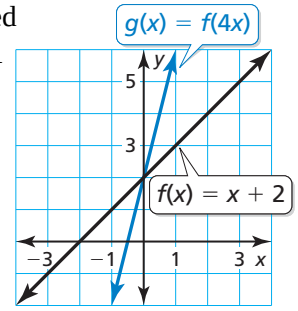
Vocabulary Flash Cards

correlation coefficient *Chapter 1 (p. 25)*	**horizontal shrink** *Chapter 1 (p. 14)*
horizontal stretch *Chapter 1 (p .14)*	**line of best fit** *Chapter 1 (p. 25)*
line of fit *Chapter 1 (p. 24)*	**linear equation in three variables** *Chapter 1 (p. 30)*
ordered triple *Chapter 1 (p. 30)*	**parent function** *Chapter 1 (p. 4)*

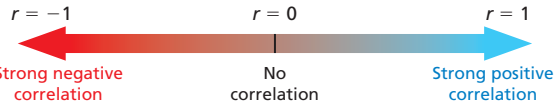
Vocabulary Flash Cards

A transformation that causes the graph of a function to shrink toward the y-axis when all the x-coordinates are multiplied by a factor a, where $a > 1$

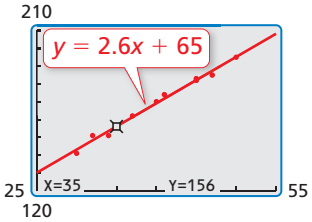
The graph of g is a horizontal shrink of the graph of f by a factor of $\frac{1}{4}$.



A number r form –1 to 1 that measures how well a line fits a set of data pairs (x, y)

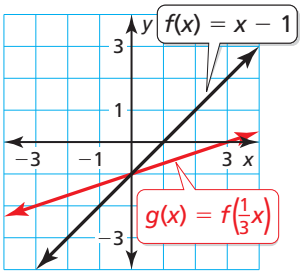


A line that lies as close as possible to all of the data points in a scatter plot



A transformation that causes the graph of a function to stretch away from the y-axis when all the x-coordinates are multiplied by a factor a, where $0 < a < 1$

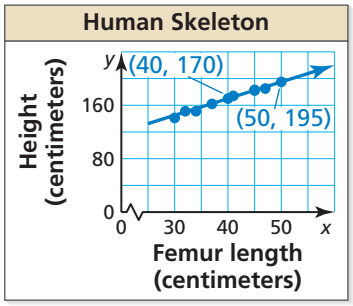
The graph of g is a horizontal stretch of the graph of f by a factor of $1 \div \frac{1}{3} = 3$.



An equation of the form $ax + by + cz = d$, where x, y, and z are variables and a, b, and c are not all zero

$$2x - 5y + 6z = 1$$

A line that models data in a scatter plot



The most basic function in a family of functions

The parent function of absolute value functions is $f(x) = |x|$.

A solution of a system of three linear equations represented by (x, y, z)

$$(-1, 2, 5)$$

Vocabulary Flash Cards

reflection *Chapter 1 (p. 5)*	**solution of a system of three linear equations** *Chapter 1 (p. 30)*
system of three linear equations *Chapter 1 (p. 30)*	**transformation** *Chapter 1 (p. 5)*
translation *Chapter 1 (p. 5)*	**vertical shrink** *Chapter 1 (p. 6)*
vertical stretch *Chapter 1 (p. 6)*	

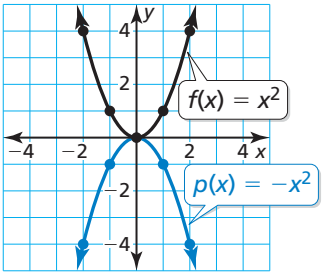
Vocabulary Flash Cards

An ordered triple (x, y, z) whose coordinates make each equation true

$$4x + 2y + 3z = 12 \quad \text{Equation 1}$$
$$2x - 3y + 5z = -7 \quad \text{Equation 2}$$
$$6x - y + 4z = -3 \quad \text{Equation 3}$$

A transformation that flips a graph over the line of reflection

The graph of $p(x)$ is a reflection in the x-axis of the parent quadratic function.



A change in the size, shape, position, or orientation of a graph

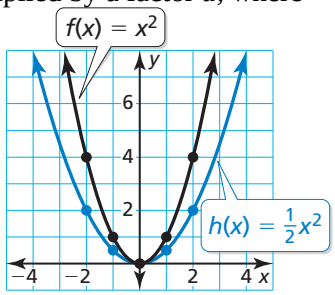
See translation, reflection, horizontal shrink, horizontal stretch, vertical shrink, and vertical stretch.

A set of three equations of the form $ax + by + cz = d$, where x, y, and z are variables and a, b, and c are not all zero

$$3x + 4y - 8z = -3 \quad \text{Equation 1}$$
$$x + y + 5z = -12 \quad \text{Equation 2}$$
$$4x - 2y + z = 10 \quad \text{Equation 3}$$

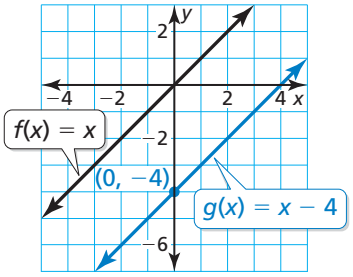
A transformation that causes the graph of a function to shrink toward the x-axis when all the y-coordinates are multiplied by a factor a, where $0 < a < 1$

The graph of $g(x) = \frac{1}{2}x^2$ is a vertical shrink of the graph of the parent quadratic function.



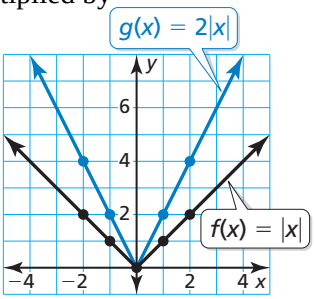
A transformation that shifts a graph horizontally and/or vertically but does not change its size, shape, or orientation

The graph of $g(x) = x - 4$ is a vertical translation 4 units down of the graph of the parent linear function.



A transformation that causes the graph of a function to stretch away from the x-axis when all the y-coordinates are multiplied by a factor a, where $a > 1$

The graph of $g(x) = 2|x|$ is a vertical stretch of the graph of the parent absolute value function.



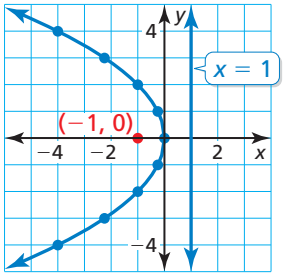
Vocabulary Flash Cards

axis of symmetry *Chapter 2 (p. 56)*	**directrix** *Chapter 2 (p. 68)*
focus *Chapter 2 (p. 68)*	**intercept form** *Chapter 2 (p. 59)*
maximum value *Chapter 2 (p. 58)*	**minimum value** *Chapter 2 (p. 58)*
parabola *Chapter 2 (p. 48)*	**quadratic function** *Chapter 2 (p. 48)*

Vocabulary Flash Cards

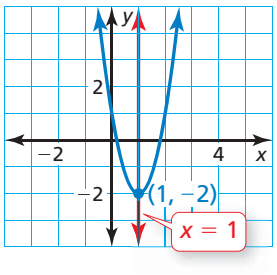
A fixed line perpendicular to the axis of symmetry such that the set of all points (x, y) of the parabola are equidistant from the focus and the directrix

The directrix of $x = -\frac{1}{4}y^2$ is $x = 1$.



A line that divides a parabola into mirror images and passes through the vertex

The axis of symmetry of $f(x) = 3x^2 - 6x + 1$ is $x = 1$.

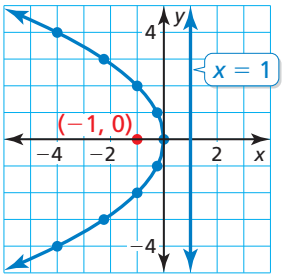


A quadratic function written in the form $f(x) = a(x - p)(x - q)$, where $a \neq 0$

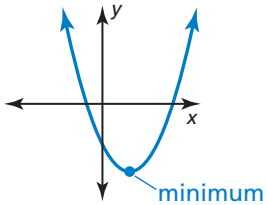
$$f(x) = 2(x - 3)(x - 1)$$
$$f(x) = 3(x + 4)(x - 2)$$

A fixed point in the interior of a parabola, such that the set of all points (x, y) of the parabola are equidistant from the focus and the directrix

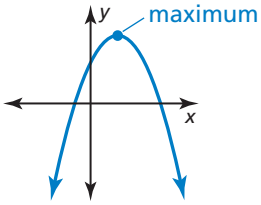
The focus of $x = -\frac{1}{4}y^2$ is $(-1, 0)$.



The y-coordinate of the vertex of the quadratic function $f(x) = ax^2 + bx + c$ when $a > 0$



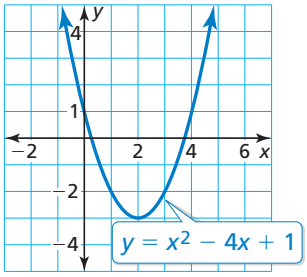
The y-coordinate of the vertex of the quadratic function $f(x) = ax^2 + bx + c$ when $a < 0$



A function that can be written in the form $f(x) = a(x - h)^2 + k$, where $a \neq 0$

$$f(x) = (x + 4)^2 - 1$$

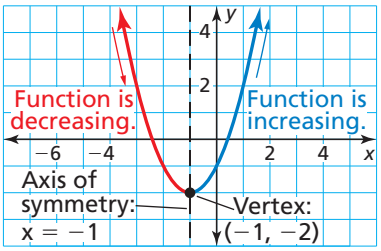
The graph of a quadratic function



Vocabulary Flash Cards

standard form *Chapter 2 (p. 56)*	**vertex form** *Chapter 2 (p. 50)*
vertex of a parabola *Chapter 2 (p. 50)*	

Vocabulary Flash Cards

A quadratic function written in the form $f(x) = a(x - h)^2 + k$, where $a \neq 0$ $f(x) = 3(x - 2)^2 + 1$	A quadratic function written in the form $f(x) = ax^2 + bx + c$, where $a \neq 0$ $f(x) = 2x^2 - x + 3$
	The lowest point on a parabola that opens up or the highest point on a parabola that opens down 

Vocabulary Flash Cards

completing the square *Chapter 3 (p. 112)*	**complex number** *Chapter 3 (p. 104)*
discriminant *Chapter 3 (p. 124)*	**imaginary number** *Chapter 3 (p. 104)*
imaginary unit *i* *Chapter 3 (p. 104)*	**pure imaginary number** *Chapter 3 (p. 104)*
quadratic equation in one variable *Chapter 3 (p. 94)*	**Quadratic Formula** *Chapter 3 (p. 122)*

Vocabulary Flash Cards

A number written in the form $a + bi,$ where *a* and *b* are real numbers $5 + 2i$	To add a term *c* to an expression of the form $x^2 + bx$ such that $x^2 + bx + c$ is a perfect square trinomial $x^2 + 6x + 9 = (x + 3)^2$ $x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$
A number written in the form $a + bi,$ where *a* and *b* are real numbers and $b \neq 0$ $10 - 2i$	The expression $b^2 - 4ac$ in the Quadratic Formula The value of the discriminant of the equation $3x^2 - 2x - 7 = 0$ is $b^2 - 4ac = (-2)^2 - 4(3)(-7) = 88.$
A number written in the form $a + bi,$ where $a = 0$ and $b \neq 0$ $5i$	The square root of $-1,$ denoted $i = \sqrt{-1}$ $i = \sqrt{-1}$
The solutions of the quadratic equation $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a},$ where *a*, *b*, and *c* are real numbers and $a \neq 0.$ To solve $2x^2 + 13x - 7 = 0,$ substitute 2 for *a*, 13 for *b*, and –7 for *c* in the Quadratic Formula. $x = \frac{-13 \pm \sqrt{13^2 - 4(2)(-7)}}{2(2)} \rightarrow x = \frac{1}{2}$ and $x = -7$	An equation that can be written in the standard form $ax^2 + bx + c = 0,$ where *a*, *b*, and *c* are real numbers and $a \neq 0$ $2x^2 - 3x + 8 = 0$

Vocabulary Flash Cards

quadratic inequality in one variable *Chapter 3 (p. 142)*	**quadratic inequality in two variables** *Chapter 3 (p. 140)*
root of an equation *Chapter 3 (p. 94)*	**system of nonlinear equations** *Chapter 3 (p. 132)*
zero of a function *Chapter 3 (p. 96)*	

Vocabulary Flash Cards

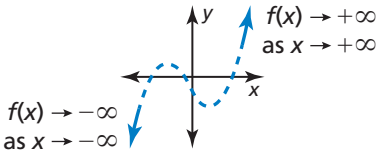
An inequality of the form $y < ax^2 + bx + c$, $y > ax^2 + bx + c$, $y \leq ax^2 + bx + c$, or $y \geq ax^2 + bx + c$, where a, b, and c are real numbers and $a \neq 0$ $y < -x^2 - 2x - 1$	An inequality of the form $ax^2 + bx + c < 0$, $ax^2 + bx + c > 0$, $ax^2 + bx + c \leq 0$, or $ax^2 + bx + c \geq 0$, where a, b, and c are real numbers and $a \neq 0$ $x^2 - 3x - 4 < 0$
A system of equations where at least one of the equations is nonlinear $y = x^2 + 2x - 4$ Equation 1 $y = 2x + 5$ Equation 2	A solution of an equation The roots of $x^2 - x - 6 = 0$ are $x = -2$ and $x = 3$.
	An x-value of a function f for which $f(x) = 0$ The zeroes of $f(x) = x^2 - 4x - 45$ are $x = 9$ and $x = -5$.

Vocabulary Flash Cards

complex conjugates *Chapter 4 (p. 199)*	**end behavior** *Chapter 4 (p. 159)*
even function *Chapter 4 (p. 215)*	**factor by grouping** *Chapter 4 (p. 181)*
factored completely *Chapter 4 (p. 180)*	**finite differences** *Chapter 4 (p. 220)*
local maximum *Chapter 4 (p. 214)*	**local minimum** *Chapter 4 (p. 214)*

Vocabulary Flash Cards

The behavior of the graph of a function as x approaches positive infinity or negative infinity



Pairs of complex numbers of the forms $a + bi$ and $a - bi$, where $b \neq 0$

$5 + 2i$ and $5 - 2i$

A method of factoring a polynomial by grouping pairs of terms that have a common monomial factor

$$t^3 + t^2 - 9t - 9 = t^2(t + 1) - 9(t + 1)$$
$$= (t^2 - 9)(t + 1)$$
$$= (t - 3)(t + 3)(t + 1)$$

For a function f, $f(-x) = f(x)$ for all x in its domain

$f(x) = x^2$

$f(x) = 3x^4 - 2x^2$

The differences of consecutive y-values in a data set when the x-values are equally spaced

Equally-spaced *x*-values

x	–3	–2	–1	0	1	2	3
y	9	4	1	0	1	4	9

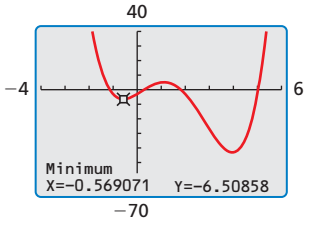
first differences: –5 –3 –1 1 3 5

second differences: 2 2 2 2 2

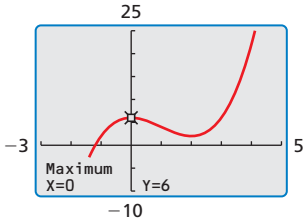
A polynomial written as a product of unfactorable polynomials with integer coefficients

$$x^3 - 2x^2 - 8x = x(x^2 - 2x - 8)$$
$$= x(x - 4)(x + 2)$$

The y-coordinate of a turning point of a function when the point is lower than all nearby points



The y-coordinate of a turning point of a function when the point is higher than all nearby points



Vocabulary Flash Cards

odd function *Chapter 4 (p. 215)*	**Pascal's Triangle** *Chapter 4 (p. 169)*
polynomial *Chapter 4 (p. 158)*	**polynomial function** *Chapter 4 (p. 158)*
polynomial long division *Chapter 4 (p. 174)*	**quadratic form** *Chapter 4 (p. 181)*
repeated solution *Chapter 4 (p. 190)*	**synthetic division** *Chapter 4 (p. 175)*

Vocabulary Flash Cards

A triangular array of numbers such that the numbers in the *n*th row are the coefficients of the terms in the expression of $(a + b)^n$ for whole number values of *n*

$$\begin{array}{c} 1 \\ 1 \quad 1 \\ 1 \quad 2 \quad 1 \\ 1 \quad 3 \quad 3 \quad 1 \\ 1 \quad 4 \quad 6 \quad 4 \quad 1 \\ 1 \quad 5 \quad 10 \quad 10 \quad 5 \quad 1 \end{array}$$

For a function *f*, $f(-x) = -f(x)$ for all *x* in its domain

$$f(x) = x^3$$
$$f(x) = 2x^5 + x^3$$

A function of the form $f(x) = a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$, where $a_n \neq 0$, the exponents are all whole numbers, and the coefficients are all real numbers

$$f(x) = 3x^3 + 4x^2 + 2x - 1$$

A monomial or a sum of monomials

$$5x + 2$$
$$x^2 + 5x + 2$$

An expression of the form $au^2 + bu + c = 0$, where *u* is an algebraic expression

$$16x^4 - 81 = (4x^2)^2 - 81$$
$$= u^2 - 81, \text{ where } u = 4x^2$$

A method to divide a polynomial $f(x)$ by a nonzero divisor $d(x)$ to yield a quotient polynomial $q(x)$ and a remainder polynomial $r(x)$

$$\begin{array}{r} x + 3 \\ x + 1 \overline{)\, x^2 + 4x + 2} \\ \underline{x^2 + x} \\ 3x + 2 \\ \underline{3x + 3} \\ -1 \end{array}$$

$$\frac{x^2 + 4x + 2}{x + 1} = x + 3 - \frac{1}{x + 1}$$

A shortcut method to divide a polynomial by a binomial of the form $x - k$

You can use synthetic division to divide $x^2 + 4x + 2$ by $x + 1$.

$$\begin{array}{r|rrr} -1 & 1 & 4 & 2 \\ & & -1 & -3 \\ \hline & 1 & 3 & -1 \end{array}$$

$$\frac{x^2 + 4x + 2}{x + 1} = x + 3 - \frac{1}{x + 1}$$

A solution of an equation that appears more than once

The equation $(x + 2)^2 = 0$ has a repeated solution of $x = -2$.

Vocabulary Flash Cards

conjugate *Chapter 5 (p. 246)*	**extraneous solutions** *Chapter 5 (p. 263)*
index of a radical *Chapter 5 (p. 238)*	**inverse functions** *Chapter 5 (p. 277)*
like radicals *Chapter 5 (p. 246)*	***n*th root of *a*** *Chapter 5 (p. 238)*
radical equation *Chapter 5 (p. 262)*	**radical function** *Chapter 5 (p. 252)*

Vocabulary Flash Cards

Solutions that are not solutions of the original equation $x = -2$ is an extraneous solution of $x + 1 = \sqrt{7x + 15}$ that is introduced by squaring both sides of the equation.	Binomials of the form $a\sqrt{b} + c\sqrt{d}$ and $a\sqrt{b} - c\sqrt{d}$, where *a*, *b*, *c*, and *d* are rational numbers $6\sqrt{5} + 2\sqrt{3}$ and $6\sqrt{5} - 2\sqrt{3}$
Functions that undo each other $f(x) = 2x - 5$ and $g(x) = \frac{x + 5}{2}$	The value of *n* in the radical $\sqrt[n]{a}$ The index of $\sqrt[3]{70}$ is 3.
For an integer *n* greater than 1, if $b^n = a$, then *b* is an *n*th root of *a*. $\sqrt[3]{64} = \sqrt[3]{4 \bullet 4 \bullet 4} = 4$ $\sqrt[n]{a}$ = *n*th root of *a*	Radical expressions with the same index and radicand $2\sqrt{7}$ and $-3\sqrt{7}$
A function that contains a radical expression with the independent variable in the radicand $g(x) = -3\sqrt[3]{x}$	An equation with a radical that has a variable in the radicand $2\sqrt{x + 1} = 4$

Vocabulary Flash Cards

simplest form

Chapter 5 (p. 245)

Vocabulary Flash Cards

An expression involving a radical with index n that has no radicands with perfect nth powers as factors other than 1, no radicands that contain fractions, and no radicals that appear in the denominator of a fraction

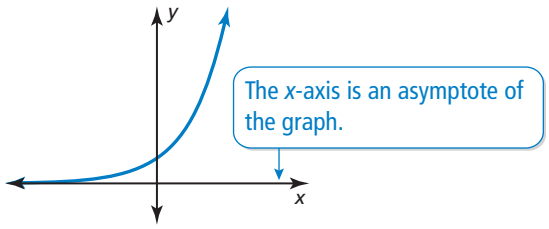
$$\sqrt{27} = 3\sqrt{3}$$

$$\frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

Vocabulary Flash Cards

asymptote *Chapter 6 (p. 296)*	**common logarithm** *Chapter 6 (p. 311)*
decay factor *Chapter 6 (p. 296)*	**exponential decay function** *Chapter 6 (p. 296)*
exponential equations *Chapter 6 (p. 334)*	**exponential function** *Chapter 6 (p. 296)*
exponential growth function *Chapter 6 (p. 296)*	**growth factor** *Chapter 6 (p. 296)*

Vocabulary Flash Cards

A logarithm with base 10, denoted as $\log_{10}$ or simply by log $\log_{10} x$ or $\log x$	A line that a graph approaches more and more closely 
A function of the form $y = ab^x$, where $a > 0$ and $0 < b < 1$ $y = 30(0.75)^x$	The value of b in an exponential decay function of the form $y = ab^x$, where $a > 0$ and $0 < b < 1$ In the exponential decay function $y = 30(0.75)^x$, 0.75 is the decay factor.
A function of the form $y = ab^x$, where $a \neq 0$ and the base b is a positive real number other than 1 $y = 20(0.85)^x$	Equations in which variable expressions occur as exponents $2^x = 7$ $5^{x-3} = 25^{x-5}$
The value of b in an exponential growth function of the form $y = ab^x$, where $a > 0$ and $b > 1$ In the exponential growth function $y = 10(1.5)^x$, 1.5 is the growth factor.	A function of the form $y = ab^x$, where $a > 0$ and $b > 1$ $y = 10(1.25)^x$

Vocabulary Flash Cards

logarithm of *y* with base *b* function *Chapter 6 (p. 310)*	**logarithmic equations** *Chapter 6 (p. 335)*
natural base *e* *Chapter 6 (p. 304)*	**natural logarithm** *Chapter 6 (p. 311)*

Vocabulary Flash Cards

Equations that involve logarithms of variable expressions $\ln(4x - 7) = \ln(x + 5)$	The function $\log_b y = x$ if and only if $b^x = y$, where $b > 0$, $y > 0$, and $b \neq 1$ **Logarithmic Form** $\log_3 125 = 5$ **Exponential Form** $5^3 = 125$
A logarithm with base e, denoted by $\log_e$ or $\ln$ $\log_e x = \ln x$	An irrational number approximately equal to $2.71828\ldots$ $e \approx 2.71828\ldots$

Vocabulary Flash Cards

complex fraction *Chapter 7 (p. 387)*	**constant of variation** *Chapter 7 (p. 360)*
cross multiplying *Chapter 7 (p. 392)*	**inverse variation** *Chapter 7 (p. 360)*
rational expression *Chapter 7 (p. 376)*	**rational function** *Chapter 7 (p. 366)*
simplified form of a rational expression *Chapter 7 (p. 376)*	

Vocabulary Flash Cards

The constant a in the inverse variation equation $y = \frac{a}{x}$, where $a \neq 0$

In the inverse variation equation $y = \frac{5}{x}$, 5 is the constant of variation.

A fraction that contains a fraction in its numerator or denominator

$$\frac{\frac{4}{x+3}}{\frac{1}{x+3}+\frac{5}{x}}$$

Two variables x and y show inverse variation when $y = \frac{a}{x}$, where $a \neq 0$.

$$y = \frac{2}{x}$$

A method used to solve a rational equation when each side of the equation is a single rational expression

$$\frac{4}{x+1} = \frac{3}{x}$$
$$4x = 3(x+1)$$
$$4x = 3x + 3$$
$$x = 3$$

A function that has the form $f(x) = \frac{p(x)}{q(x)}$, where $p(x)$ and $q(x)$ are polynomials and $q(x) \neq 0$

$$g(x) = \frac{4}{x}$$

A fraction whose numerator and denominator are nonzero polynomials

$$\frac{x^2 - 4x - 12}{x^2 - 4}$$

A rational expression whose numerator and denominator have no common factors (other than ± 1)

$$\frac{15}{65} = \frac{3 \bullet \cancel{5}}{13 \bullet \cancel{5}} = \frac{3}{13}$$
$$\frac{4\cancel{(x+3)}}{(x+3)\cancel{(x+3)}} = \frac{4}{x+3}$$

Vocabulary Flash Cards

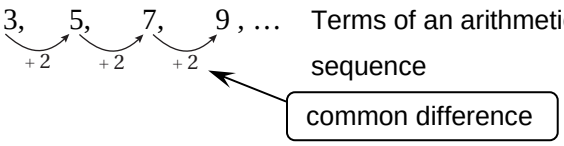
arithmetic sequence *Chapter 8 (p. 418)*	**arithmetic series** *Chapter 8 (p. 420)*
common difference *Chapter 8 (p. 418)*	**common ratio** *Chapter 8 (p. 426)*
explicit rule *Chapter 8 (p. 442)*	**geometric sequence** *Chapter 8 (p. 426)*
geometric series *Chapter 8 (p. 428)*	**partial sum** *Chapter 8 (p. 436)*

Vocabulary Flash Cards

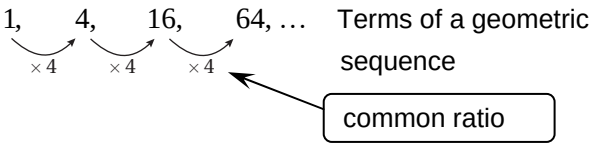
The expression formed by adding the terms of an arithmetic sequence

$$\sum_{i=1}^{20}(3i + 7)$$

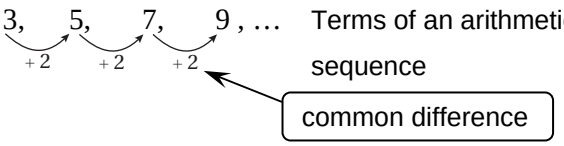
A sequence in which the difference of consecutive terms is constant



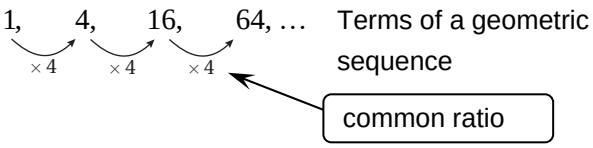
The constant ratio *r* between consecutive terms of a geometric sequence



The constant difference *d* between consecutive terms of an arithmetic sequence



A sequence in which the ratio of any term to the previous term is constant



A rule that gives a_n as a function of the term's position number *n* in the sequence

$$a_n = 3n - 2$$

The sum S_n of the first *n* terms of an infinite series

For the infinite series $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \cdots$, the first three partial sums are

$$S_1 = \frac{1}{2} = 0.5,$$

$$S_2 = \frac{1}{2} + \frac{1}{4} = 0.75, \text{ and}$$

$$S_3 = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} = 0.88.$$

The expression formed by adding the terms of a geometric sequence

$$\sum_{k=1}^{10} 4(3)^{k-1}$$

Vocabulary Flash Cards

recursive rule *Chapter 8 (p. 442)*	**sequence** *Chapter 8 (p. 410)*
series *Chapter 8 (p. 412)*	**sigma notation** *Chapter 8 (p. 412)*
summation notation *Chapter 8 (p. 412)*	**terms of a sequence** *Chapter 8 (p. 410)*

Vocabulary Flash Cards

An ordered list of numbers

$5, 10, 15, 20, \ldots, a_n, \ldots$

$2, 4, 8, 16, \ldots, a_n, \ldots$

A rule that gives the beginning term(s) of a sequence and a recursive equation that tells how a_n is related to one or more preceding terms

$$a_0 = 1,\ a_n = a_{n-1} + 4$$

For any sequence $a_1, a_2, a_3, \ldots,$ the sum of the first k terms may be written as $\sum_{n=1}^{k} a_n = a_1 + a_2 + a_3 + \cdots + a_k,$ where k is an integer.

Finite series: $1 + 3 + 5 + 7 = \sum_{i=1}^{4} 2i - 1$

Infinite series: $1 + 3 + 5 + 7 + \cdots = \sum_{i=1}^{\infty} 2i - 1$

The sum of the terms of a sequence

Finite series: $1 + 3 + 5 + 7$

Infinite series: $1 + 3 + 5 + 7 + \cdots$

The values in the range of a sequence

$5,\ 10,\ 15,\ 20,\ 25,\ \ldots,\ a_n,\ \ldots$

1st position | 3rd position | nth position

For any sequence $a_1, a_2, a_3, \ldots,$ the sum of the first k terms may be written as $\sum_{n=1}^{k} a_n = a_1 + a_2 + a_3 + \cdots + a_k,$ where k is an integer.

Finite series: $1 + 3 + 5 + 7 = \sum_{i=1}^{4} 2i - 1$

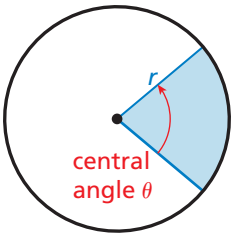
Infinite series: $1 + 3 + 5 + 7 + \cdots = \sum_{i=1}^{\infty} 2i - 1$

Vocabulary Flash Cards

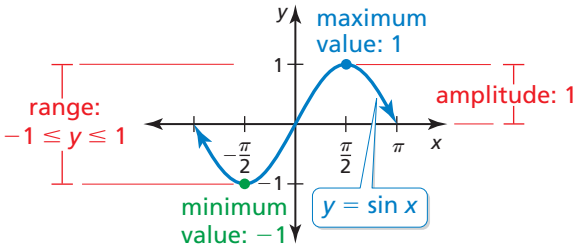
amplitude *Chapter 9 (p. 486)*	**central angle** *Chapter 9 (p. 472)*
cosecant *Chapter 9 (p. 462)*	**cosine** *Chapter 9 (p. 462)*
cotangent *Chapter 9 (p. 462)*	**coterminal** *Chapter 9 (p. 471)*
cycle *Chapter 9 (p. 486)*	**frequency** *Chapter 9 (p. 506)*

Vocabulary Flash Cards

The angle measure of a sector of a circle formed by two radii



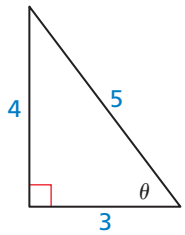
One-half the difference of the maximum value and the minimum value of the graph of a trigonometric function



$$\text{amplitude} = \frac{1}{2}[1 - (-1)] = 1$$

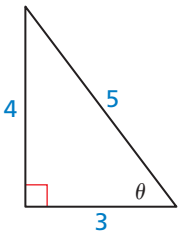
A trigonometric function for an acute angle θ of a right triangle, denoted by $\cos\theta = \dfrac{\text{adjacent}}{\text{hypotenuse}}$

$$\cos\theta = \frac{3}{5}$$

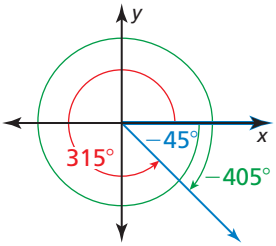


A trigonometric function for an acute angle θ of a right triangle, denoted by $\csc\theta = \dfrac{\text{hypotenuse}}{\text{opposite}}$

$$\csc\theta = \frac{5}{4}$$



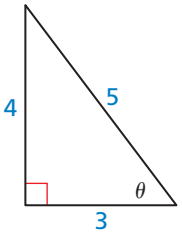
Two angles whose terminal sides coincide



The angles 315° and -405° are coterminal with -45°.

A trigonometric function for an acute angle θ of a right triangle, denoted by $\cot\theta = \dfrac{\text{adjacent}}{\text{opposite}}$

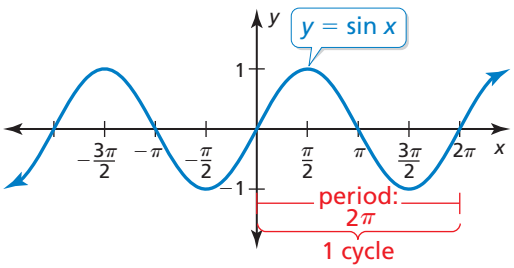
$$\cot\theta = \frac{3}{4}$$



The number of cycles per unit of time, which is the reciprocal of the period

The period of $\sin 2\pi$ is π, so the frequency is $\dfrac{1}{\pi}$.

The shortest repeating position of the graph of a periodic function



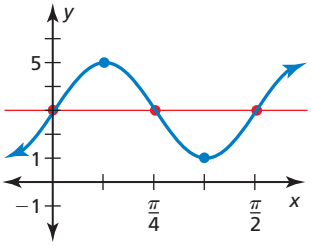
Vocabulary Flash Cards

initial side *Chapter 9 (p. 470)*	**midline** *Chapter 9 (p. 488)*
period *Chapter 9 (p. 486)*	**periodic function** *Chapter 9 (p. 486)*
phase shift *Chapter 9 (p. 488)*	**quadrantal angle** *Chapter 9 (p. 479)*
radian *Chapter 9 (p. 471)*	**reference angle** *Chapter 9 (p. 480)*

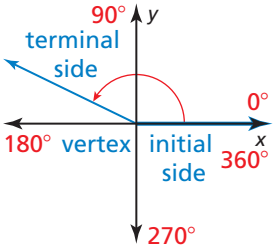
Vocabulary Flash Cards

The horizontal line $y = k$ in which the graph of a periodic function oscillates

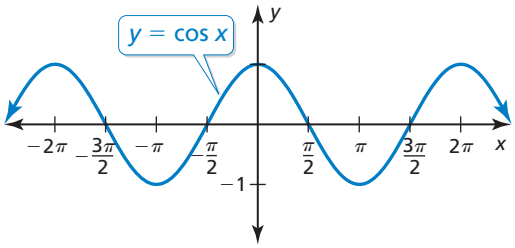
The midline of $g(x) = 2\sin 4x + 3$ is $y = 3$.



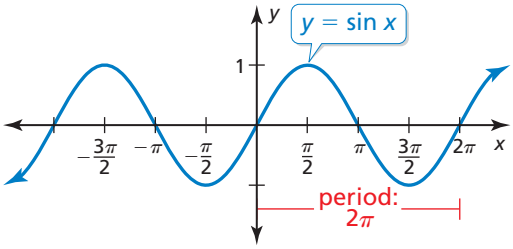
The fixed ray of an angle in standard position in a coordinate plane



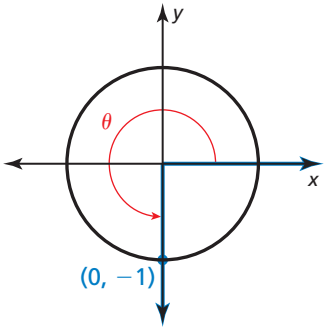
A function whose graph has a repeating pattern



The horizontal length of each cycle of a periodic function



An angle in standard position whose terminal side lies on an axis



A horizontal translation of a periodic function

$g(x) = a\sin b(x - h) + k$

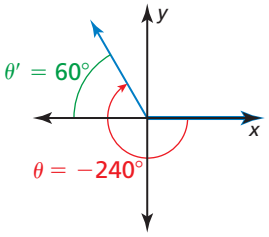
horizontal shift: h

$g(x) = 5\cos\frac{1}{2}(x - 3\pi)$

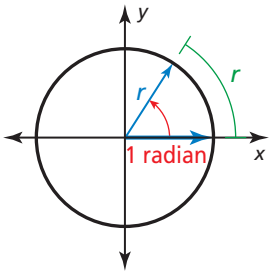
horizontal shift: $h = 3\pi$

The acute angle formed by the terminal side of an angle and the x-axis

The reference angle for $\theta = -240^\circ$ is $\theta' = 60^\circ$.



For a circle with radius r, the measure of an angle in standard position whose terminal side intercepts an arc of length r is one radian.

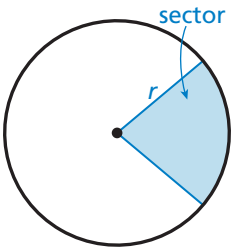


Vocabulary Flash Cards

secant *Chapter 9 (p. 462)*	**sector** *Chapter 9 (p. 472)*
sine *Chapter 9 (p. 462)*	**sinusoid** *Chapter 9 (p. 507)*
standard position *Chapter 9 (p. 470)*	**tangent** *Chapter 9 (p. 462)*
terminal side *Chapter 9 (p. 470)*	**trigonometric identity** *Chapter 9 (p. 514)*

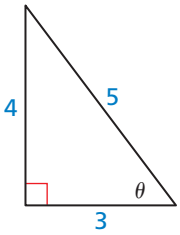
Vocabulary Flash Cards

A region of a circle that is bounded by two radii and an arc of the circle

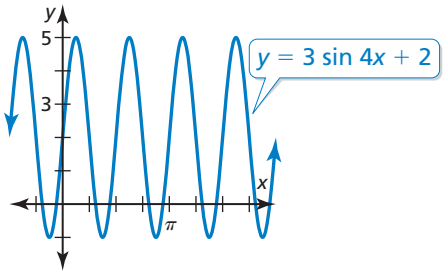


A trigonometric function for an acute angle θ of a right triangle, denoted by $\sec\theta = \dfrac{\text{hypotenuse}}{\text{adjacent}}$

$\sec\theta = \dfrac{5}{3}$

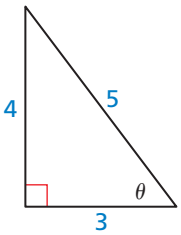


The graph of a sine or cosine function



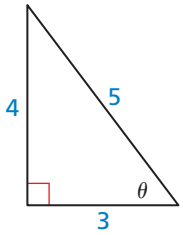
A trigonometric function for an acute angle θ of a right triangle, denoted by $\sin\theta = \dfrac{\text{opposite}}{\text{hypotenuse}}$

$\sin\theta = \dfrac{4}{5}$

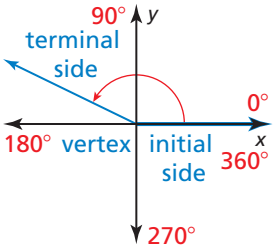


A trigonometric function for an acute angle θ of a right triangle, denoted by $\tan\theta = \dfrac{\text{opposite}}{\text{adjacent}}$

$\tan\theta = \dfrac{4}{3}$



An angle in a coordinate plane such that its vertex is at the origin and its initial side lies on the positive x-axis

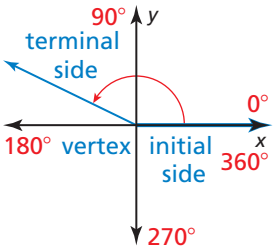


A trigonometric equation that is true for all values of the variable for which both sides of the equation are defined

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sin\left(\frac{\pi}{2} - \theta\right) = \cos\theta$$

A ray of an angle in standard position that has been rotated about the vertex in a coordinate plane



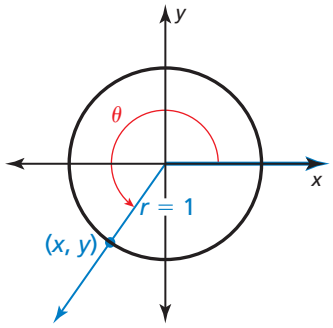
Vocabulary Flash Cards

unit circle

Chapter 9 (p. 479)

Vocabulary Flash Cards

The circle $x^2 + y^2 = 1$, which has center $(0, 0)$ and radius 1



Vocabulary Flash Cards

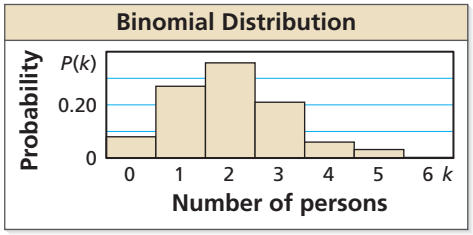
binomial distribution *Chapter 10 (p. 581)*	**binomial experiment** *Chapter 10 (p. 581)*
Binomial Theorem *Chapter 10 (p. 574)*	**combination** *Chapter 10 (p. 572)*
compound event *Chapter 10 (p. 564)*	**conditional probability** *Chapter 10 (p. 547)*
conditional relative frequency *Chapter 10 (p. 555)*	**dependent events** *Chapter 10 (p. 547)*

Vocabulary Flash Cards

An experiment in which there are a fixed number of independent trials, exactly two possible outcomes for each trial, and the probability of success is the dame for each trial

You ask 50 randomly chosen people whether they recycle and 82% responded "yes."

A type of probability distribution that shows the probabilities of the outcomes of a binomial experiment



A selection of objects in which order is not important

The possible combinations of 2 letters chosen from the list A, B, C:

AB AC BC

For any positive integer n, the binomial expansion of $(a + b)^n$ is

$$(a + b)^n = {}_nC_0a^nb^0 + {}_nC_1a^{n-1}b^1 + {}_nC_2a^{n-2}b^2 + \cdots + {}_nC_na^0b^n.$$

$$(x + y^2)^3 = {}_3C_0x^3(y^2)^0 + {}_3C_1x^2(y^2)^1 + {}_3C_2x^1(y^2)^2 + {}_3C_3x^0(y^2)^3$$
$$= (1)(x^3)(1) + (3)(x^2)(y^2) + (3)(x^1)(y^4) + (1)(1)(y^6)$$
$$= x^3 + 3x^2y^2 + 3xy^4 + y^6$$

The probability that event B occurs given that event A has occurred, written as $P(B|A)$

the probability of drawing a heart given you drew and did not replace a diamond from a standard deck of 52 cards

The union or intersection of two events

selecting a blue marble or a red marble from a bag

Two events in which the occurrence of one event does affect the occurrence of the other event

Randomly selecting a diamond from a standard deck of 52 cards and randomly selecting another diamond from the same deck are dependent events when you do not replace the first card.

The ratio of a joint relative frequency to the marginal relative frequency in a two-way table

		Major in Medical Field	
		Yes	No
Class	Junior	$\frac{0.18}{0.33} \approx 0.55$	$\frac{0.32}{0.67} \approx 0.48$
	Senior	$\frac{0.15}{0.33} \approx 0.45$	$\frac{0.35}{0.67} \approx 0.52$

Given that a student is not planning to major in a medical field, the conditional relative frequency that he or she is a junior is about 48%.

Vocabulary Flash Cards

disjoint *Chapter 10 (p. 564)*	**event** *Chapter 10 (p. 538)*
experimental probability *Chapter 10 (p. 541)*	**geometric probability** *Chapter 10 (p. 540)*
independent events *Chapter 10 (p. 546)*	**joint frequency** *Chapter 10 (p. 554)*
joint relative frequency *Chapter 10 (p. 555)*	**marginal frequency** *Chapter 10 (p. 554)*

Vocabulary Flash Cards

A collection of one or more outcomes in a probability experiment

rolling an odd number when you roll a six-sided die

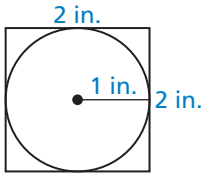
Two events that have no outcomes in common

selecting a diamond or a club from a standard deck of 52 cards

A probability found by calculating a ratio of two lengths, areas, or volumes

The probability that a dart that is equally likely to land anywhere in the square will land in the circle is

$$P(\text{circle}) = \frac{\text{Area of circle}}{\text{Area of square}} = \frac{\pi \cdot 1^2}{2^2} = \frac{\pi}{4} \approx 0.785.$$



The ratio of the number of successes, or favorable outcomes, to the number of trials in a probability experiment

In 100 trials of tossing a coin, the result was heads 56 times and tails 44 times. So, the experimental probability of tossing heads is

$$\frac{56}{100} = 0.56.$$

Each entry in a two-way table

		Student	
		Studied	Did Not Study
Grade	Passed	21	2
	Failed	1	6

joint frequency

Two events in which the occurrence of one event does not affect the occurrence of another event

selecting a heart from a standard deck of 52 cards and then selecting a red card after replacing the first card

The sums of the rows and columns in a two-way table

		Age			
		12–13	14–15	16–17	Total
Student	Ride Bus	24	12	14	50
	Does Not Ride Bus	16	13	21	50
	Total	40	25	35	100

marginal frequency

The ratio of a frequency that is not in the total row or the total column to the total number of values or observations in a two-way table

		Major in Medical Field		
		Yes	No	Total
Class	Junior	$\frac{124}{680} \approx 0.18$	$\frac{219}{680} \approx 0.32$	0.50
	Senior	$\frac{101}{680} \approx 0.15$	$\frac{236}{680} \approx 0.35$	0.50
	Total	0.33	0.67	1

joint relative frequency

Vocabulary Flash Cards

marginal relative frequency *Chapter 10 (p. 555)*	**mutually exclusive events** *Chapter 10 (p. 564)*
***n* factorial** *Chapter 10 (p. 570)*	**outcome** *Chapter 10 (p. 538)*
overlapping events *Chapter 10 (p. 564)*	**permutation** *Chapter 10 (p. 570)*
probability distribution *Chapter 10 (p. 580)*	**probability of an event** *Chapter 10 (p. 538)*

Vocabulary Flash Cards

Two events that have no outcomes in common

selecting a black card or a red card from a standard deck of 52 cards

The sum of the joint relative frequencies in a row or a column in a two-way table

		Major in Medical Field		
		Yes	No	Total
Class	Junior	$\frac{124}{680} \approx 0.18$	$\frac{219}{680} \approx 0.32$	0.50
	Senior	$\frac{101}{680} \approx 0.15$	$\frac{236}{680} \approx 0.35$	0.50
	Total	0.33	0.67	1

marginal relative frequency

The possible result of a probability experiment

The outcomes of flipping a coin are the coin landing heads up or the coin landing tails up.

The product of the integers from 1 to n, for any positive integer n

$$4! = 4 \bullet 3 \bullet 2 \bullet 1 = 24$$

An arrangement of objects in which order is important

The 6 possible permutations of the letters A, B, and C are shown:

ABC ACB BAC BCA CAB CBA

Two events that have one or more outcomes in common

selecting a face card or a diamond from a standard deck of 52 cards

A measure of the likelihood, or chance, that an event will occur

When you roll a six-sided die, the probability of rolling a 4 is $\frac{1}{6}$.

A function that gives the probability of each possible value of a random variable

Probability Distribution for Rolling a Six-Sided Die						
x	1	2	3	4	5	6
$P(x)$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

Vocabulary Flash Cards

probability experiment *Chapter 10 (p. 538)*	**random variable** *Chapter 10 (p. 580)*
sample space *Chapter 10 (p. 538)*	**theoretical probability** *Chapter 10 (p. 539)*
two-way table *Chapter 10 (p. 554)*	

Vocabulary Flash Cards

A variable whose value is determined by the outcomes of a probability experiment

When you roll a six-sided die, you can define a random variable X that represents the number showing on the die.

An action, or trial, that has varing results

flipping a coin

The ratio of the number of favorable outcomes to the total number of outcomes when all outcomes are equally likely

You flip a coin. The theoretical probability that the coin lands heads up is

$$P(\text{heads}) = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}} = \frac{1}{2}.$$

The set of all possible outcomes for an experiment

The sample space for flipping two coins is listed below.

HH TH HT TT

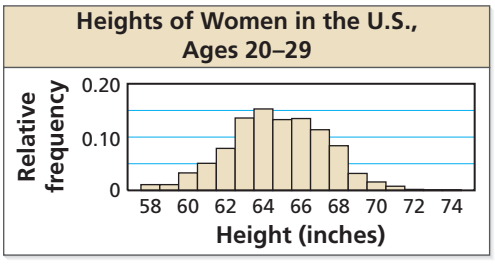
A frequency table that displays data collected from one source that belong to two different categories

		Fundraiser	
		No	Yes
Gender	Female	22	51
	Male	30	29

Vocabulary Flash Cards

bias *Chapter 11 (p. 611)*	**biased question** *Chapter 11 (p. 613)*
biased sample *Chapter 11 (p. 611)*	**cluster sample** *Chapter 11 (p. 610)*
control group *Chapter 11 (p. 620)*	**controlled experiment** *Chapter 11 (p. 620)*
convenience sample *Chapter 11 (p. 610)*	**descriptive statistics** *Chapter 11 (p. 626)*

Vocabulary Flash Cards

A question that is flawed in a way that leads to inaccurate results The question "*Do you agree that we should take a field trip to a science museum this year?*" is biased because it encourages a particular response.	An error that results in a misrepresentation of a population An environmental magazine sends out a survey on recycling to its readers. The sample is biased because the readers of an environmental magazine most likely have a strong opinion about recycling.
A sample in which a population is divided into groups, called clusters, and all of the members in one or more of the clusters are randomly selected You want to find out whether booth holders at a convention were pleased with their booth locations. You divide the convention center into six sections and survey every booth holder in the fifth section.	A sample that overrepresents or underrepresents part of the population An environmental magazine sends out a survey on recycling to its readers. The sample is biased because the readers of an environmental magazine most likely have a strong opinion about recycling.
An experiment in which two groups are studied under identical conditions with the exception of one variable In an experiment studying the effectiveness of a health supplement in aiding weight loss, one group uses a health supplement and another group does not. Both groups exercise regularly and are weighed over a three-month period. The group who does not use the supplement is the control group. The group using the health supplement is the treatment group.	The group under ordinary conditions that is subjected to no treatment during an experiment In an experiment studying the effectiveness of a health supplement in aiding weight loss, one group uses a health supplement and another group does not. Both groups exercise regularly and are weighed over a three-month period. The group who does not use the supplement is the control group. The group using the health supplement is the treatment group.
The branch of statistics that involves the organization, summarization, and display of data 	A sample in which only members of a population that are easy to reach are selected You are conducting a poll to determine how students feel about your school's new mascot and you only survey the students in your homeroom.

Vocabulary Flash Cards

experiment *Chapter 11 (p. 612)*	**hypothesis** *Chapter 11 (p. 605)*
inferential statistics *Chapter 11 (p. 626)*	**information design** *Chapter 11 (p. 594)*
margin of error *Chapter 11 (p. 629)*	**normal curve** *Chapter 11 (p. 596)*
normal distribution *Chapter 11 (p. 596)*	**observational study** *Chapter 11 (p. 612)*

Vocabulary Flash Cards

A claim about a characteristic of a population

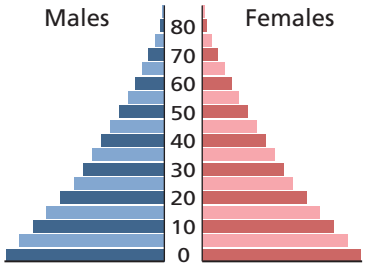
A medical researcher claims that the proportion of U.S. adults living with one or more chronic conditions, such as high blood pressure, is 0.45, or 45%.

A method that imposes a treatment on individuals in order to collect data on their response to the treatment

adding methanol to gasoline and then measuring its effect on fuel efficiency

The designing of data and information so it can be understood and used

The age pyramid shows the ages of males and females in the population of a country.



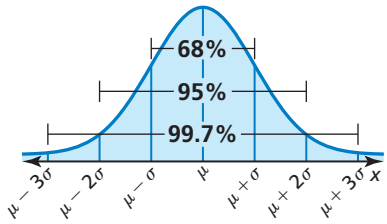
The branch of statistics that involves using a sample to draw conclusions about a population

Two candidates are running for class president. The table shows the results of four surveys of randomly selected students in the class.

Sample Size	Number of "Yes" Responses	Percent of Votes for Incumbent
10	7	70%
20	11	55%
30	13	43.3%
40	17	42.5%

Based on the results of the surveys, you can predict the incumbent will not be reelected.

The graph of a normal distribution that is bell-shaped and is symmetric about the mean



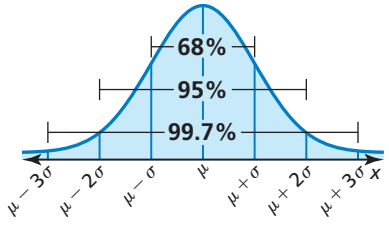
The limit on how much the responses of the sample would differ from the responses of the population

The margin of error of a survey of 1014 people is $\pm\frac{1}{\sqrt{1014}} \approx 0.031$, or about 3.1%

Individuals are observed and variables are measured without controlling the individuals or their environment.

A researcher records whether people at a gas station use hand sanitizer.

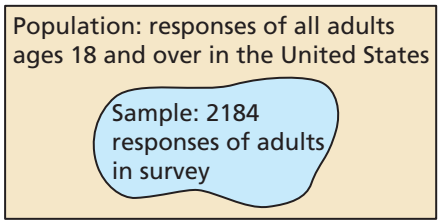
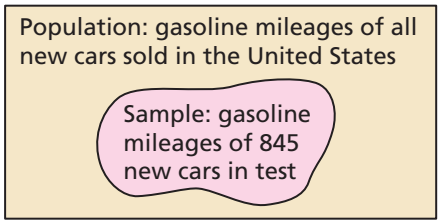
A type of probability distribution in which the graph is a bell-shaped curve that is symmetric about the mean



Vocabulary Flash Cards

parameter *Chapter 11 (p. 605)*	**placebo** *Chapter 11 (p. 620)*
population *Chapter 11 (p. 604)*	**random sample** *Chapter 11 (p. 610)*
randomization *Chapter 11 (p. 620)*	**randomized comparative experiment** *Chapter 11 (p. 620)*
replication *Chapter 11 (p. 622)*	**sample** *Chapter 11 (p. 604)*

Vocabulary Flash Cards

A harmless, unmedicated treatment that resembles the actual treatment In a study, half the paricipants are given headache medication and the other half are given sugar pills that resemble the headache medication.	A numerical description of a population characteristic For all students taking the SAT in a recent year, the mean mathematics score was 514.
A sample in which each member of a population has an equal chance of being selected a survey of 1000 randomly selected adults about how many times per day they brush their teeth	The collection of all data, such as response, measurements, or counts, that you want information about 
An experiment in which subjects are randomly assigned to the control group or the treatment group To test the new design of its self checkout, a grocer gathered 142 customers and randomly divided them into two groups. One group used the new self checkout and one group used the old self checkout to buy the same groceries. Users of the new self checkout were able to complete their purchases 16% faster.	A process of randomly assigning subjects to different treatment groups To test the new design of its self checkout, a grocer gathered 142 customers and randomly divided them into two groups. One group used the new self checkout and one group used the old self checkout to buy the same groceries. Users of the new self checkout were able to complete their purchases 16% faster.
A subset of a population 	The repetition of an experiment under the same or similar conditions to improve the validity of the experiment A lab repeats the same experiment multiple times where participants try a weight loss treatment.

Vocabulary Flash Cards

self-selected sample *Chapter 11 (p. 610)*	**simulation** *Chapter 11 (p. 612)*
standard normal distribution *Chapter 11 (p. 597)*	**statistic** *Chapter 11 (p. 605)*
stratified sample *Chapter 11 (p. 610)*	**survey** *Chapter 11 (p. 612)*
systematic sample *Chapter 11 (p. 610)*	**treatment group** *Chapter 11 (p. 620)*

Vocabulary Flash Cards

The use of a model to reproduce the conditions of a situation or process so that the simulated outcomes closely match the real-world outcomes You use a computer program to simulate flipping a coin 10,000 times.	A sample in which members of a population can volunteer to be in the sample You want to determine whether students in your school like the new design of the school's website. You mail questionnaires and use only the questionnaires that are returned.
A numerical description of a sample characteristic The mean score on the last exam was 88.	The normal distribution with mean 0 and standard deviation 1 You can use the formula below to transform *x*-values from a normal distribution with mean μ and standard deviation σ into *z*-values having a standard normal distribution. $z = \frac{x - \mu}{\sigma}$
An investigation of one or more characteristics of a population An online poll asks people to select their favorite type of breakfast from a list of options.	A sample in which a population is divided into smaller groups that share a similar characteristic and a sample is then randomly selected from each group You want to determine whether students in your school like the new design of the school's website. You randomly select two students from each classroom.
The group that is subjected to the treatment in an experiment In an experiment studying the effectiveness of a health supplement in aiding weight loss, one group uses a health supplement and another group does not. Both groups exercise regularly and are weighed over a three-month period. The group who does not use the supplement is the control group. The group using the health supplement is the treatment group.	A sample in which a rule is used to select members of a population You want to determine whether students in your school like the new design of the school's website. You list all of the students alphabetically and choose every sixth student.

Vocabulary Flash Cards

unbiased sample *Chapter 11 (p. 611)*	***z*-score** *Chapter 11 (p. 597)*

Vocabulary Flash Cards

The *z*-score for a particular *x*-value which is the number of standard deviations the *x*-value lies above or below the mean $z = \frac{x - \mu}{\sigma}$	A sample that is representative of the population that you want information about You randomly select a sample of students from each grade and ask them whether they would rather have a new gymnasium or a new cafeteria.