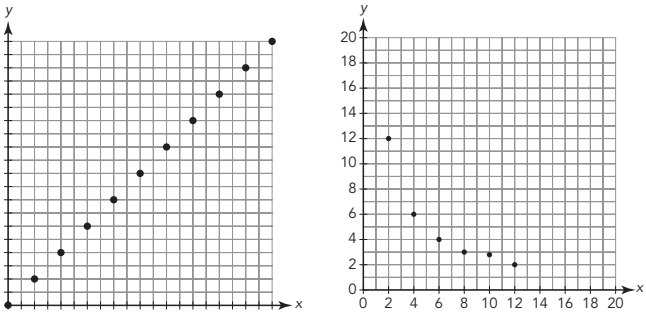


Pentagon *A'B'C'D'E'* is a dilation of Pentagon *ABCDE*.

discrete

A discrete graph is a graph of isolated points.

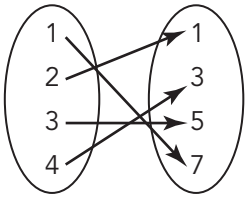
Examples



domain

The domain of a function is the set of all inputs of the function.

Example



The domain in the mapping shown is {1, 2, 3, 4}.

E

ellipsis

An ellipsis is a set of three periods which stands for "and so on."

Example

3, 9, 27, 81, ...

ellipsis

enlargement

When the scale factor is greater than 1, the image is called an enlargement.

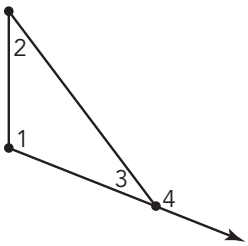
explanatory variable

The independent variable can also be called the explanatory variable.

exterior angle of a polygon

An exterior angle of a polygon is an angle between a side of a polygon and the extension of its adjacent side.

Example

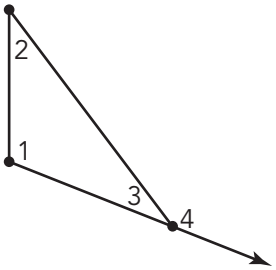


Angle 4 is an exterior angle of a polygon.

Exterior Angle Theorem

The Exterior Angle Theorem states that the measure of the exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles of the triangle.

Example



According to the Exterior Angle Theorem, $m\angle 4 = m\angle 1 + m\angle 2$.

extrapolating

Extrapolating is predicting values that fall outside the plotted values on a scatterplot.

F

first differences

First differences are the values determined by subtracting consecutive *y*-values in a table when the *x*-values are consecutive integers. When the first differences are equal, the points represented by the ordered pairs in the table will form a straight line.

Example

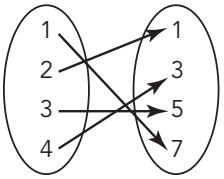
x	*y*	
1	25	
2	34	9
3	45	11

The first differences are 9 and 11, so the points represented by these ordered pairs will not form a straight line.

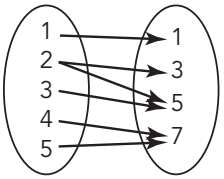
function

A function maps each input to one and only one output.

Example



This mapping represents a function.



This mapping does NOT represent a function.

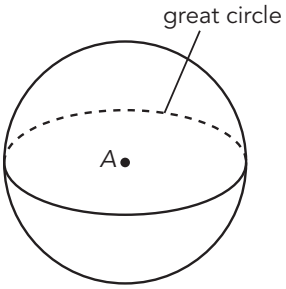
G

great circle

A great circle is the circumference of the sphere at the sphere's widest part.

Example

Point *A* is the center of the sphere. It is also the center of the great circle.

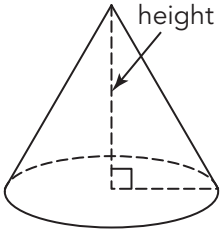


H

height of a cone

The height of a cone is the length of a line segment drawn from the vertex to the base of the cone. In a right cone, this line segment is perpendicular to the base.

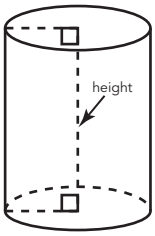
Example



height of a cylinder

The height of a cylinder is the length of a line segment drawn from one base to the other base, perpendicular to both bases.

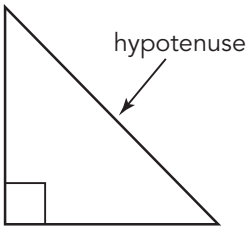
Example

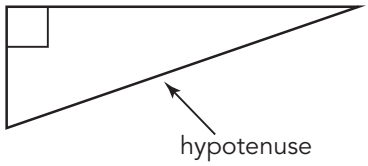


hypotenuse

The side opposite the right angle in a right triangle is called the hypotenuse.

Examples

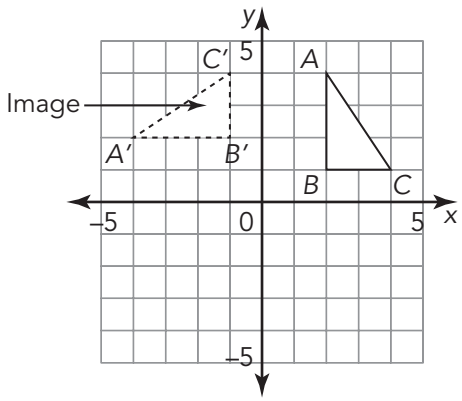




image

The new figure created from a transformation is called the image.

Example



inconsistent system

Systems that have no solution are called inconsistent systems.

increasing function

When both values of a function increase together, the function is called an increasing function.

input

The first coordinate of an ordered pair in a relation is the input.

integers

Integers are the set of whole numbers and their additive inverses.

Example

The set of integers can be represented as {... −3, −2, −1, 0, 1, 2, 3, ...}

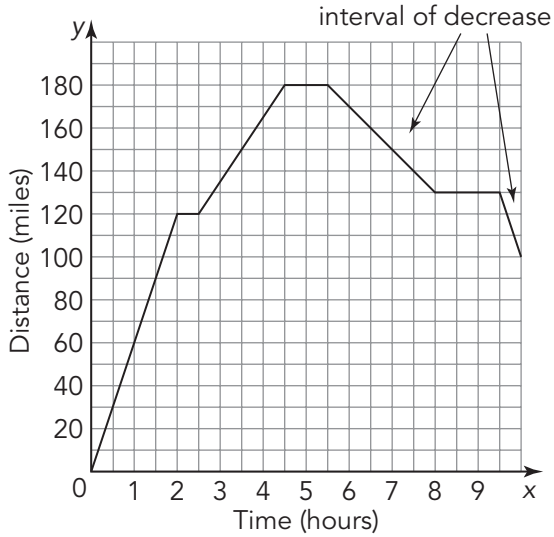
interpolating

Interpolating is predicting values that fall within the plotted values on a scatterplot.

interval of decrease

When a function is decreasing for some values of the independent variable, it is said to have an interval of decrease.

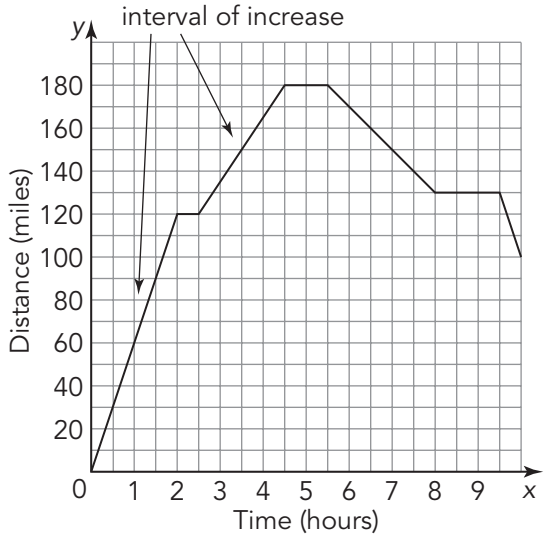
Example



interval of increase

When a function is increasing for some values of the independent variable, it is said to have an interval of increase.

Example



irrational numbers

Numbers that cannot be written as fractions in the form $\frac{a}{b}$, where a and b are integers and b is not equal to 0 are irrational numbers.

Examples

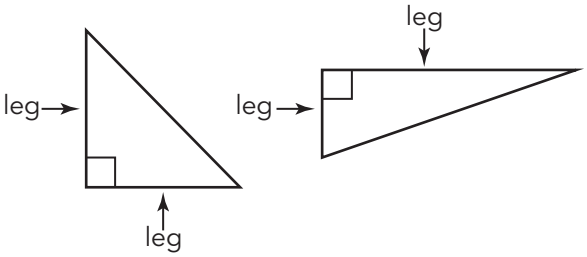
The numbers $\sqrt{2}$, 0.313113111…, and π are irrational numbers

L

leg

A leg of a right triangle is either of the two shorter sides. Together, the two legs form the right angle of a right triangle.

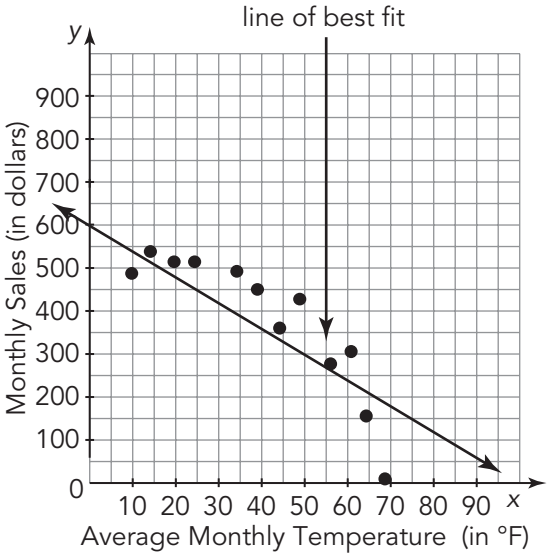
Examples



line of best fit

A line of best fit is a line that is as close to as many points as possible in a scatterplot, but doesn't have to go through all of the points.

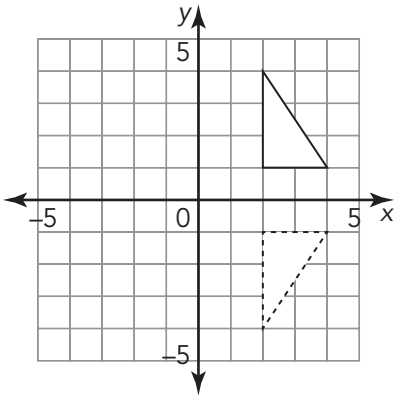
Example



line of reflection

A line of reflection is a line that acts as a mirror so that corresponding points are the same distance from the line.

Example

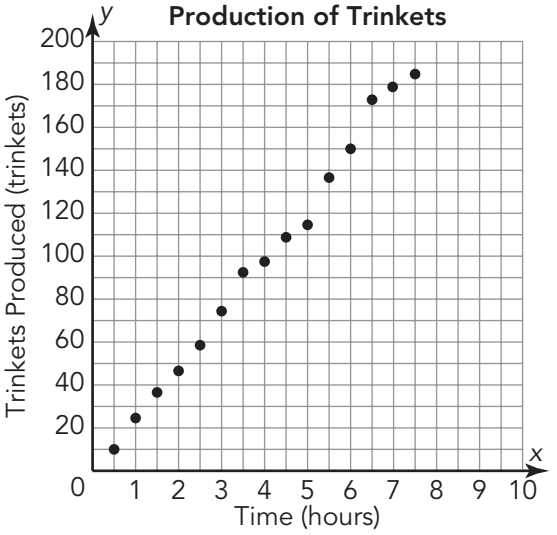


The x-axis is the line of reflection.

linear association

A linear association occurs when the points on the scatterplot are arranged in such a way that, as you look at the graph from left to right, you can imagine a line going through the scatterplot with most of the points being close to the line.

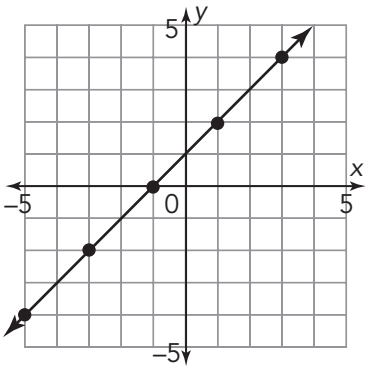
Example



linear function

A function whose graph is a straight line is a linear function.

Example



The function $f(x) = x + 1$ is a linear function.

M

mantissa

In the expression $a \times 10^n$, the variable a is called the mantissa. In scientific notation, the mantissa is greater than or equal to 1 and less than 10.

Example

$6.1 \times 10^5 = 610{,}000$

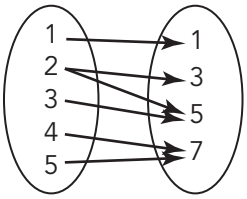
↑

mantissa

mapping

A mapping represents two sets of objects or items. Arrows connect the items to represent a relationship between them.

Example



mean absolute deviation

The mean absolute deviation (MAD) is the mean of the absolute deviations, or the average of the absolute values of the differences between each data value and the mean in a data set.

Example

Data Point	15	12	13	10	9	13
Deviation from the Mean	3	0	1	−2	−3	1

For example, the mean absolute deviation of the data shown in the table is

$$\frac{|3| + |0| + |1| + |-2| + |-3| + |1|}{6} = \frac{10}{6}.$$

So, the MAD is about 1.67.

model

When you use a line of best fit, the line and its equation are often referred to as a model of the data, or a trend line. (See *trend line*.)

N

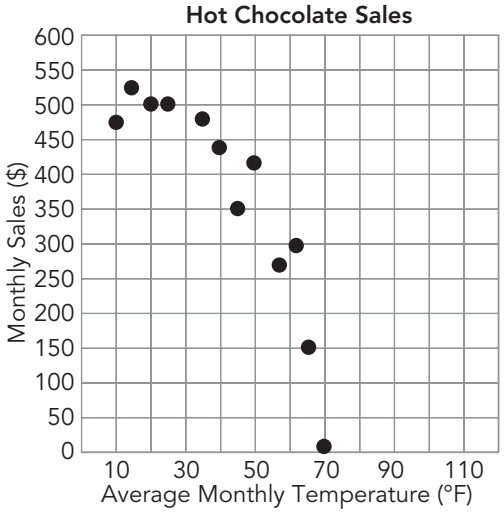
natural numbers

The set of natural numbers consists of the numbers that you use to count objects: {1, 2, 3, 4, 5…}.

negative association

If the response variable decreases as the explanatory variable increases, then the two variables have a negative association.

Example

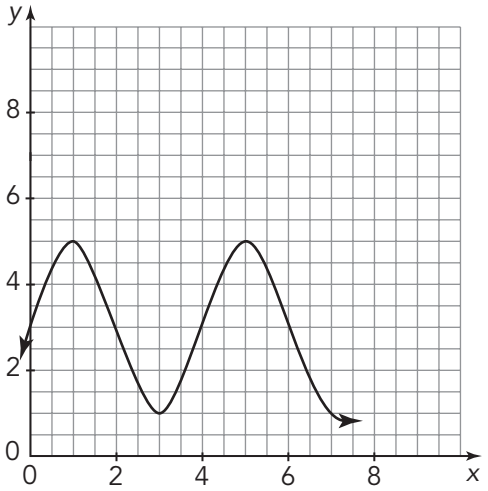


There is a negative association between average monthly temperature and hot chocolate sales.

non-linear

A non-linear graph is a graph that is not a line and therefore not a series of collinear points.

Example



online calculator

An online calculator is an internet-based application that quickly performs calculations for the user.

order of magnitude

The order of magnitude is an estimate of size expressed as a power of ten.

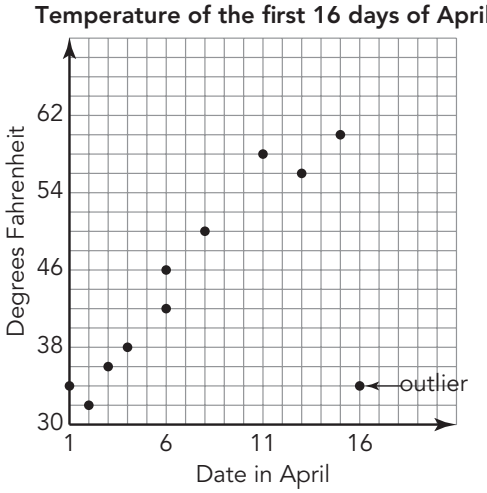
Example

The Earth's mass has an order of magnitude of about 10^{24} kilograms.

outlier

An outlier for bivariate data is a point that varies greatly from the overall pattern of the data.

Example



output

The second coordinate of an ordered pair in a relation is the output.

P

parameter

When data are gathered from a population, the characteristic used to describe the population is called a parameter.

plane

A plane is a flat surface. It has infinite length and width, but no depth. A plane extends infinitely in all directions in two dimensions. Planes are determined by three points, but are usually named using one uppercase letter.

Example

Plane Q is shown.

point of intersection

The point of intersection is the point at which two lines cross on a coordinate plane. In a system of linear equations, a point of intersection indicates a solution to both equations.

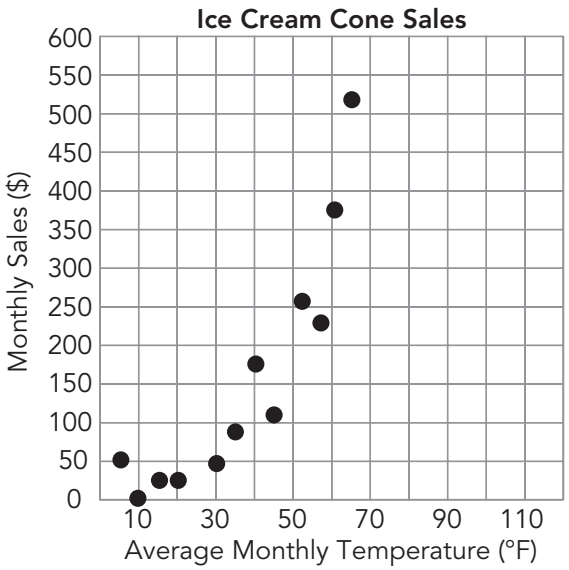
population

The population is the entire set of items from which data can be selected.

positive association

The two variables have a positive association if, as the explanatory variable increases, the response variable also increases.

Example

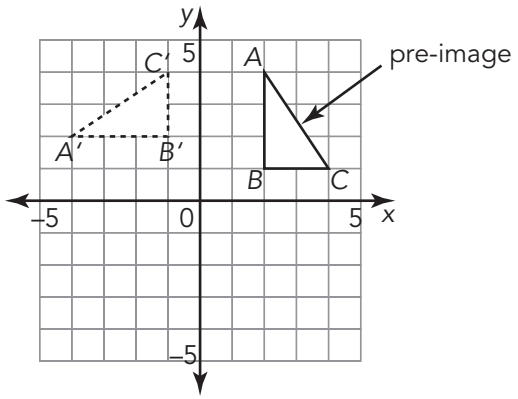


There is a positive association between the average monthly temperature and ice cream cone sales.

pre-image

The original figure in a transformation is called the pre-image.

Example



proof

A proof is a line of reasoning used to validate a theorem.

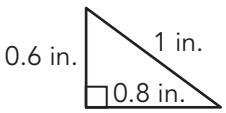
proportional relationship

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.

Pythagorean Theorem

The Pythagorean Theorem states that the sum of the squares of the lengths of the legs of a right triangle equals the square of the length of the hypotenuse. If a and b are the lengths of the legs, and c is the length of the hypotenuse, then $a^2 + b^2 = c^2$.

Example



$0.6^2 + 0.8^2 = 1^2$
$0.36 + 0.64 = 1$

Pythagorean triple

Any set of three positive integers a, b, and c that satisfies the equation $a^2 + b^2 = c^2$ is a Pythagorean triple.

Example

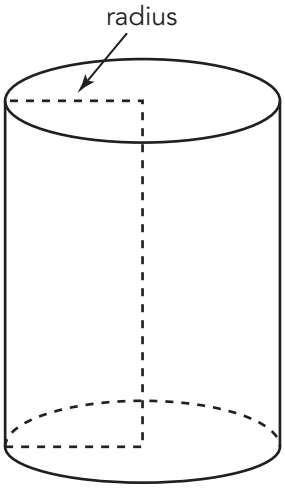
3, 4, and 5 is a Pythagorean triple: $3^2 + 4^2 = 5^2$

R

radius of a cylinder

The radius of a cylinder is the distance from the center of the base to any point on the edge of the base.

Example

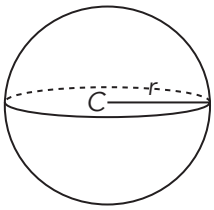


radius of the sphere

A segment drawn from the center of a sphere to a point on the sphere is called a radius of the sphere.

Example

Point C is the center of the sphere, and r is the radius of the sphere.



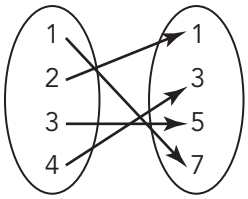
random sample

A random sample is a sample that is selected from the population in such a way that every member of the population has the same chance of being selected.

range

The range of a function is the set of all outputs of the function.

Example



The range in the mapping shown is {1, 3, 5, 7}.

rate of change

The rate of change for a situation describes the amount that the dependent variable changes compared with the amount that the independent variable changes.

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

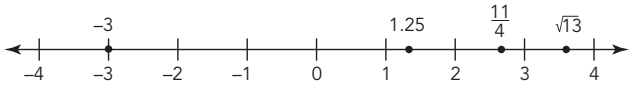
-4, $\frac{1}{2}$, $\frac{2}{3}$, 0.67, and $\frac{22}{7}$ are examples of rational numbers.

real numbers

Combining the set of rational numbers and the set of irrational numbers produces the set of real numbers. Real numbers can be represented on the real number line.

Examples

The numbers -3, 1.25, $\frac{11}{4}$, and $\sqrt{13}$ shown are real numbers.



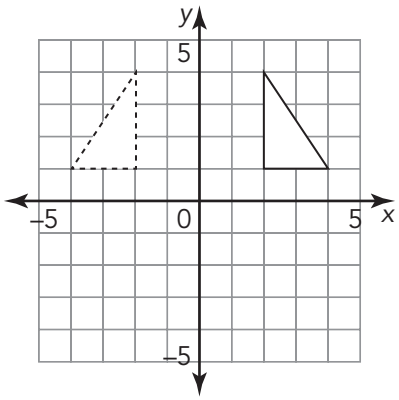
reduction

When the scale factor is less than 1, the image is called a reduction.

reflection

A reflection is a rigid motion transformation that "flips" a figure across a line of reflection.

Example



The figure has been reflected across the y-axis.

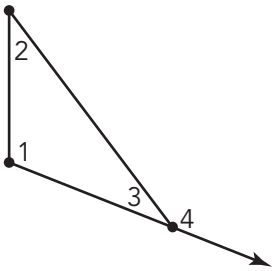
relation

A relation is any set of ordered pairs or the mapping between a set of inputs and a set of outputs.

remote interior angles of a triangle

The remote interior angles of a triangle are the two angles that are non-adjacent to the specified exterior angle.

Example



Angles 1 and 2 are remote interior angles of a triangle.

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

$\frac{1}{9} = 0.111\ldots$ $\frac{7}{12} = 0.58333\ldots$

$\frac{22}{7} = 3.142857142857...$

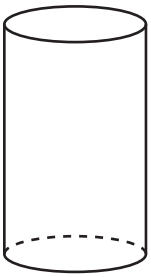
response variable

The dependent variable can also be called the response variable, because this is the variable that responds to what occurs to the explanatory variable.

right cylinder

A right cylinder is a cylinder in which the bases are aligned one directly above the other.

Example



rigid motion

A rigid motion is a special type of transformation that preserves the size and shape of the figure.

Examples

Translations, reflections, and rotations are examples of rigid motion transformations.

rotation

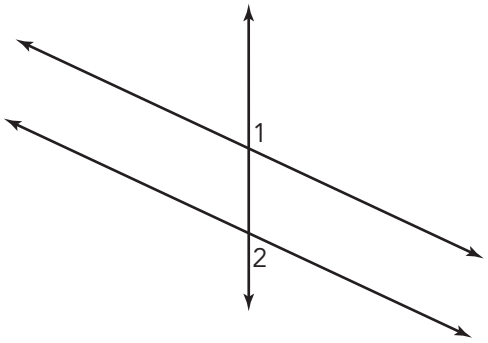
A rotation is a rigid motion transformation that turns a figure on a plane about a fixed point, called the center of rotation, through a given angle, called the angle of rotation.

S

same-side exterior angles

Same-side interior angles are formed when a transversal intersects two other lines. These angle pairs are on the same side of the transversal and are outside the other two lines.

Example

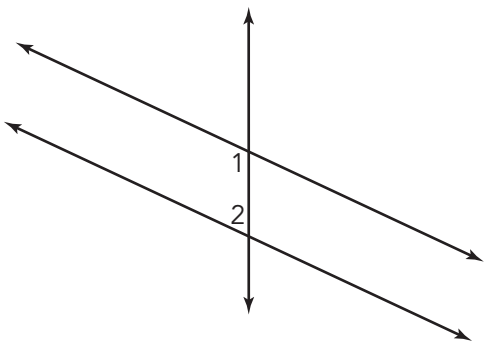


Angles 1 and 2 are same-side exterior angles.

same-side interior angles

Same-side interior angles are formed when a transversal intersects two other lines. These angle pairs are on the same side of the transversal and are between the other two lines.

Example



Angles 1 and 2 are same-side interior angles.

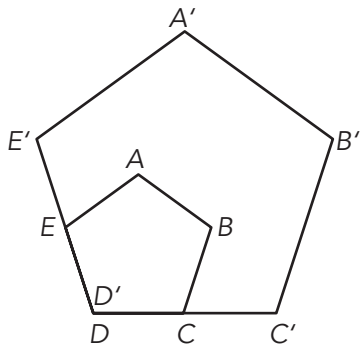
sample

When data are collected from a part of the population, the data are called a sample.

scale factor

In a dilation, the scale factor is the ratio of the distance of the new figure from the center of dilation to the distance of the original figure from the center of dilation.

Example

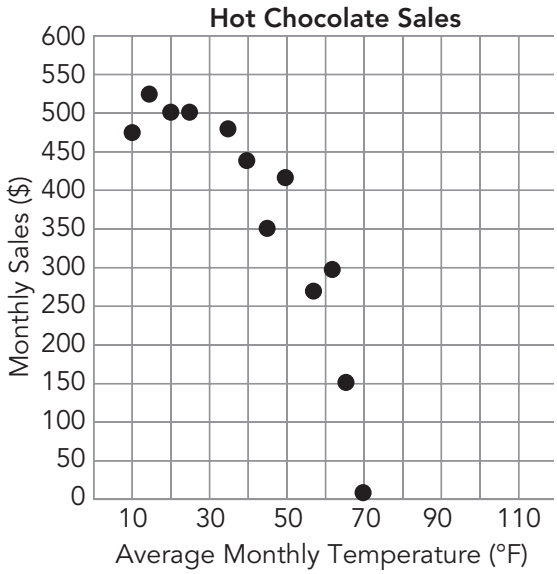


Pentagon *ABCDE* has been dilated by a scale factor of 2 to create Pentagon *A'B'C'D'E'*.

scatterplot

A scatterplot is a graph of a collection of ordered pairs that allows an exploration of the relationship between the points.

Example



scientific notation

Scientific notation is a notation used to express a very large or a very small number as the product of a number greater than or equal to 1 and less than 10 and a power of 10.

Example

The number 1,345,000,000 is written in scientific notation as 1.345×10^9.

sequence

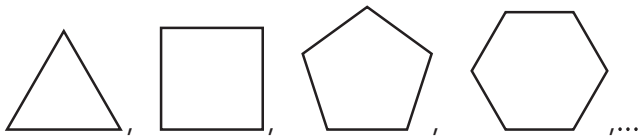
A sequence is a pattern involving an ordered arrangement of numbers, geometric figures, letters, or other objects.

Examples

Sequence A:

2, 4, 6, 8, 10, 12, . . .

Sequence B:



set

A set is a collection of numbers, geometric figures, letters, or other objects that have some characteristic in common.

Examples

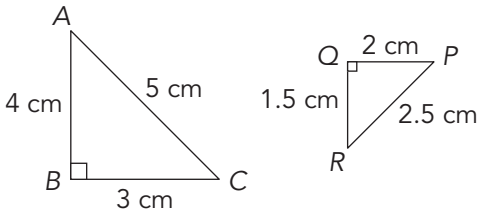
The set of counting numbers is {1, 2, 3, 4, …}

The set of even numbers is {2, 4, 6, 8, …}

similar

When two figures are similar, the ratios of their corresponding side lengths are equal.

Example



Triangle *ABC* is similar to Triangle *PQR*.

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.

Interest = Principal × rate × time

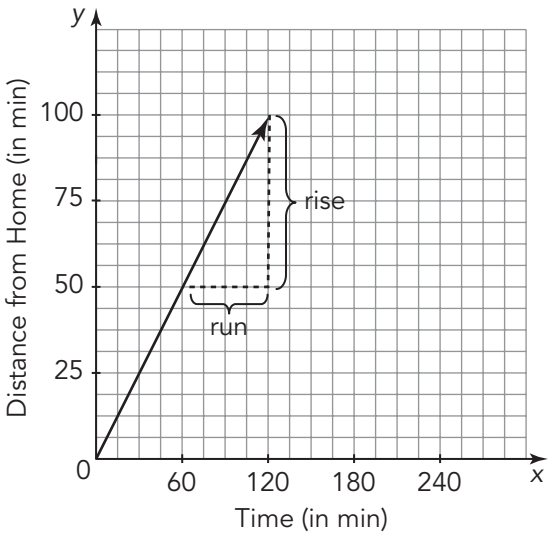
Interest = (300)(0.05)(3)

= $45

slope

In any linear relationship, slope describes the direction and steepness of a line and is usually represented by the variable m. Slope is another name for rate of change. (See *rate of change*.)

Example



The slope of the line is $\frac{50}{60}$, or $\frac{5}{6}$.

slope-intercept form

The slope-intercept form of a linear equation is $y = mx + b$, where m is the slope of the line and $(0, b)$ is the y-intercept.

solution of a linear system

The solution of a linear system is an ordered pair (x, y) that is a solution to both equations in the system. Graphically, the solution is the point of intersection.

Example

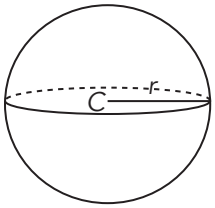
$$\begin{cases} y = x + 5 \\ y = -2x + 8 \end{cases}$$

The solution to this system of equations is (1, 6).

sphere

A sphere is the set of all points in three dimensions that are the same distance from a given point called the center of the sphere.

Example



statistic

When data are gathered from a sample, the characteristic used to describe the sample is called a statistic.

survey

A survey is a method of collecting information about a certain group of people.

system of linear equations

When two or more linear equations define a relationship between quantities they form a system of linear equations.

Example

$$\begin{cases} y = x + 5 \\ y = -2x + 8 \end{cases}$$

T

term

A term in a sequence is an individual number, figure, or letter in the sequence.

Example

2, 7, 12, 17, 22, 27, 32, ...

↑

term

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

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

terms of an investment

The terms of an investment include the type of loan, amount of money invested, and the length of the investment.

transformation

A transformation is the mapping, or movement, of a plane and all the points of a figure on a plane according to a common action or operation.

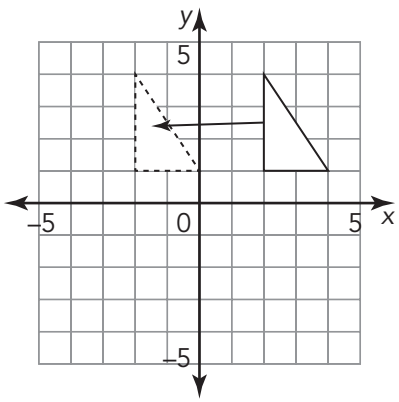
Examples

Translations, reflections, rotations, and dilations are examples of transformations.

translation

A translation is a rigid motion transformation that "slides" each point of a figure the same distance and direction.

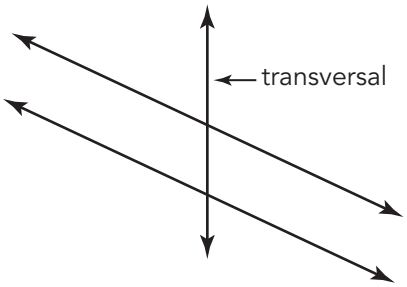
Example



transversal

A transversal is a line that intersects two or more lines at distinct points.

Example



trend line

When you use a line of best fit, the line and its equation are often referred to as a model of the data, or a trend line. (See *model*.)

Triangle Sum Theorem

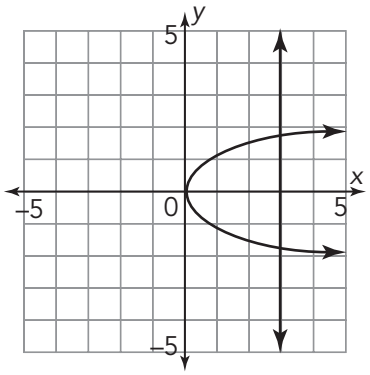
The Triangle Sum Theorem states that the sum of the measures of the interior angles of a triangle is 180°.

V

vertical line test

The vertical line test is a visual method used to determine whether a relation represented as a graph is a function. To apply the vertical line test, consider all the vertical lines that could be drawn on the graph of a relation. If any of the vertical lines intersect the graph of the relation at more than one point, then the relation is not a function.

Example



The line drawn at $x = 3$ crosses two points on the graph, so the relation is not a function.

W

whole numbers

Whole numbers are made up of the set of natural numbers and the number 0, the additive identity.

Example

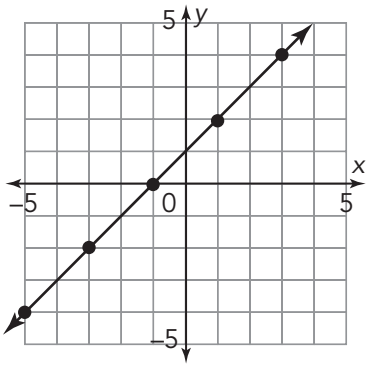
The set of whole numbers can be represented as {0, 1, 2, 3, 4, 5, …}.

Y

y-intercept

The *y*-intercept is the *y*-coordinate of the point where a graph crosses the *y*-axis. The *y*-intercept can be written in the form (0, *y*).

Example



The *y*-intercept of the graph is (0, 1).