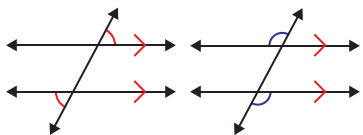


# Glossary

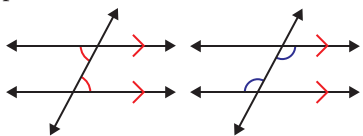
## A

**acute angle:** An angle that is greater than  $0^\circ$  and less than  $90^\circ$ .

**alternate exterior angles:** Two exterior angles formed between two lines and a transversal, on opposite sides of the transversal.

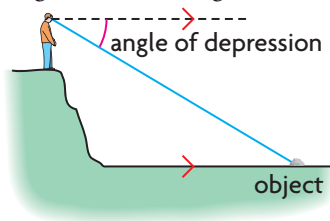


**alternate interior angles:** Two non-adjacent interior angles on opposite sides of a transversal.

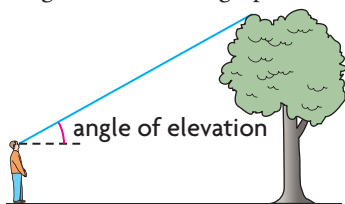


**ambiguous case of the sine law:** A situation in which two triangles can be drawn, given the available information; the ambiguous case may occur when the given measurements are the lengths of two sides and the measure of an angle that is not contained by the two sides (SSA).

**angle of depression:** The angle between a horizontal line and the line of sight when looking down at an object.



**angle of elevation:** The angle between a horizontal line and the line of sight when looking up at an object.



**axis of symmetry:** A line that separates a 2-D figure into two identical parts. For example, a parabola has a vertical axis of symmetry passing through its vertex.

## B

**bell curve:** See **normal curve**.

## C

**circular reasoning:** An argument that is incorrect because it makes use of the conclusion to be proved.

**confidence interval:** The interval in which the true value you're trying to determine is estimated to lie, with a stated degree of probability; the confidence interval may be expressed using  $\pm$  notation, such as  $54.0\% \pm 3.5\%$ , or ranging from 50.5% to 57.5%.

**confidence level:** The likelihood that the result for the "true" population lies within the range of the confidence interval; surveys and other studies usually use a confidence level of 95%, although 90% or 99% is sometimes used.

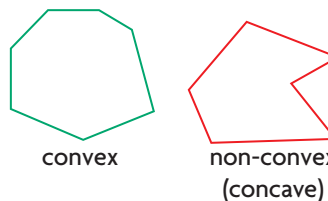
**conjecture:** A testable expression that is based on available evidence but is not yet proved.

**constraint:** A limiting condition of the optimization problem being modelled, represented by a linear inequality.

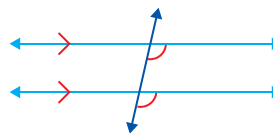
**continuous:** A connected set of numbers. In a continuous set, there is always another number between any two given numbers. Continuous variables represent things that can be measured, such as time.

**converse:** A statement that is formed by switching the premise and the conclusion of another statement.

**convex polygon:** A polygon in which each interior angle measures less than  $180^\circ$ .



**corresponding angles:** One interior angle and one exterior angle that are non-adjacent and on the same side of a transversal.

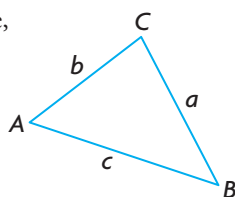


**cosine law:** In any acute triangle,

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$



**counterexample:** An example that invalidates a conjecture.

## D

**deductive reasoning:** Drawing a specific conclusion through logical reasoning by starting with general assumptions that are known to be valid.

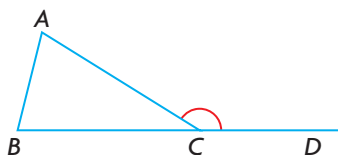
**deviation:** The difference between a data value and the mean for the same set of data.

**discrete:** Consisting of separate or distinct parts. Discrete variables represent things that can be counted, such as people in a room.

**dispersion:** A measure that varies by the spread among the data in a set; dispersion has a value of zero if all the data in a set is identical, and it increases in value as the data becomes more spread out.

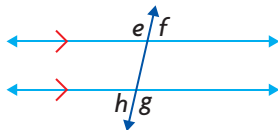
## E

**exterior angle of a polygon:** The angle that is formed by a side of a polygon and the extension of an adjacent side.



$ACD$  is an exterior angle of  $\triangle ABC$ .

**exterior angles:** Any angles formed by a transversal and two parallel lines that lie outside the parallel lines.



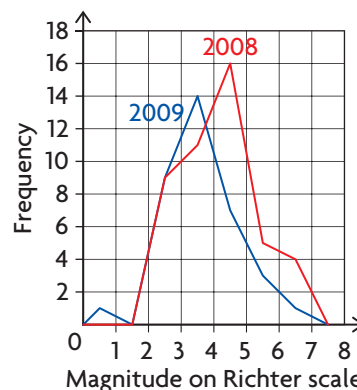
$e$ ,  $f$ ,  $g$ , and  $h$  are exterior angles.

## F

**feasible region:** The solution region for a system of linear inequalities that is modelling an optimization problem.

**frequency distribution:** A set of intervals (table or graph), usually of equal width, into which raw data is organized; each interval is associated with a frequency that indicates the number of measurements in this interval.

**frequency polygon:** The graph of a frequency distribution, produced by joining the midpoints of the intervals using straight lines.



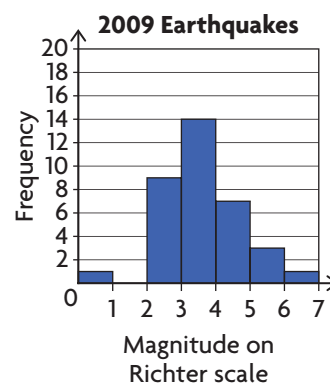
## G

**generalization:** A principle, statement, or idea that has general application.

## H

**half plane:** The region on one side of the graph of a linear relation on a Cartesian plane.

**histogram:** The graph of a frequency distribution, in which equal intervals of values are marked on a horizontal axis and the frequencies associated with these intervals are indicated by the areas of the rectangles drawn for these intervals.

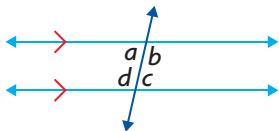


## I

**inadmissible solution:** A root of a quadratic equation that does not lead to a solution that satisfies the original problem.

**inductive reasoning:** Drawing a general conclusion by observing patterns and identifying properties in specific examples.

**interior angles:** Any angles formed by a transversal and two parallel lines that lie inside the parallel lines.

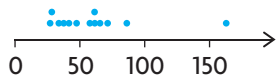


$a$ ,  $b$ ,  $c$ , and  $d$  are interior angles.

**invalid proof:** A proof that contains an error in reasoning or that contains invalid assumptions.

## L

**line plot:** A graph that records each data value in a data set as a point above a number line.



**linear inequality:** A linear inequality is a relationship between two linear expressions in which one expression is less than ( $<$ ), greater than ( $>$ ), less than or equal to ( $\leq$ ), or greater than or equal to ( $\geq$ ) the other expression.

**linear programming:** A mathematical technique used to determine which solutions in the feasible region result in the optimal solutions of the objective function.

## M

**margin of error:** The possible difference between the estimate of the value you're trying to determine, as determined from a random sample, and the true value for the population; the margin of error is generally expressed as a plus or minus percent, such as  $\pm 5\%$ .

**maximum value:** The greatest value of the dependent variable in a relation.

**mean:** A measure of central tendency determined by dividing the sum of all the values in a data set by the number of values in the set.

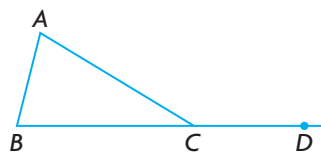
**median:** A measure of central tendency represented by the middle value of an ordered data set. For example, the median of 3, 3, 4, 5, 6 is 4. If the data set has more than one middle value, the median is the mean of the two. For example, the median of 3, 3, 5, 6 is also 4.

**minimum value:** The least value of the dependent variable in a relation.

**mode:** A measure of central tendency represented by the value that occurs most often in a data set. For example, the mode of 2, 2, 4, 5, 6 is 2.

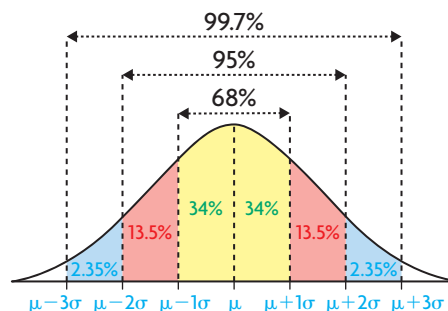
## N

**non-adjacent interior angles:** The two angles of a triangle that do not have the same vertex as an exterior angle.



$A$  and  $B$  are non-adjacent interior angles to exterior  $ACD$ .

**normal curve:** A symmetrical curve that represents the normal distribution; also called a **bell curve**.

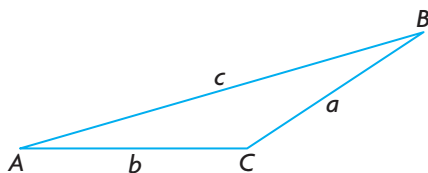


**normal distribution:** Data that, when graphed as a histogram or a frequency polygon, results in a unimodal symmetric distribution about the mean.

## O

**objective function:** In an optimization problem, the equation that represents the relationship between the two variables in the system of linear inequalities and the quantity to be optimized.

**oblique triangle:** A triangle that does not contain a  $90^\circ$  angle.



**obtuse angle:** An angle greater than  $90^\circ$  and less than  $180^\circ$ .

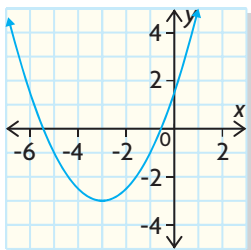
**optimal solution:** A point in the solution set that represents the maximum or minimum value of the objective function.

**optimization problem:** A problem where a quantity must be maximized or minimized following a set of guidelines or conditions.

**outlier:** A value in a data set that is very different from other values in the set.

## P

**parabola:** The shape of the graph of any quadratic relation.



**premise:** A statement assumed to be true.

**proof:** A mathematical argument showing that a statement is valid in all cases, or that no counterexample exists.

## Q

**quadratic equation:** A polynomial equation of the second degree; the standard form of a quadratic equation is

$$ax^2 + bx + c = 0$$

For example:

$$2x^2 + 4x - 3 = 0$$

**quadratic formula:** A formula for determining the roots of a quadratic equation in the form  $ax^2 + bx + c = 0$ , where  $a \neq 0$ ; the quadratic formula is written using the coefficients of the variables and the constant in the quadratic equation that is being solved:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

This formula is derived from  $ax^2 + bx + c = 0$  by isolating  $x$ .

**quadratic relation:** A relation that can be written in the standard form

$$y = ax^2 + bx + c, \text{ where } a \neq 0$$

For example:

$$y = 4x^2 + 2x + 1$$

## R

**range:** The difference between the maximum value and the minimum value in a data set.

**rate:** A comparison of two amounts that are measured in different units; for example, keying 240 words/8 min.

**roots:** The values of the variable that make an equation in standard form equal to zero. These are also called solutions to the equation. These values are also the zeros of the corresponding function and the  $x$ -intercepts of its graph.

## S

**scale:** The ratio of a measurement on a diagram to the corresponding distance measured on the shape or object represented by the diagram.

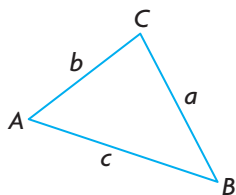
**scale diagram:** A drawing in which measurements are proportionally reduced or enlarged from actual measurements; a scale diagram is similar to the original.

**scale factor:** A number created from the ratio of any two corresponding measurements of two similar shapes or objects, written as a fraction, a decimal, or a percent.

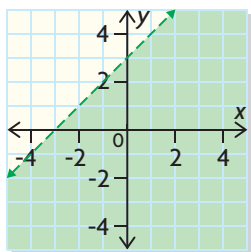
**similar objects:** Two or more 3-D objects that have proportional dimensions.

**sine law:** In any acute triangle,

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



**solution region:** The part of the graph of a linear inequality that represents the solution set; the solution region includes points on its boundary if the inequality has the possibility of equality.

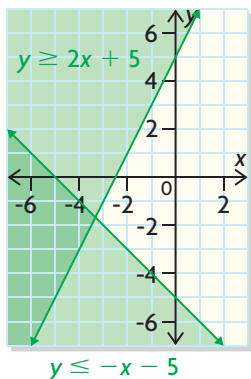


**solution set:** The set of all possible solutions.

**standard deviation:** A measure of the dispersion or scatter of data values in relation to the mean; a low standard deviation indicates that most data values are close to the mean, and a high standard deviation indicates that most data values are scattered farther from the mean. The symbol used to represent standard deviation is the Greek letter  $\sigma$  (sigma).

**standard normal distribution:** A normal distribution that has a mean of zero and a standard deviation of one.

**system of linear inequalities:** A set of two or more linear inequalities that are graphed on the same coordinate plane; the intersection of their solution regions represents the solution set for the system.

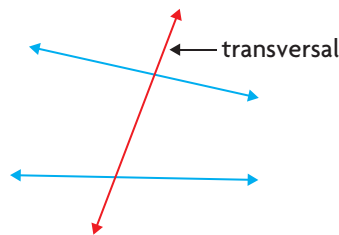


## T

**transitive property:** If two quantities are equal to the same quantity, then they are equal to each other.

If  $a = b$  and  $b = c$ , then  $a = c$ .

**transversal:** A line that intersects two or more other lines at distinct points.



**two-column proof:** A presentation of a logical argument involving deductive reasoning in which the statements of the argument are written in one column and the justifications for the statements are written in the other column.

## U

**unit rate:** A rate in which the numerical value of the second term is 1; for example, keying 240 words/8 min expressed as a unit rate is 30 words/min.

## V

**vertex:** The point at which the quadratic function reaches its maximum or minimum value.

## Z

**z-score:** A standardized value that indicates the number of standard deviations of a data value above or below the mean.

**z-score table:** A table that displays the fraction of data with a z-score that is less than any given data value in a standard normal distribution.

**zero:** In a function, a value of the variable that makes the value of the function equal to zero.