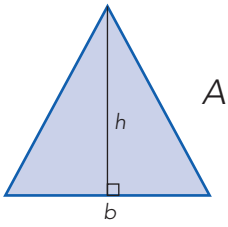
A

See also **angle name, area, formula, line, point, vertex**

1 In formulas, the letter *A* stands for area.

Example

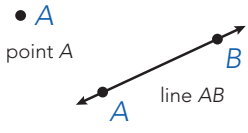
Area of a triangle

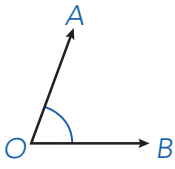


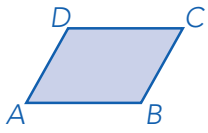
$$A = \frac{b \times h}{2}$$

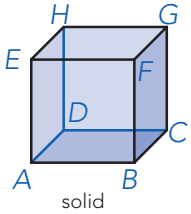
2 *A* and other letters of the alphabet are used to name points, lines, angles and vertices (corners) of polygons and solids (3D objects).

Examples





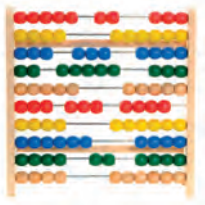




abacus

A board with spikes or a frame with wires on which discs, beads or counters are placed. Used for counting and calculating.

Examples



abbreviation

See also **symbol**

A shortened form of writing words and phrases.
When writing shortened forms of words, we usually put full stops after the letters.

Example

Victoria: Vic.

In mathematics, symbols are often used, for example, to show units of measurement. Although they represent a word, we do not write full stops after symbols.

Examples

m cm mm kg mL m^2 cm^3

abscissa

See also **Cartesian plane, coordinates, ordinate**

The horizontal coordinate of a point. The *x*-coordinate of a point (*x*,*y*) in a Cartesian coordinate system.

Example

For the point (2,3), 2 is the abscissa.

accurate

See also **approximately pi, surd**

Exact, correct, right, without error.

Example

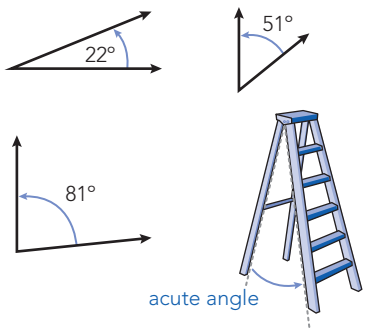
The accurate answer to $1 \div 3$ is $\frac{1}{3}$ or $0.\dot{3}$. If it is written as 0.3, 0.33, 0.333, the answer is only an approximation. Calculations involving π (pi) or surds such as $\sqrt{7}$ must be left in this form to give accurate answers. Exact values must be used in calculations until the final step to ensure an answer is as accurate as possible. Anything that is measured is only as accurate as the equipment used to make the measurement.

acute angle

See also **angle, obtuse angle, reflex angle, revolution, right angle**

A sharply pointed angle with size between 0° and 90°.

Examples

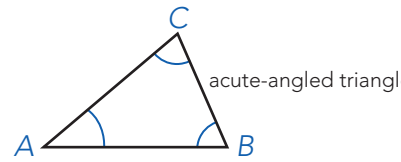


acute-angled triangle

See also **acute, equilateral triangle, obtuse triangle, right-angled triangle, scalene triangle**

A triangle that has three acute angles.

Example



AD (Anno Domini)

See also **BC, CE**

An abbreviation of the Latin phrase meaning 'in the year of our Lord'. The number of years after the birth of Christ.

Example

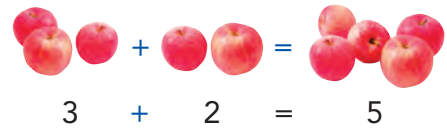
The eruption of Mount Vesuvius in AD 79 destroyed Pompeii.

add

See also **addition, quantity, total**

Join two or more numbers or quantities together to get a combined total.

Example



The apples were added together.

addend

See also **sum**

Any number that is to be added.

Example

$$\underset{\text{addend}}{2} + \underset{\text{addend}}{6} = \underset{\text{sum}}{8}$$

In 2 + 6 = 8, 2 and 6 are addends, 8 is the sum.

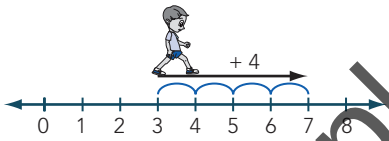
addition (Symbol: +)

See also **algebraic expression, fraction, integers, number line**

1 Joining the values of two or more numbers together.

$$3 + 4 = 7$$

On the number line.



$$3 + 4 = 7$$

2 Addition of fractions.
Fractions must be converted so they have the same denominator before being added.

$$\frac{1}{4} + \frac{3}{5} = \frac{5}{20} + \frac{12}{20}$$

$$= \frac{17}{20}$$

3 Addition of integers.
Adding a negative integer gives the same result as subtracting a positive integer.

$$+5 + -7 = 5 - 7$$

$$= -2$$

4 Addition of algebraic terms.
Only terms with exactly the same pronumeral part can be added.

In a figure, two sides that have a common side.

$$2a + 3b + 5a = 7a + 3b$$

addition property of zero

See also **sum, zero**

When zero is added to any number, the sum is the same as the number.

Examples

$$4 + 0 = 4$$
$$0 + 12 = 12$$

additive inverse

See also **inverse, zero**

When we add a number and its inverse, the answer is zero.

Example

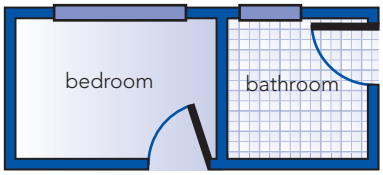
$$\underset{\text{number}}{8} + \underset{\text{inverse}}{-8} = 0$$

adjacent

See also **angle, arm of an angle, hypotenuse, vertex**

Positioned next to each other, having a common point or side.

Example



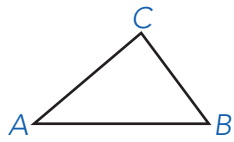
The bedroom is adjacent to the bathroom.

adjacent continued ▶

1 Adjacent sides.

In a figure, two sides that have a common vertex.

Example

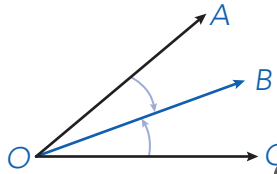


In this triangle, side *AB* is adjacent to side *AC* because they have a common vertex *A*. Side *BC* is also adjacent to side *AC*, with the common vertex at *C*.

2 Adjacent angles.

Two angles positioned in the same plane that have a common side and a common vertex.

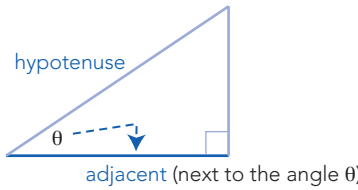
Example



$\angle AOB$ is adjacent to $\angle BOC$ because they share the angle arm $\overrightarrow{OB}$.

3 In a right-angled triangle, the adjacent side is the side that is not the hypotenuse and that is next to the reference angle θ.

Example



algebra

See also **algebraic expression, coefficient, pronumeral, symbol, variable**

A branch of mathematics that studies number systems, number properties, patterns and rules.

Letters and symbols called pronumerals are used as a 'shorthand' way of writing mathematical ideas, such as a formula or equation.

Examples

$2c$, $3x + 5z - 2$, $2a + 3a = 5a$

algebraic expression

See also **coefficient, numeral, pronumeral, symbol, value, variable, term**

Terms that are added or subtracted. They can all be algebraic or a combination of algebraic and numerical terms.

Examples

$5 - x$
$a + b + c$
$x^2 - 2xy + y$

algebraic fraction

See also **denominator, expression, fraction, numerator**

A fraction that has an algebraic expression as either the numerator, the denominator or both.

Examples

$\frac{n}{3}$, $\frac{1}{2n + 5}$, $\frac{x}{y + 4}$, $\frac{a + b}{3a}$, $\frac{2x + 1}{y + 3}$

Algebraic fractions follow the same rules for simplification as numeric fractions.

algebraic term

See also **algebraic expression, variable**

A number, a letter (pronumeral) or the product of a number and/or letters (pronumerals).

Examples

i a variable or number: a, x, 7, -3

ii the product of two or more variables: ab, xyz

iii a variable raised to a power: x^2, b^3

iv the product of one or more variables and a number: $4x$, $-6d$, $2ab$, $11xy^2$

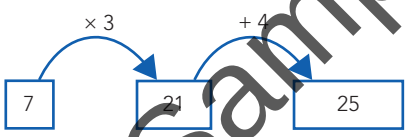
algorithm

See also **backtracking, inverse operations**

A rule for solving a problem in a certain number of steps. Every step is clearly described. A flowchart or arrow diagram can be used to show the steps.

Example

Evaluate 7 × 3 + 4.



Step **1:** Multiply 7 by 3 to get 21.

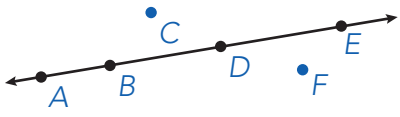
Step **2:** Add 4 to get 25.

align

See also **line**

To place in a straight line.

Example

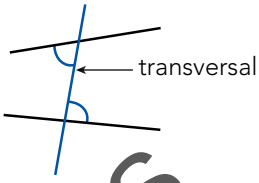


Points A, B, D and E are aligned; points C and F are not.

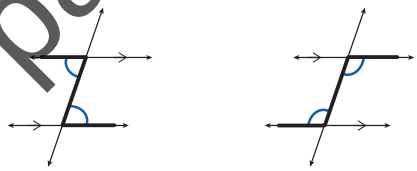
alternate angles

See also **angles, parallel lines, transversal**

When two or more lines are crossed by a transversal (another line), pairs of alternate angles are formed. The angles in each pair lie on opposite sides of the transversal and between the other two lines.



If the two lines that are crossed by the transversal are parallel, then pairs of alternate angles are equal. They can be easily remembered as 'Z' angles because of the shape they make.



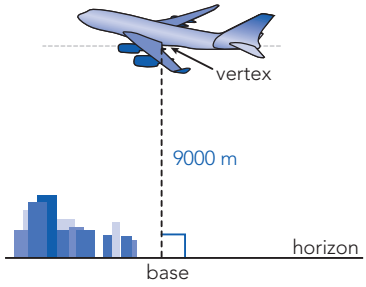
altitude

See also **height, perpendicular, surface**

Another name for height. How high something is above the surface of the Earth, sea level or horizon. In a figure, the altitude is the perpendicular height from base to highest vertex.

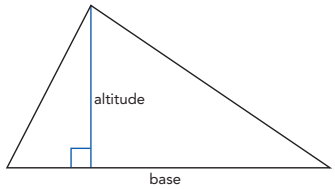
Example

i The altitude of this aeroplane is 9000 metres.



altitude continued ▶

ii The perpendicular height in this figure is the altitude.



a.m. (ante meridiem)

See also **p.m.**

The time from immediately after midnight until immediately before midday. The term a.m. is used only with 12-hour time.

Example

The time is five past five in the morning.

It is 5.05 a.m.

amount

See also **quantity**

The total of something.

Example

The amount of money in my pocket is seven dollars and fifty cents.

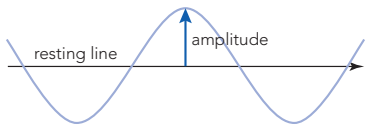
amplitude

See also **cosine, sine, trigonometry**

The greatest displacement or height reached by a wave curve, perpendicular to the resting line.

The magnitude of an oscillating curve such as a sine or cosine curve.

Example



analogue clock

See also **a.m., digital clock, p.m.**

A clock or a watch that has numerals 1 to 12 equally spaced 30° apart, usually around the edge of a circular face, and two hands of different lengths attached at the centre, that rotate around the face. The longer hand indicates the minutes past the hour and takes 1 hour to complete one full 360° turn or revolution, and the shorter hand indicates the hour and takes 12 hours to complete one revolution.

Example

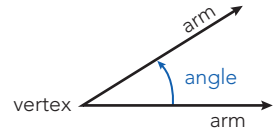
This watch shows twenty-five minutes past nine in the morning.

It is 9.25 a.m.

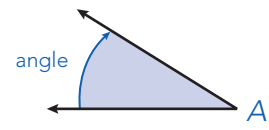
angle

See also **acute angle, arm of an angle, degree, obtuse angle, parallel lines, ray, reflex angle, revolution, right angle, straight angle**

The space between two rays that start at a given point. This point is called the vertex, and the two lines are the 'arms' of the angle.

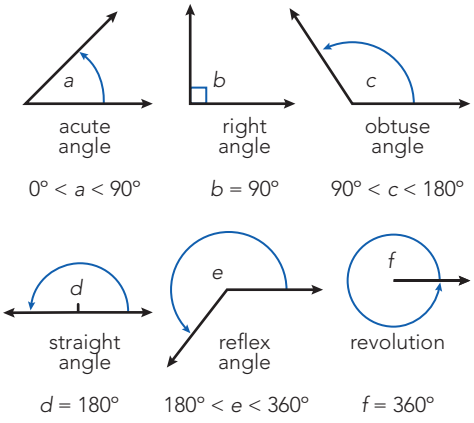


The size of the angle is the amount of turn from one arm to the other.



Angles are measured in degrees (°), minutes (') and seconds ("). There are 360 degrees in one full turn, or revolution. There are 60 minutes in one degree. There are 60 seconds in one minute.

Types of angles:

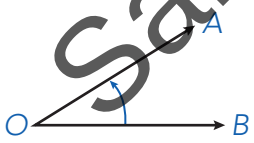


angle name

See also **vertex**

Angles are given names by marking them with letters.

Example

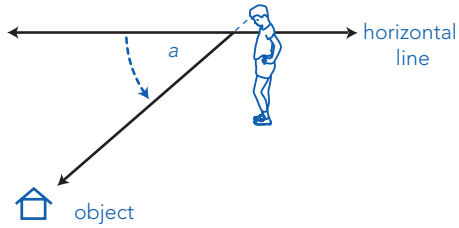


The name of this angle is $\angle AOB$. The letter O in the middle of $\angle AOB$ indicates the vertex of the angle.

angle of depression

See also **angle of elevation**

An angle formed between the horizontal line and the line of sight to an object below.

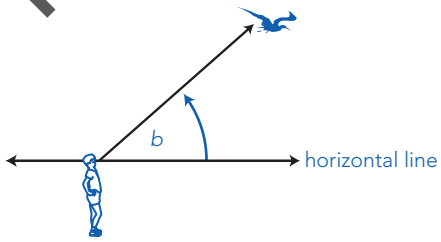


The angle of depression is a.

angle of elevation

See also **angle of depression**

An angle formed between the horizontal line and the line of sight to an object above.



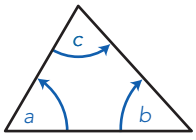
The angle of elevation is b.

angle sum

See also **polygon**

The total number of degrees in any polygon.

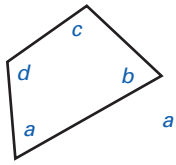
1 The angle sum of a triangle is 180°.



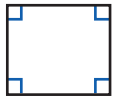
$a + b + c = 180°$

angle sum continued ▶

2 The angle sum of a quadrilateral is 360°.



$a + b + c + d = 360°$



$4 \times 90° = 360°$

3 The angle sum of any polygon may be found using the following rule: number of vertices × 180° – 360° or (number of vertices – 2) × 180°

Examples

i the angle sum of a triangle

$(3 \times 180°) - 360° = 180°$ or
$(3 - 2) \times 180° = 180°$

ii the angle sum of a pentagon

$(5 - 2) \times 180° = 540°$

iii the angle sum of a hexagon

$(6 \times 180°) - 360° = 720°$

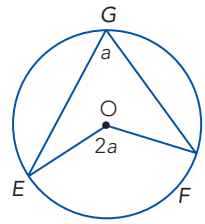
angles in a circle

See also **arc, circumference, diameter, subtend**

Angles formed by connecting three points on the circumference of a circle with straight lines, or connecting two points on the circumference with straight lines to the centre of the circle. Here are three circle theorems.

1 The angle at the centre of a circle is twice the angle at the circumference, subtended by the same arc.

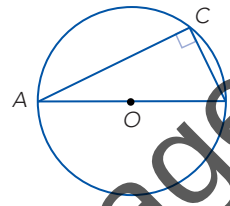
Example



$\angle EOF = 2\angle EGF$

2 The angle in a semicircle is a right angle.

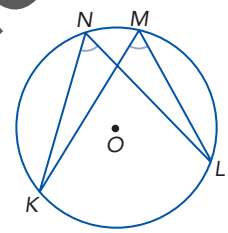
Example



$\angle ACB$ is a right angle. The interval AB is the diameter of the circle.

3 Angles at the circumference of a circle that are subtended by the same arc are equal.

Example



$\angle KML = \angle KNL$

annual

See also **per annum**

1 Happening only once a year.

Example

Annual flower show.

2 Recurring yearly.

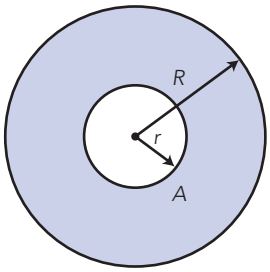
Example

Annual rate of interest is 6.5%.

annulus

See also **area, circle, concentric circles**

The shape formed between two concentric circles (circles with the same centre).



The area of an annulus can be found by subtracting the area of the inner circle from the area of the outer circle.

$$A = \pi R^2 - \pi r^2$$
$$= \pi(R^2 - r^2)$$

anticlockwise

See also **clockwise**

The direction opposite to that in which the hands of a clock travel.

Example

Example

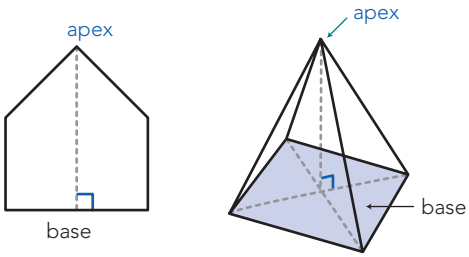
Screws and bottle tops are loosened in an anticlockwise direction.

apex

See also **base, pyramid, vertex**

The highest point where two or more lines meet to form a corner of a figure or solid. The apex is the furthest vertical distance from the base.

Examples



appreciation

See also **depreciation, interest, principal**

An increase in the value of an object over time.

Example

A painting bought for $600 was sold at auction a year later for $950. The appreciation over 12 months was $350.

approximately (Symbols: ≈ ÷ ≃)

See also **accurate, rounding**

Nearly, not exactly, but almost. The symbols ≈ or ÷ or ≃ may be used for 'is approximately equal to'.

Example

The expressions

$0.97 \approx 1 \quad 0.97 \div 1 \quad 0.97 \simeq 1$

all mean '0.97 is approximately equal to 1'.