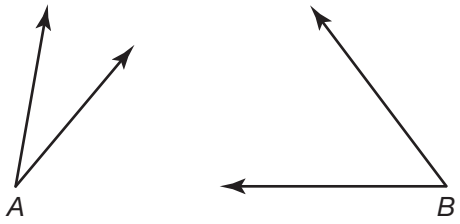
Glossary

acute angle

An acute angle is an angle whose measure is greater than 0 degrees and less than 90 degrees.

Examples

Angles *A* and *B* are acute angles.

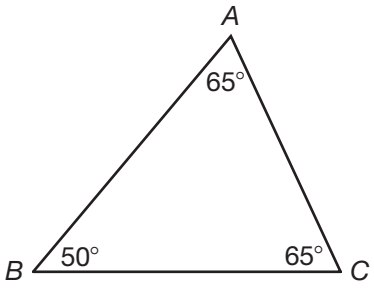


acute triangle

An acute triangle is a triangle with three acute interior angles.

Example

Angles *A*, *B,* and *C* are acute angles, so triangle *ABC* is an acute triangle.



addition property

The addition property states that if $a = b$, then $a + c = b + c$.

Example

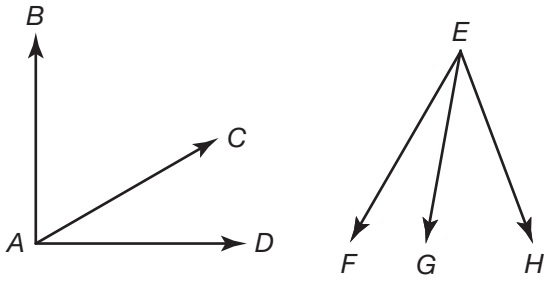
If $x = 2$ then $x + 5 = 7$ is an example of the addition property.

adjacent angles

Adjacent angles are angles that share a common side and a common vertex and lie on opposite sides of their common side.

Examples

Angle *BAC* and angle *CAD* are adjacent angles.
Angle *FEG* and angle *GEH* are adjacent angles.

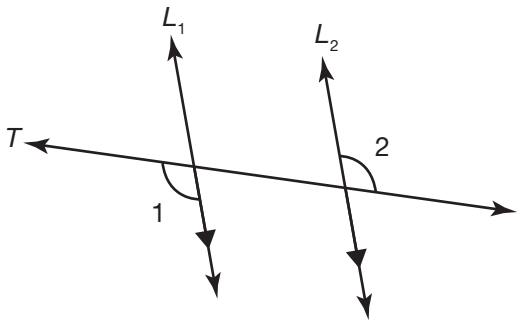


alternate exterior angles

When two parallel lines are intersected by a transversal, alternate exterior angles are two angles that lie outside of the two lines and on opposite sides of a transversal.

Example

Lines L_1 and L_2 are parallel lines. Angle 1 and angle 2 are alternate exterior angles that are congruent. This means that if $m\angle 1 = 103.$,.then $m\angle 2 = 103$...



Glossary

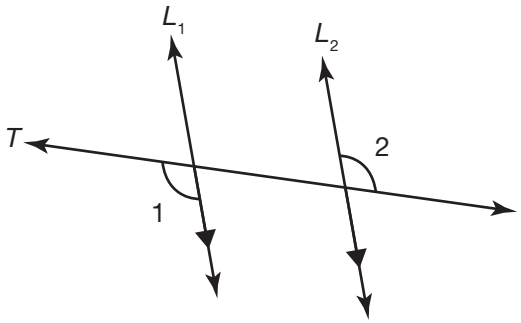
alternate exterior angles theorem

Theorem

If two parallel lines are intersected by a transversal, then the pairs of alternate exterior angles are congruent.

Example

Lines L_1 and L_2 are parallel lines intersected by transversal T. Angle 1 and angle 2 are alternate exterior angles that are congruent. This means that if $m\angle 1 = 103.$,.then $m\angle 2 = 103...$

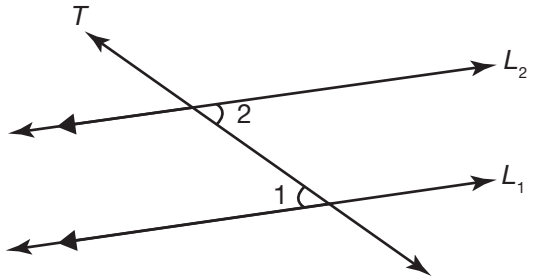


alternate interior angles

When two parallel lines are cut by a transversal, alternate interior angles are two angles that lie between the two lines and on opposite sides of a transversal.

Example

Lines L_1 and L_2 are parallel lines intersected by transversal T. Angle 1 and angle 2 are alternate interior angles that are congruent. This means that if $m\angle 1 = 50.$,.then $m\angle 2 = 50...$



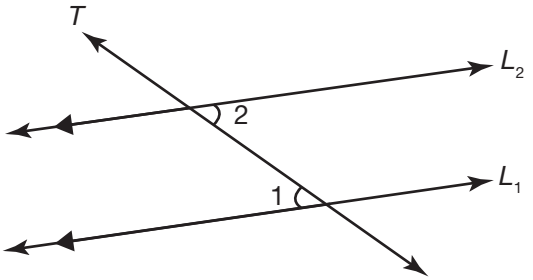
alternate interior angles theorem

Theorem

If two parallel lines are intersected by a transversal, then the pairs of alternate interior angles are congruent.

Example

Lines L_1 and L_2 are parallel lines intersected by transversal T. Angle 1 and angle 2 are alternate interior angles that are congruent. This means that if $m\angle 1 = 50.$,.then $m\angle 2 = 50...$

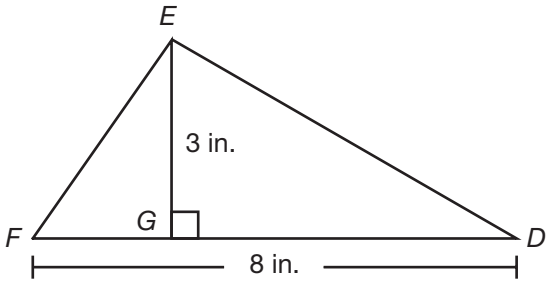


altitude

An altitude is a perpendicular segment that indicates the height of a figure. It is drawn from a vertex to the opposite side or to the line that contains the opposite side.

Example

Segment EG is the altitude of triangle FED.

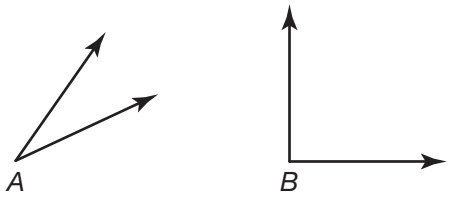


angle

An angle is a figure that is formed by two rays that extend from a common point called the vertex.

Examples

Angles *A* and *B*.

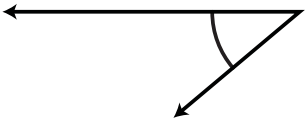


angle of depression

An angle of depression is the angle that is formed by a horizontal line and a line from an observer's eye to a point below the horizontal line.

Example

The angle below is an angle of depression.

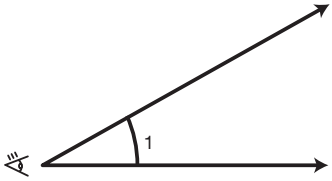


angle of elevation

An angle of elevation is the angle that is formed by a horizontal line and a line from an observer's eye to a point above the horizontal line.

Example

Angle 1 is an angle of elevation.

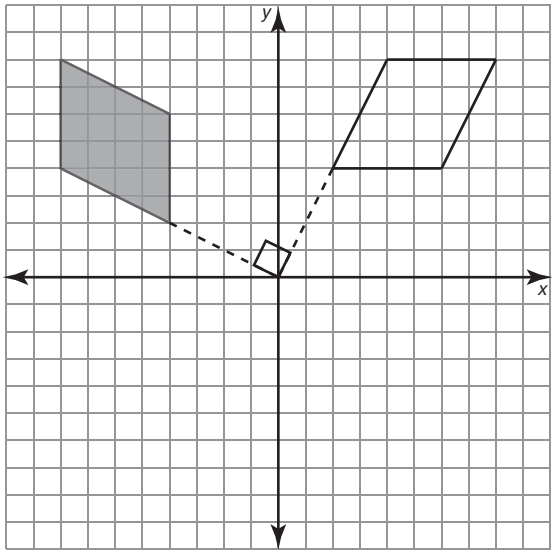


angle of rotation

The angle of rotation is the number of degrees through which a rotation occurs.

Example

In the rotation shown, the angle of rotation is 90 degrees.

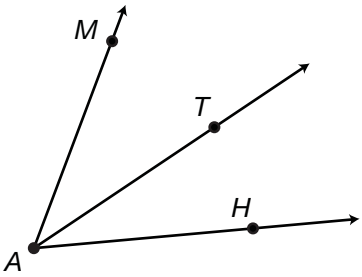


angle bisector

An angle bisector is a line, segment, or ray that divides an angle into two angles of equal measure.

Example

Ray *AT* is the angle bisector of angle *MAH*.



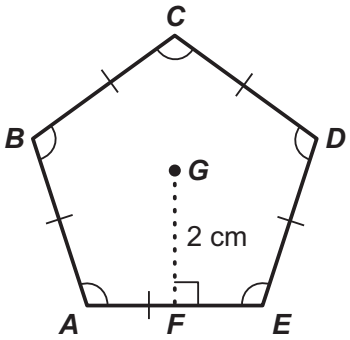
Glossary

apothem

The apothem is the perpendicular distance from the center of a regular polygon to a side.

Example

The apothem of regular pentagon *ABCDE* is the length of segment *FG*. The length of segment *FG* is 2 centimeters.



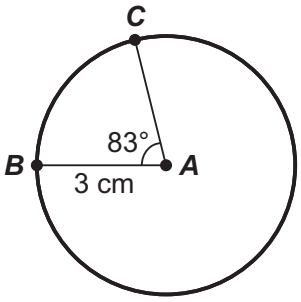
arc length

An arc length is a portion of the circumference of a circle. The length of an arc of a circle can be found by multiplying the circumference of the circle by the ratio of the measure of the arc to 360°:

$$\text{arc length} = 2\pi r \cdot \frac{x...}{360...}$$

Example

In circle *A*, the radius *AB* is 3 centimeters and the measure of arc *BC* is 83 degrees. So, the length of arc *BC* is $(2\pi r)\left(\frac{m\overset{\frown}{BC}}{360..}\right) = 2\pi(3)\left(\frac{83...}{360..}\right) \approx 4.35$ centimeters.



area

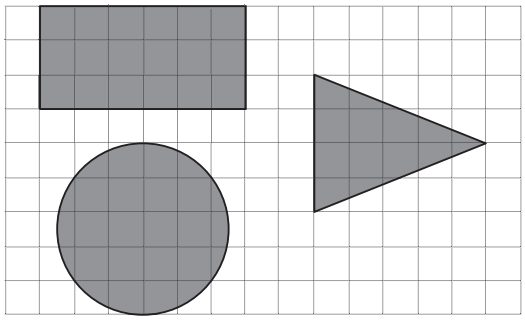
The area of a figure is the number of square units needed to cover the figure.

Examples

The area of the rectangle is 18 square units.

The area of the triangle is 10 square units.

The area of circle is about 19.63 square units.

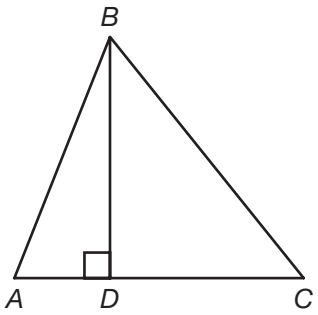


base of a geometric figure

The base of a geometric figure is the side or face to which an altitude is drawn, or is considered to be drawn.

Example

Altitude *BD* is drawn to side *AC*, so side *AC* is the base of triangle *ABC*.



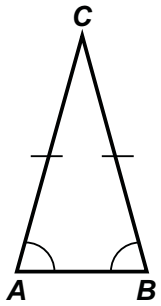
Glossary

base angle

The base angles of an isosceles triangle are the angles that are opposite the equal sides.

Example

Angles *A* and *B* are base angles of isosceles triangle *ABC*.

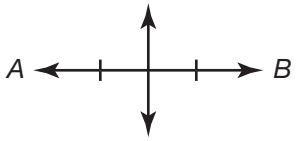


bisected line segments

To bisect a line segment is to divide a line segment into two smaller segments of equal length.

Example

Line segment *AB* has been bisected.

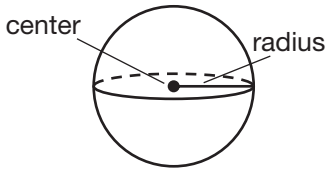


center of a sphere

The center of a sphere is a fixed point in space that is at an equal distance from every point on the sphere.

Example

The center and radius of the sphere are labeled.

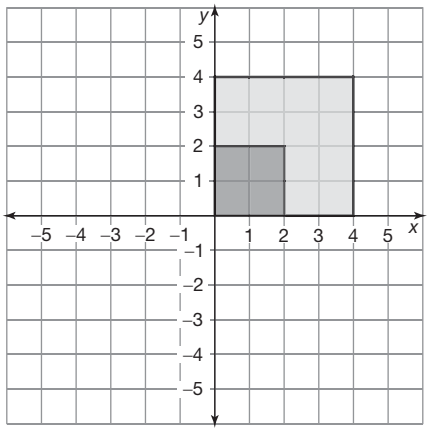


center of dilation

The center of dilation is the fixed point about which a figure is dilated.

Example

In the dilation shown, the center of dilation is the point (0, 0).

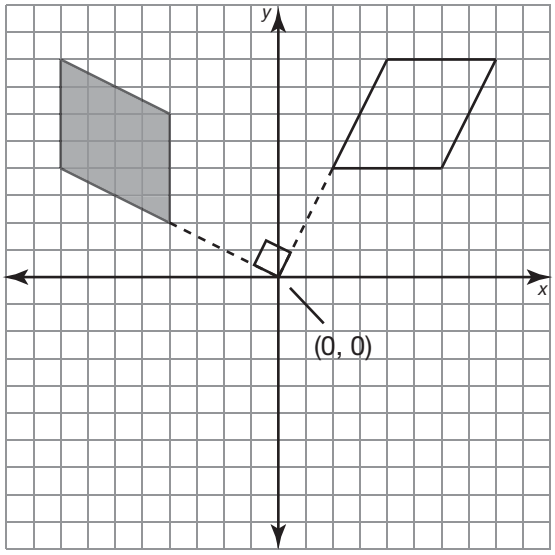


center of rotation

The center of rotation is the fixed point about which a figure is rotated.

Example

In the rotation shown, the center of rotation is the point (0, 0).



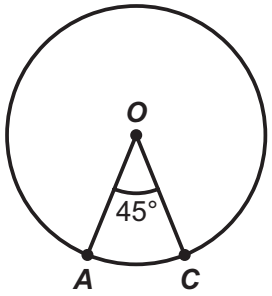
Glossary

central angle

A central angle of a circle is an angle whose sides are radii. The measure of a central angle is equal to the measure of its intercepted arc.

Example

In the circle *O*, angle *AOC* is a central angle and arc *AC* is its intercepted arc. If the measure of angle *AOC* is 45 degrees, then the measure of arc *AC* is 45 degrees.

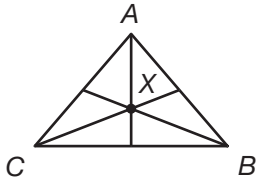


centroid

The centroid of a triangle is the point at which the medians of the triangle intersect.

Example

Point *X* is the centroid of triangle *ABC*.

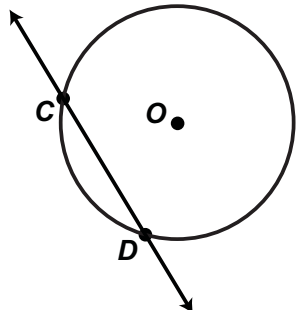


chord

A chord is a segment whose endpoints are points on a circle. A chord is formed by the intersection of the circle and a secant line.

Example

Segment *CD* is a chord of circle *O*.

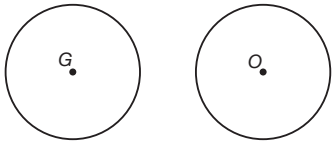


circle

A circle is the set of all points in a plane that are the same distance from a given point, called the center of the circle. The measure of a circle is 360°.

Examples

The measure of circle *G* is 360°. The measure of circle *O* is 360°.

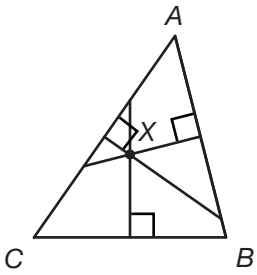


circumcenter

The circumcenter of a triangle is the point at which the perpendicular bisectors intersect.

Example

Point *X* is the circumcenter of triangle *ABC*.



circumference

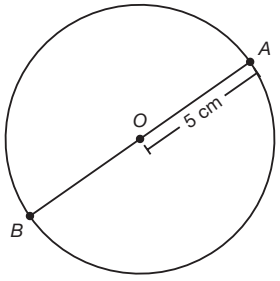
The circumference *C* of a circle is equal to π multiplied by the diameter *d*, or π multiplied by twice the radius *r*.

$C = \pi d = 2\pi r$

Example

In circle *O,* the radius *OA* is 5 centimeters.

The circumference of circle *O* is $2\pi r = 2\pi(5) = 10\pi \approx 31.4$ centimeters.

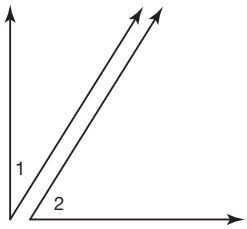


complementary

Two angles are complementary if the sum of their measures is 90°.

Example

Angle 1 and angle 2 are complementary angles.
$m\angle 1 + m\angle 2 = 90$...

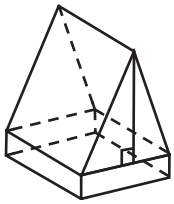


composite solid

A composite solid is formed from two or more solids.

Example

The figure below is formed by a triangular prism and a rectangular prism.

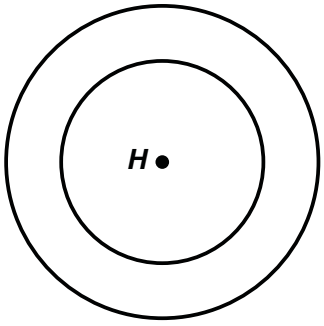


concentric

Concentric circles are circles in the same plane that have a common center.

Example

The circles below are concentric because they are in the same plane and have a common center *H*.



conclusion

Conditional statements are made up of two parts. The conclusion is the result that follows from the given information.

Example

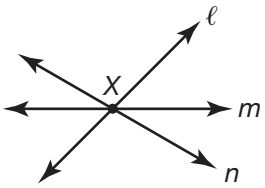
In the conditional statement "If two positive numbers are added, then the sum is positive," the conclusion is "the sum is positive."

concurrent lines

Concurrent lines are three or more lines that intersect at the same point.

Example

Lines ℓ, m, and n are concurrent lines.



conditional statements

Conditional statements are made up of two parts: the hypothesis and the conclusion.

Example

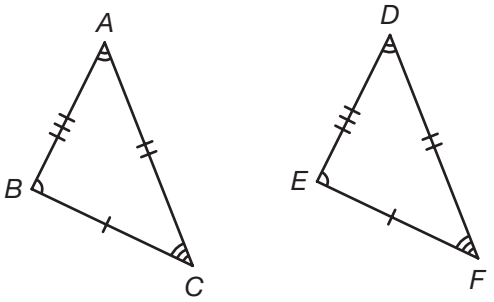
The statement "If two positive numbers are added, then the sum is positive" is a conditional statement.

congruent figures

Two figures are congruent if they have the same size and the same shape.

Example

Triangle *ABC* and triangle *DEF* are congruent triangles.



Glossary

consecutive angles

Consecutive angles of a polygon are two angles that share a common side.

Examples

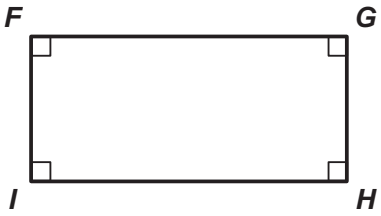
In rectangle *FGHI*:

Angles *I* and *F* are consecutive angles.

Angles *F* and *G* are consecutive angles.

Angles *G* and *H* are consecutive angles.

Angles *H* and *I* are consecutive angles.



consecutive sides

Consecutive sides of a polygon are two sides that share a common vertex.

Examples

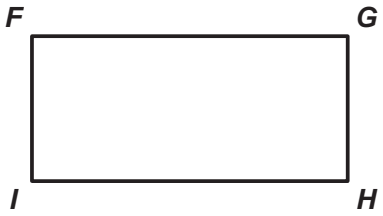
In the figure below:

Sides *IF* and *FG* are consecutive sides.

Sides *FG* and *GH* are consecutive sides.

Sides *GH* and *HI* are consecutive sides.

Sides *HI* and *IF* are consecutive sides.



converse

The converse of an if-then statement is the statement that results from interchanging the hypothesis (the "if" part) and the conclusion (the "then" part) of the original statement.

Example

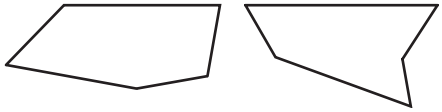
The converse of the statement "If $a = 0$ or $b = 0$, then $ab = 0$" is "If $ab = 0$, then $a = 0$ or $b = 0$."

convex polygon

A convex polygon is a polygon in which no segments can be drawn to connect any two vertices so that the segment is outside the polygon.

Examples

The polygon on the left is a convex polygon.
The polygon on the right is not a convex polygon.

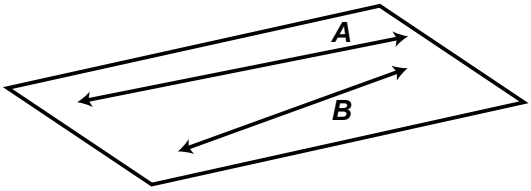


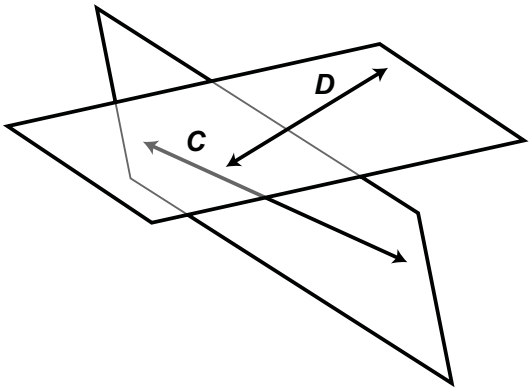
coplanar

Coplanar lines are lines that lie in the same plane.

Examples

Line *A* and line *B* are coplanar lines. Line *C* and line *D* are not coplanar lines.





corresponding angles

Corresponding angles of two similar or congruent figures are pairs of angles that are in the same relative position in both figures.

Examples

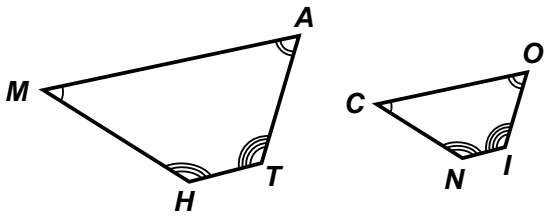
Corresponding angles of the two quadrilaterals are listed below.

Angle *M* and angle *C* are corresponding angles.

Angle *A* and angle *O* are corresponding angles.

Angle *T* and angle *I* are corresponding angles.

Angle *H* and angle *N* are corresponding angles.

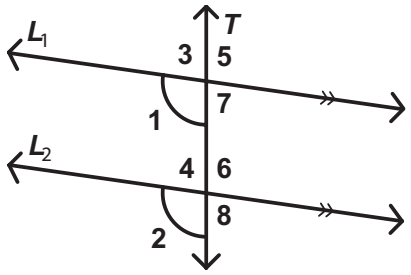


Corresponding Angles Postulate

If two parallel lines are intersected by a transversal, then the pairs of corresponding angles are congruent.

Example

Lines L_1 and L_2 are parallel lines intersected by transversal *T*. Angle 1 and angle 2 are corresponding angles that are congruent. This means that if $m\angle 1 = 112°$, then $m\angle 2 = 112°$. Note that there are three additional pairs of corresponding angles $\angle 3$ and $\angle 4$; $\angle 5$ and $\angle 6$; and $\angle 7$ and $\angle 8$.

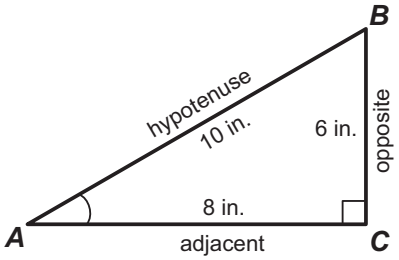


cosine

In a right triangle, the cosine of an angle is equal to the ratio of the length of the side adjacent to the angle to the length of the hypotenuse.

Example

In triangle *ABC*, the length of the side adjacent to angle *A* is 8 inches, and the length of the hypotenuse is 10 inches. So, the cosine of angle *A*, or cos *A*, is $\frac{\text{length of side adjacent to}\angle A}{\text{length of hypotenuse}} = \frac{8 \text{ in.}}{10 \text{ in.}} = \frac{4}{5}$.

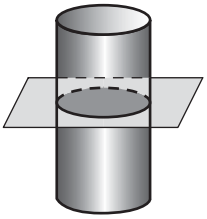


cross section

The cross section of a three-dimensional solid is a two-dimensional figure that is formed by the intersection of the solid and a perpendicular plane.

Example

The cross section of the cylinder is a circle.

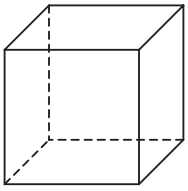


cube

A cube is a polyhedron with six square faces.

Example

The polyhedron below is a cube.



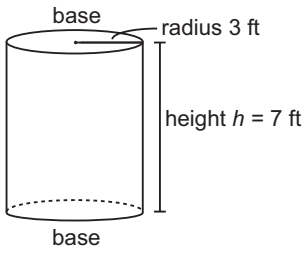
Glossary

cylinder

A cylinder is a solid with two parallel bases that are congruent circles. The height of the cylinder is the perpendicular distance between its bases. The radius of the cylinder is the radius of the base.

Example

The cylinder has a height of 7 feet and a radius of 3 feet.

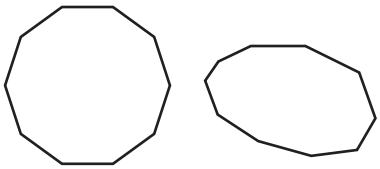


decagon

A decagon is a polygon with ten sides.

Examples

The polygons below are both decagons.

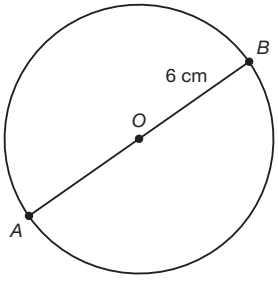


diameter

The diameter of a circle is the distance across the circle through the center. The diameter is equal to twice the radius of the circle.

Example

In the circle, *O* is the center of the circle, segment *AB* is a diameter, segment *AO* is a radius and segment *OB* is a radius. The diameter *AB* is equal to twice the radius *OA*. The radius *OB* is 6 centimeters, so the diameter *AB* is 12 centimeters.

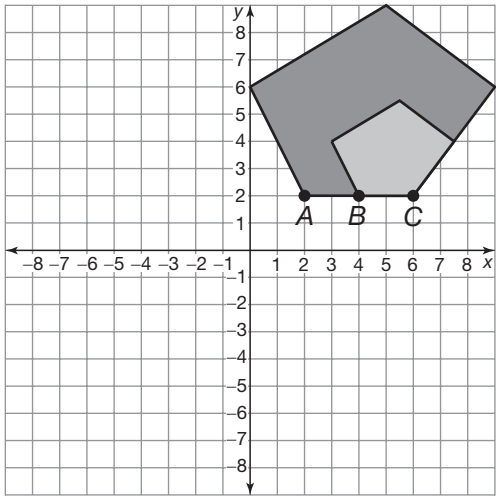


dilation

A dilation is a transformation of a figure in which the figure stretches or shrinks with respect to a fixed point. The scale factor of a dilation is the ratio of a side length of the dilated figure to the original figure. An enlargement or reduction of a photo is an example of a dilation.

Example

The original light hexagon is dilated to produce the dark hexagon by a scale factor of 2.

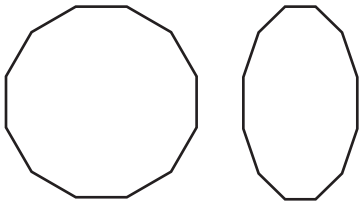


dodecagon

A dodecagon is a polygon with twelve sides.

Examples

The polygons below are both dodecagons.

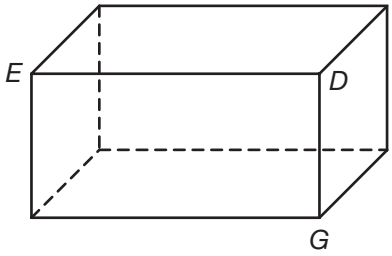


edge

An edge is a line segment common to two sides of a three-dimensional figure.

Example

In the right prism, segment *ED* and segment *DG* are edges.



endpoint

An endpoint is a point at which a segment begins or ends, or the point at which a ray begins.

Examples

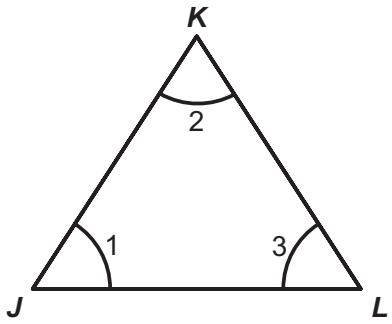
Points *A* and *B* are endpoints of segment *AB*. Point *C* is the endpoint of ray *CD*.

equiangular triangle

An equiangular triangle is a triangle that has all of its interior angles equal.

Example

In triangle *JKL*, $m\angle 1 = m\angle 2 = m\angle 3$. So, triangle *JKL* is equiangular.

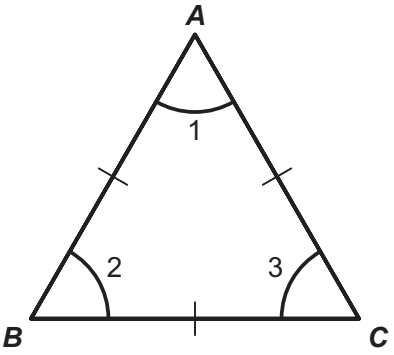


equilateral triangle

An equilateral triangle is a triangle that has all three sides equal. The measure of each interior angle of an equilateral triangle is 60 degrees.

Example

Triangle *ABC* is an equilateral triangle, so $m\angle 1 = 60.$,. $m\angle 2 = 60.$,.and $m\angle 3 = 60\ldots$



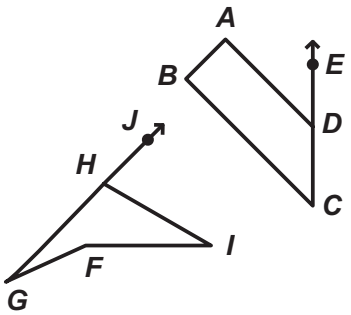
exterior angle

An exterior angle of a polygon is an angle that is adjacent to an interior angle of a polygon.

Examples

Angle *JHI* is an exterior angle of quadrilateral *FGHI*.

Angle *EDA* is an exterior angle of quadrilateral *ABCD*.



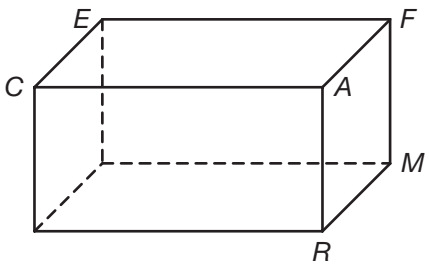
Glossary

face

A face is a side of a three-dimensional figure.

Example

The rectangle *FACE* and the rectangle *FARM* are faces of the right prism. A right prism has a total of six faces.

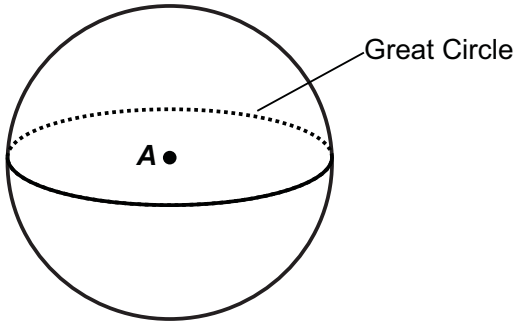


great circle

A great circle is any circle on a sphere's surface that has the same center as the center of the sphere.

Example

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

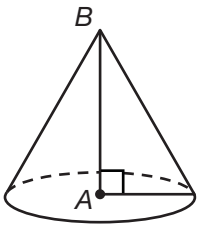


height of a cone

The height of a cone is the perpendicular distance from the base of the cone to the tip of the cone.

Example

Segment *AB* is the height of the cone.

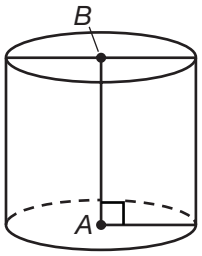


height of a cylinder

The height of a cylinder is the perpendicular distance between the two bases.

Example

Segment *AB* is the height of the cylinder.

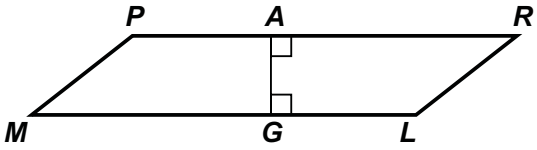


height of a parallelogram

In a parallelogram, the height is the perpendicular distance between the two bases.

Example

In parallelogram *PRLM*, the height is the length of segment *AG*.

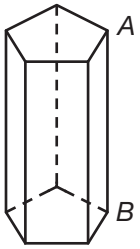


height of a prism

The height of a prism is the perpendicular distance between the two bases.

Example

Segment *AB* is the height of the prism.

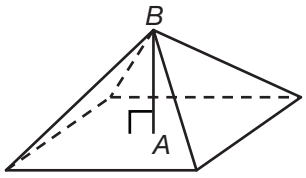


height of a pyramid

The height of a pyramid is the perpendicular distance from the base of the pyramid to the tip of the pyramid.

Example

Segment *AB* is the height of the pyramid.

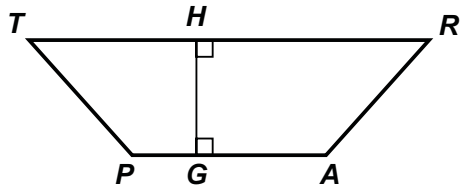


height of a trapezoid

In a trapezoid, the height is the perpendicular distance between the two bases.

Example

In trapezoid *TRAP*, the height is the length of segment *HG*.

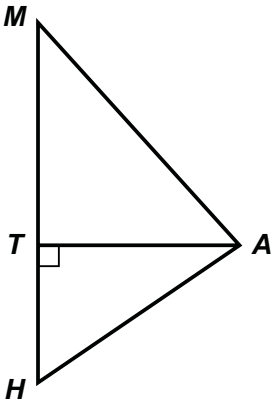


height of a triangle

In a triangle, the height is the perpendicular distance from a vertex to the side opposite the vertex.

Example

In triangle *MAH*, the height is the length of segment *AT*.

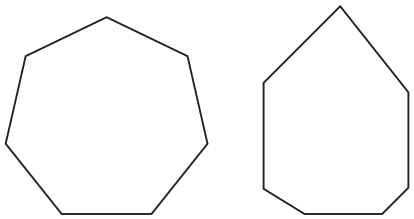


heptagon

A heptagon is a polygon with seven sides.

Examples

The polygons below are both heptagons.

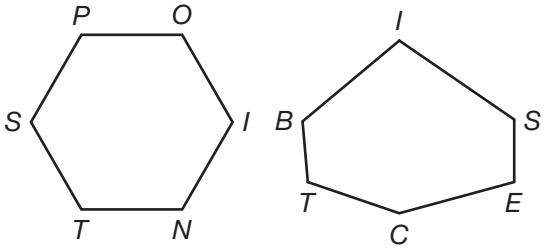


hexagon

A hexagon is a polygon with six sides.

Examples

The polygon *POINTS* and the polygon *BISECT* are both hexagons.

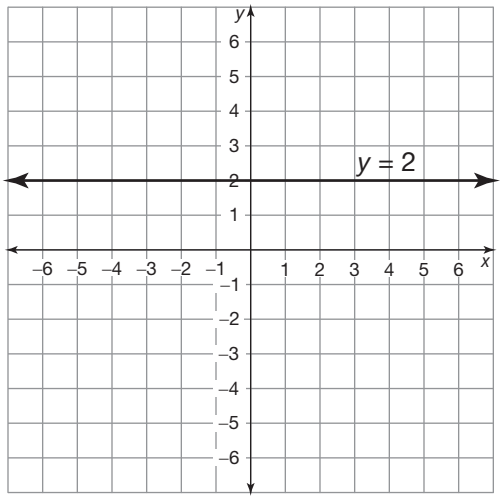


horizontal line

A horizontal line has an equation of the form $y = a$ where a is any real number.

Example

The equation $y = 2$ represents a horizontal line.



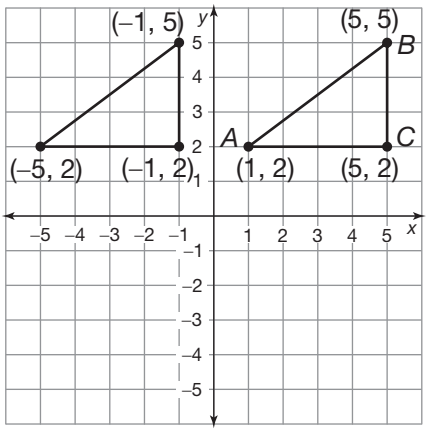
Glossary

horizontal translation

A horizontal translation is a translation in which the preimage is moved either left or right to create the image.

Example

Triangle *ABC* is translated horizontally 6 units to the left.

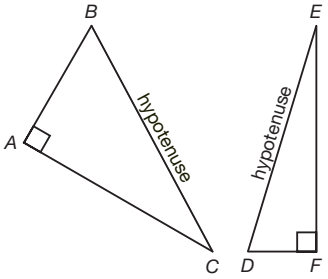


hypotenuse

In a right triangle, the hypotenuse is the side of the triangle that is opposite the right angle.

Examples

In triangle *ABC*, angle *A* is the right angle, so side *BC* is the hypotenuse. In triangle *DEF*, angle *F* is the right angle, so side *DE* is the hypotenuse.



hypothesis

A hypothesis is the "if" part of an "if-then" statement.

Example

In the statement, "if the last digit of a number is a 5, then the number is divisible by 5," the hypothesis is the part "if the last digit of a number is a 5."

if-then form

A conditional statement is written in "if-then" form when the hypothesis is contained in the "if" part and the conclusion is contained in the "then" part.

Example

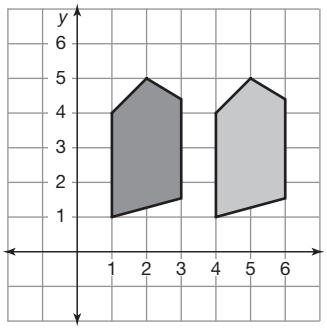
The conditional statement "If two positive numbers are added, then the sum is positive" is in "if-then" form.

image

An image is a new figure formed by a transformation.

Example

The figure below on the right is the image that has been translated 3 units to the right horizontally.

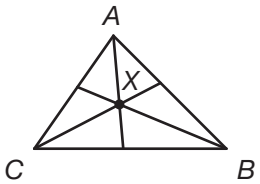


incenter

The incenter of a triangle is the point at which the angle bisectors of the triangle intersect.

Example

Point *X* is the incenter of triangle *ABC*.

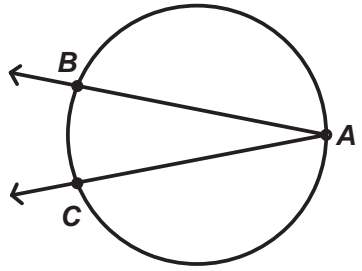


inscribed angle

An inscribed angle is an angle whose vertex is on a circle and whose sides contain chords of the circle.

Example

The vertex of angle *BAC* is on the circle and the sides of angle *BAC* contain the chords *AB* and *AC*.

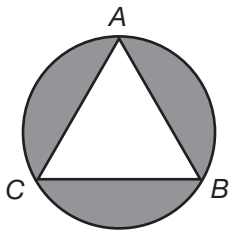


inscribed triangle

An inscribed triangle is a triangle whose vertices lie on a circle.

Example

Triangle *ABC* is an inscribed triangle.

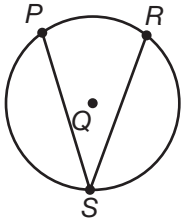


intercepted arc

An intercepted arc is formed by the intersections of the sides of an inscribed angle with a circle.

Example

$\overset{\frown}{PR}$ is an intercepted arc.

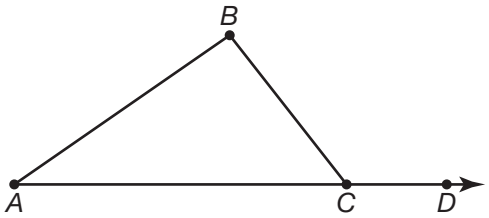


interior angles

An interior angle is an angle that is formed by two consecutive sides of a polygon.

Example

The interior angles of $\triangle ABC$ are $\angle ABC$, $\angle BCA$, and $\angle CAB$.



irrational number

An irrational number is a number that cannot be written as $\frac{a}{b}$, where a and b are integers.

Example

The number π is an irrational number.

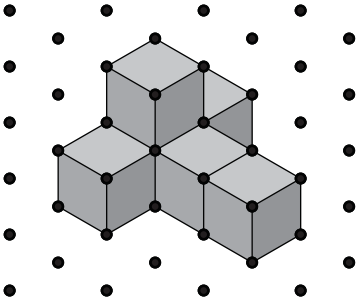
Glossary

isometric drawing

An isometric drawing is a method for drawing three-dimensional figures in two dimensions. The *x*-axis, the *y*-axis, and the *z*-axis intersect to form 120° angles.

Example

The figure below is an isometric drawing.

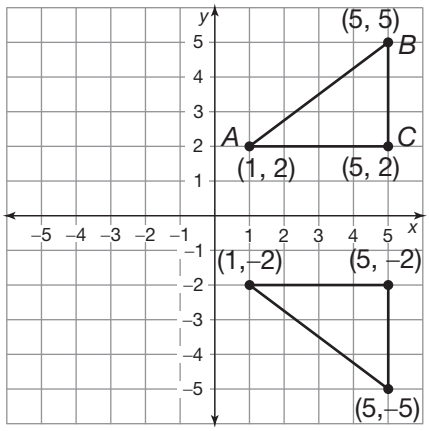


isometry

A transformation that does not change lengths, distances, or angle measures is called an isometry.

Example

A reflection is an isometry. Triangle *ABC* is reflected in the *x*-axis.

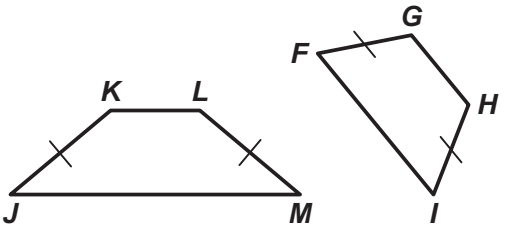


isosceles trapezoid

An isosceles trapezoid is a trapezoid whose nonparallel sides are congruent.

Examples

In trapezoid *JKLM*, side *KL* is parallel to side *JM*, and the length of side *JK* is equal to the length of side *LM*, so trapezoid *JKLM* is an isosceles trapezoid. In trapezoid *FGHI*, side *GH* is parallel to side *FI*, and the length of side *FG* is equal to the length of side *HI*, so trapezoid *FGHI* is an isosceles trapezoid.

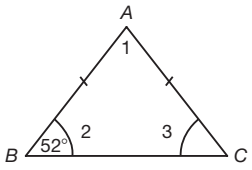


isosceles triangle

An isosceles triangle is a triangle with at least two congruent sides.

Example

Triangle *ABC* is an isosceles triangle.

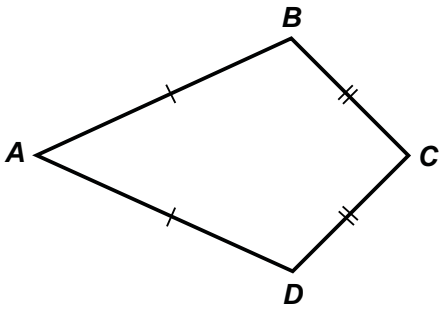


kite

A kite is a four-sided figure with two pairs of adjacent sides of equal length.

Example

In kite *ABCD*, sides *AB* and *AD* are the same length and sides *CB* and *CD* are the same length.

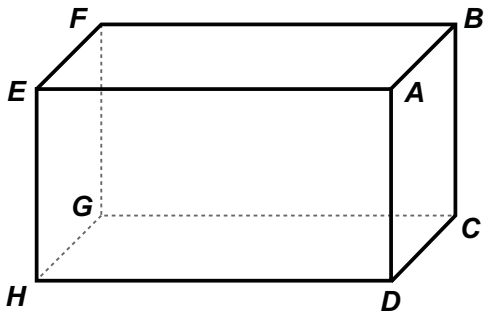


lateral area

The lateral area of a solid is the total area of the lateral faces.

Example

The lateral area of the right prism is the sum of the areas of faces *HDCG*, *EADH*, *EFBA*, and *FBCG*.

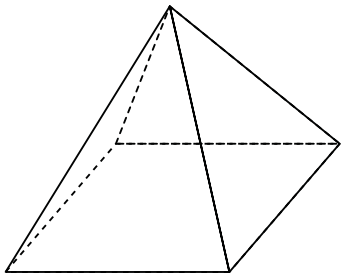


lateral faces

The lateral face of a polyhedron is a face that is not part of the base.

Example

In the rectangular pyramid below, the triangles are the lateral faces of the pyramid.

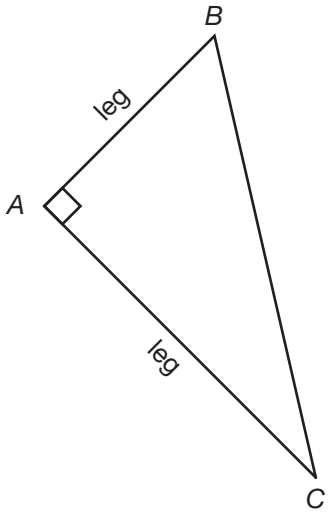


legs of a right triangle

In a right triangle, the legs are the two sides of the triangle that form the right angle.

Example

In triangle *ABC*, angle *A* is the right angle, so sides *AB* and *AC* are the legs of the triangle.

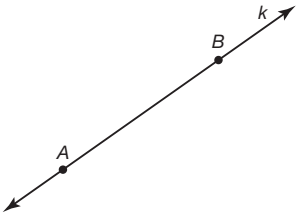


line

A line is made up of points that extend infinitely in two opposite directions. A line is straight and has only one dimension.

Example

The line below can be called line *k* or line *AB*.



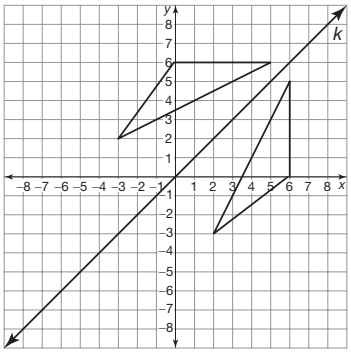
Glossary

line of reflection

A line of reflection is a line in which a figure is reflected.

Example

The triangle is reflected in line k, so line k is a line of reflection.



line of symmetry

The line of symmetry is the line that you draw through a plane figure so that the figure to one side of the line is a reflection of the figure on the other side of the line.

Examples

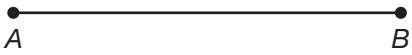
The star shown below has 5 lines of symmetry.

line segment

A line segment is a portion of a line between two points, called the endpoints.

Example

The line segment below is named segment AB or segment BA.

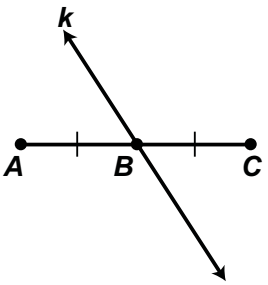


line segment bisector

A segment bisector is a line, segment, or ray that intersects a segment so that the segment is divided into two segments of equal length.

Example

Line k is the segment bisector of segment AC. The lengths of segments AB and BC are equal.

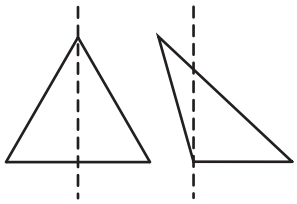


line symmetry

A plane figure has line symmetry if you can draw a line so that the figure to one side of the line is a reflection of the figure on the other side of the line.

Example

An equilateral triangle has line symmetry. A scalene triangle does not have line symmetry.

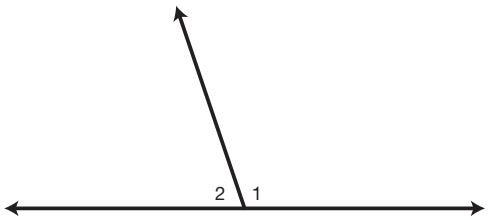


linear pair

A linear pair of angles are two adjacent angles that have noncommon sides that are opposite rays.

Example

Angle 1 and angle 2 are a linear pair.



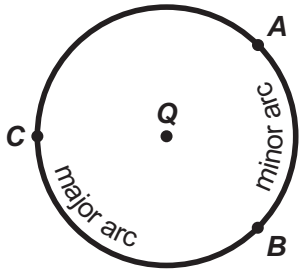
Glossary

major arc

Two points on a circle determine a major arc and a minor arc. The arc with the greater measure is the major arc. The other arc is the minor arc.

Example

Circle *Q* is divided by points *A* and *B* into two arcs, arc *ACB* and arc *AB*. Arc *ACB* has the greater measure, so it is the major arc. Arc *AB* has the lesser measure, so it is the minor arc.

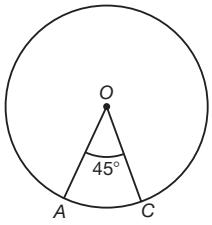


measure of a minor arc

The measure of a minor arc is equal to the measure of its central angle.

Example

In circle *O*, the measure of arc *AC* is 45 degrees.

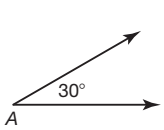


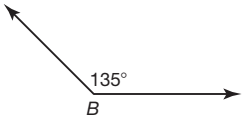
measure of an angle

The measure of an angle indicates the size of an angle.

Examples

The measure of angle *A* is 30 degrees. The measure of angle *B* is 135 degrees.



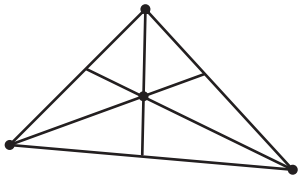


median

The median of a triangle is a segment drawn from a vertex to the midpoint of the opposite side.

Example

The 3 medians are drawn on the triangle below.

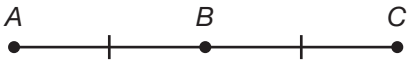


midpoint

The midpoint of a segment is the point that divides the segment into two congruent segments.

Example

Because point *B* is the midpoint of segment *AC*, segment *AB* is congruent to segment *BC*.

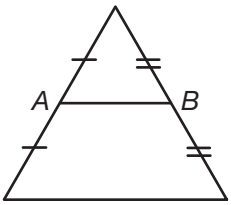


midsegments

A midsegment is a segment connecting the midpoints of two sides of a triangle.

Example

Segment *AB* is a midsegment.



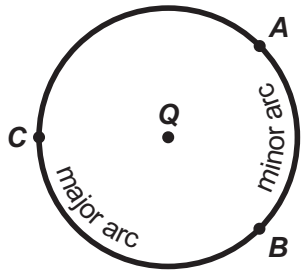
Glossary

minor arc

Two points on a circle determine a minor arc and a major arc. The arc with the lesser measure is the minor arc. The other arc is the major arc.

Example

Circle *Q* is divided by points *A* and *B* into two arcs, arc *ACB* and arc *AB*. Arc *AB* has the lesser measure, so it is the minor arc. Arc *ACB* has the greater measure, so it is the major arc.



negative reciprocals

Two numbers are negative reciprocals if their product is –1.

Example

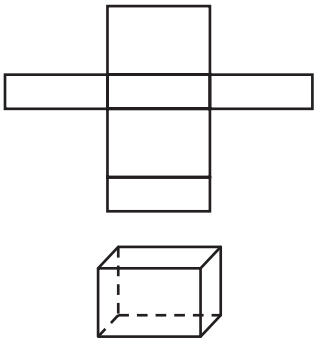
$\frac{2}{3}$ and $-\frac{3}{2}$ are negative reciprocals.

net

A net is a two-dimensional model of a three-dimensional solid. When the net is folded, it forms the solid.

Example

When the net below is folded, it forms the right prism shown.

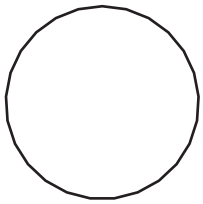


n-gon

An *n*-gon is a polygon with *n* sides.

Example

A 25-sided polygon is a 25-gon.

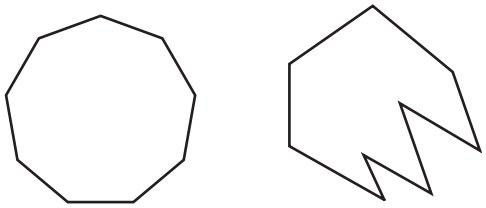


nonagon

A nonagon is a polygon with nine sides.

Examples

The polygons below are both nonagons.

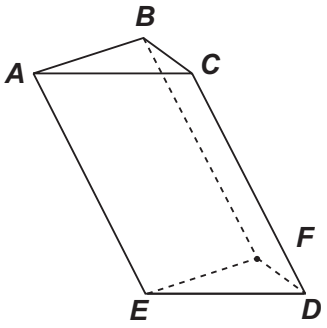


oblique prism

An oblique prism is a prism whose bases and lateral edges do not meet at right angles.

Example

In the oblique prism, base *ABC* is not perpendicular to lateral side *AE* or lateral side *CD*.

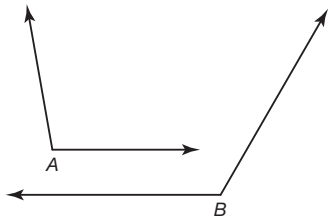


obtuse angle

An obtuse angle is an angle whose measure is greater than 90 degrees and less than 180 degrees.

Examples

Angle *A* and angle *B* are obtuse angles.

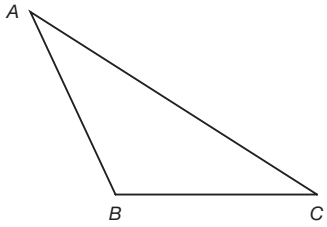


obtuse triangle

An obtuse triangle is a triangle with one obtuse angle.

Example

Angle *B* is an obtuse angle, so triangle *ABC* is an obtuse triangle.

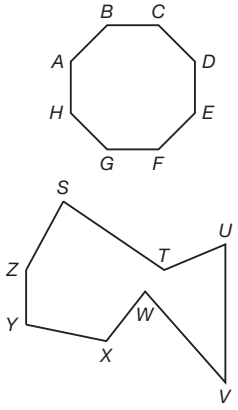


octagon

An octagon is a polygon with eight sides.

Examples

The polygon *ABCDEFGH* and the polygon *STUVWXYZ* are both octagons.

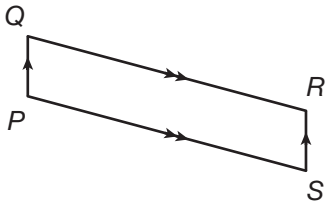


opposite angles

The opposite angles of a quadrilateral are two angles that do not share a common side.

Examples

In quadrilateral *QRSP:* Angle *PQR* and angle *RSP* are opposite angles. Angles *QPS* and *QRS* are opposite angles.

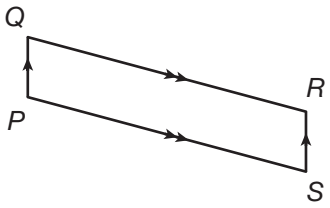


opposite sides

The opposite sides of a quadrilateral are two sides that do not intersect.

Example

In quadrilateral *QRSP*, sides *QR* and *PS* are opposite sides. Sides *QP* and *RS* are opposite sides.

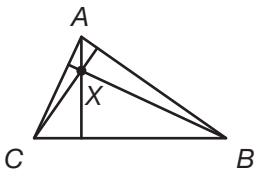


orthocenter

The orthocenter of a triangle is the point at which the altitudes of the triangle intersect.

Example

Point *X* is the orthocenter of triangle *ABC*.



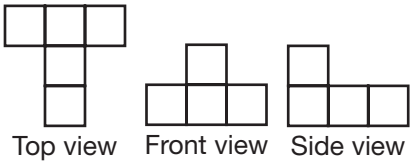
Glossary

orthographic projection

An orthographic projection is a method for drawing three-dimensional figures in two dimensions using an object's top view, front view, and side view.

Example

The figures below are an orthographic projection.



paragraph proof

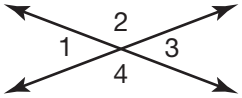
A paragraph proof is a proof that is written in paragraph form. Each sentence includes mathematical statements that are organized in logical steps with reasons.

Example

The proof below is a paragraph proof that vertical angles are congruent.

Proof

Angle 1 and angle 3 are vertical angles. By the definition of linear pair, angle 1 and angle 2 form a linear pair. Angle 2 and angle 3 also form a linear pair. By the Linear Pair Postulate, angle 1 and angle 2 are supplementary. Angle 2 and angle 3 are also supplementary. Angle 1 is congruent to angle 3 by the Congruent Supplements Theorem.

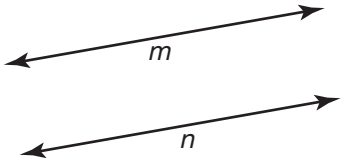


parallel lines

Two lines in the same plane are parallel to each other if they do not intersect.

Example

Lines *m* and *n* are parallel.

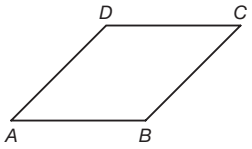


parallelogram

A parallelogram is a quadrilateral in which both pairs of opposite sides are parallel.

Example

In parallelogram *ABCD*, opposite sides *AB* and *CD* are parallel; opposite sides *AD* and *BC* are parallel.

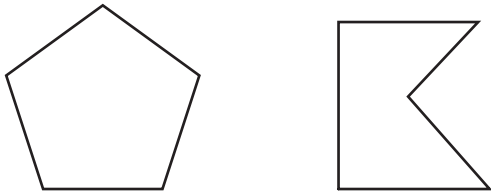


pentagon

A pentagon is a polygon with five sides.

Examples

The polygons below are both pentagons.

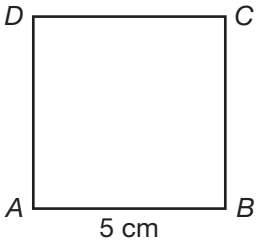


perimeter

The perimeter of a figure is the sum of all the side lengths.

Example

The perimeter of square *ABCD* is (4)(5) or 20 centimeters.



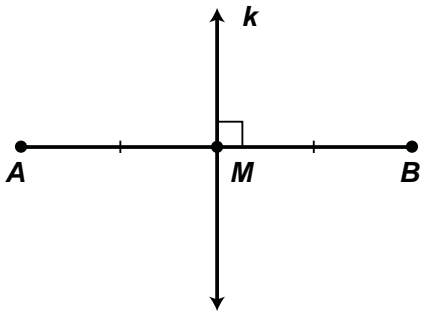
Glossary

perpendicular bisector

A perpendicular bisector is a line, segment, or ray that intersects the midpoint of a line segment at a 90-degree angle.

Example

Line *k* is the perpendicular bisector of segment *AB*. It is perpendicular to segment *AB*, and intersects segment *AB* at midpoint *M* so that *AM* = *MB*.

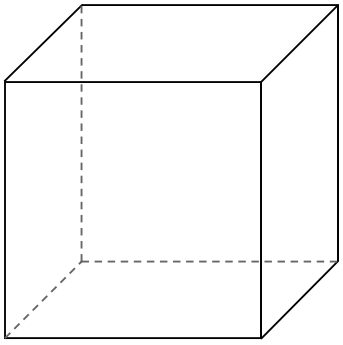


Platonic solid

A Platonic solid is a polyhedron whose faces are congruent regular polygons. The five Platonic solids are a regular tetrahedron, a cube, a regular octahedron, a regular dodecahedron, and a regular icosahedron.

Example

A cube is one of the five Platonic solids. Each of its faces is a square.



point

A point has no dimension, but can be visualized as a specific position in space, and is usually represented by a small dot.

Example

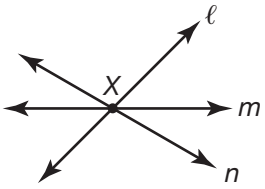
The point below is point *A*.

point of concurrency

The point of concurrency is the point at which three or more lines intersect.

Example

Point *X* is the point of concurrency for lines ℓ, *m*, and *n*.

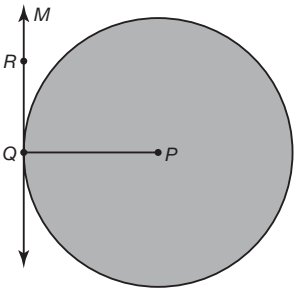


point of tangency

A tangent to a circle is a line that intersects the circle in exactly one point, called the point of tangency.

Example

Point *Q* is the point of tangency.



point-slope form

The point-slope form of a linear equation that passes through the point (x_1, y_1) and has slope m is $y - y_1 = m(x - x_1)$.

Example

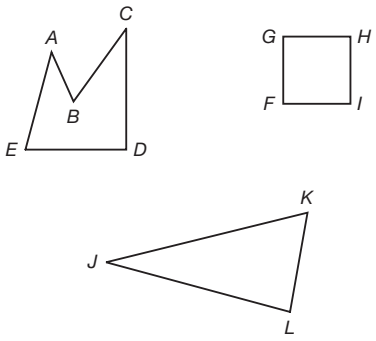
A line passing through the point (1, 2) with a slope of $\frac{1}{2}$ can be written in point-slope form as $y - 2 = \frac{1}{2}(x - 1)$.

polygon

A polygon is a two-dimensional figure that is formed by three or more segments called sides. Each side of a polygon must intersect exactly two other sides, one at each endpoint. No two sides intersect each other more than once.

Examples

Figure *ABCDE*, figure *FGHI*, and figure *JKL* are polygons.



postulate

A postulate is a statement that is accepted to be true without proof.

Example

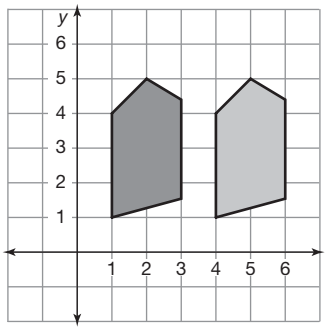
The following statement is a postulate. A straight line may be drawn between any two points.

preimage

The original point in a transformation is the preimage.

Example

The figure below on the left is the preimage.

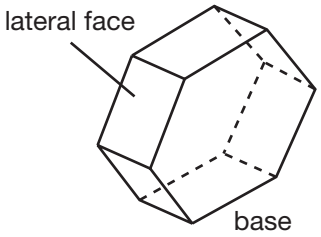


prism

A prism is a polyhedron with two parallel faces, called bases, that are congruent polygons. The other faces, called lateral faces, are parallelograms that are formed by connecting the corresponding vertices of the bases.

Example

A prism is named for the shape of its bases. The prism shown is a hexagonal prism.



Glossary

proof

A proof is a logical series of steps to demonstrate a statement.

Examples

To prove the statement $(a - b)(a^2 + ab + b^2) = a^3 - b^3$, use the following direct proof.

$(a - b)(a^2 + ab + b^2)$

$= a(a^2 + ab + b^2) - b(a^2 + ab + b^2)$

Distributive property

$= a(a^2) + a(ab) + a(b^2) - b(a^2) - b(ab) - b(b^2)$

Distributive Property of Multiplication Over Addition

$= a^3 + a^2b + ab^2 - a^2b - ab^2 - b^3$

Product of Powers

$= a^3 - b^3$

Additive Inverse

proportion

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

Examples

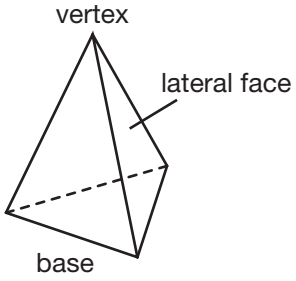
The equation $\frac{4}{8} = \frac{1}{2}$ is a proportion. The equation $\frac{x}{12} = \frac{5}{60}$ is a proportion.

pyramid

A pyramid is a polyhedron that has one base that is a polygon. The lateral faces of the pyramid are triangles that meet at a common vertex.

Example

A pyramid is named according to the shape of its base. The pyramid below is a triangular pyramid.

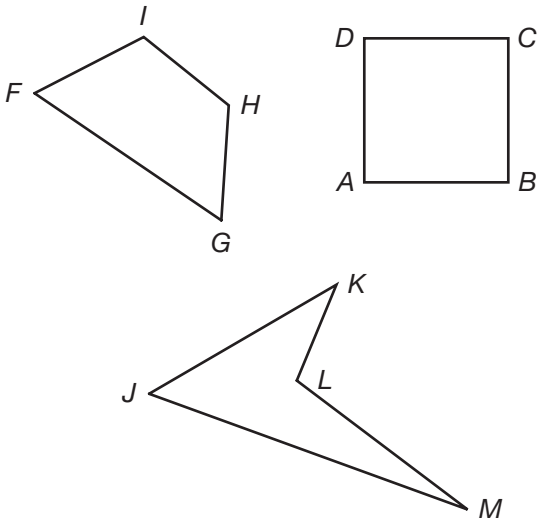


quadrilateral

A quadrilateral is a polygon that has four sides.

Examples

Figure *ABCD*, figure *FGHI*, and figure *JKLM* are quadrilaterals.



radical expression

A radical expression is an expression that involves a root.

Examples

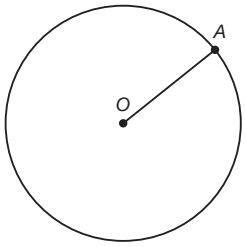
The expressions $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$, and $\sqrt{2} + \sqrt{3}$ are all radical expressions.

radius

The radius is the distance from the center of a circle to a point on the circle.

Example

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



Glossary

ratio

A ratio is a way to compare two quantities that are measured in the same units by using division. The ratio of two numbers a and b, with the restriction that b cannot equal zero, can be written in three ways a to b, a: b, and $\frac{a}{b}$.

Example

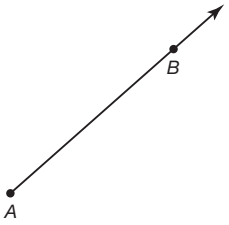
In Central High School, there are 4 boys for every 5 girls. The ratio of boys to girls can be written as 4 boys to 5 girls, 4 boys: 5 girls, or $\frac{4 \text{ boys}}{5 \text{ girls}}$.

ray

A ray consists of a point P on a straight line and all points on the line on one side of P.

Example

The ray below is ray AB.



reciprocals

Two non-zero numbers are reciprocals if their product is 1.

Examples

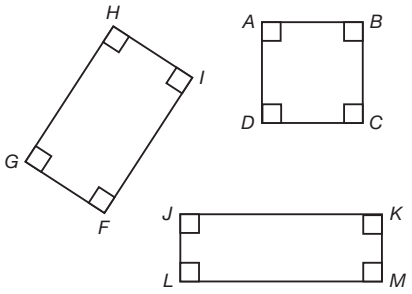
The fractions $\frac{2}{3}$ and $\frac{3}{2}$ are reciprocals.

rectangle

A rectangle is a parallelogram with four right angles.

Examples

Figure $ABCD$, figure $FGHI$, and figure $JKML$ are rectangles.

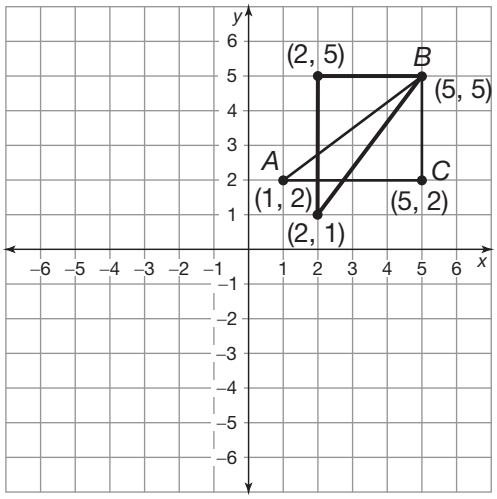


reflected in the line $y = x$

If a preimage point (x, y) is reflected in the line $y = x$, then its image is the point (y, x).

Example

Triangle ABC is reflected about the line $y = x$. The preimage points (1, 2), (5, 2), and (5, 5) are transformed to the points (2, 1), (2, 5), and (5, 5)



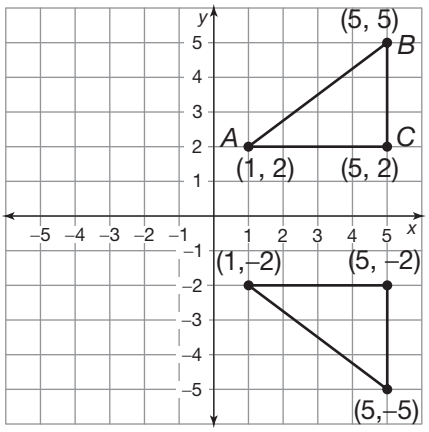
Glossary

reflected in the *x*-axis

If a preimage point (*x*, *y*) is reflected in the *x*-axis, then its image is the point (*x*, –*y*).

Example

Triangle *ABC* is reflected about the *x*-axis. The preimage points (1, 2), (5, 2), and (5, 5) are transformed to the points (1, –2), (5, –2), and (5, –5)

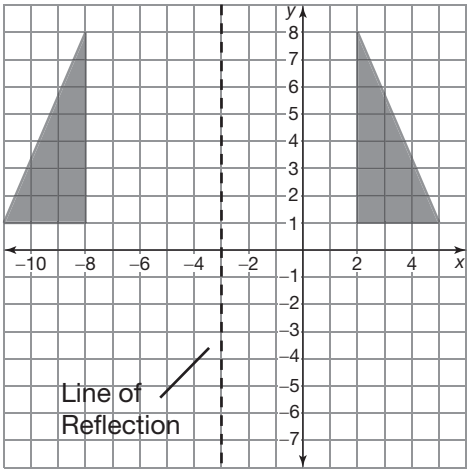


reflection

A reflection is a transformation in which a figure is reflected, or flipped, in a given line called the line of reflection.

Example

The triangle on the right is a reflection of the triangle on the left.

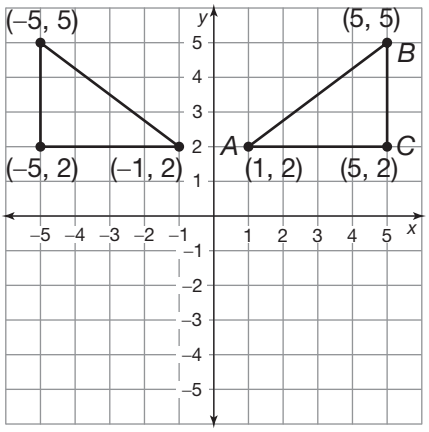


reflection in the *y*-axis

If a preimage point (*x*, *y*) is reflected in the *y*-axis, then its image is the point (–*x*, *y*).

Example

Triangle *ABC* is reflected about the *y*-axis. The preimage points (1, 2), (5, 2), and (5, 5) are transformed to the points (–1, 2), (–5, 2), and (–5, 5)



reflexive property

The reflexive property states that *a* = *a*.

Example

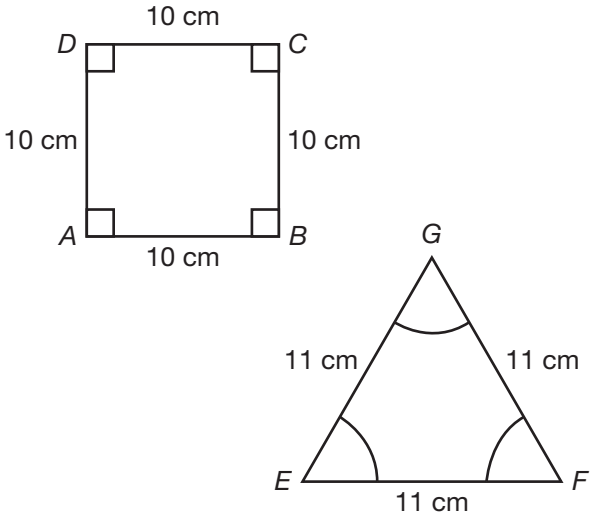
The statement 2 = 2 is an example of the reflexive property.

regular polygon

A regular polygon is a polygon whose sides all have the same length and whose angles all have the same measure.

Examples

Figure *ABCD* and figure *EFG* are regular polygons.

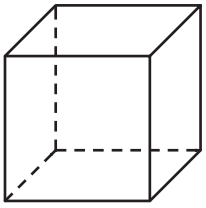


regular polyhedron

A regular polyhedron is a solid that is formed from regular polygons.

Example

A cube is a regular polyhedron. Each face of a cube is a regular quadrilateral.

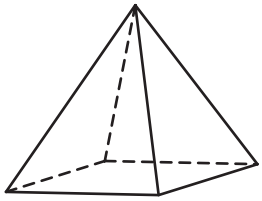


regular pyramid

A regular pyramid is a pyramid in which the base is a regular polygon and the height meets the base at its center.

Example

The pyramid shown below is a regular pyramid. The base is a regular quadrilateral, or a square.

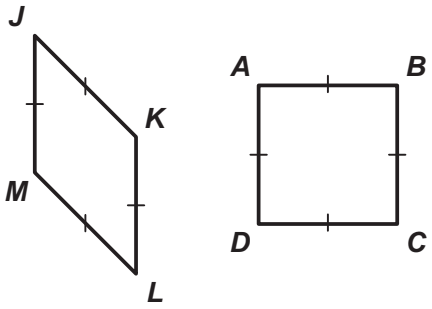


rhombi

A rhombus is a parallelogram whose four sides have the same length. The plural form of "rhombus" is "rhombi."

Examples

Figure *JKLM* is a rhombus. Figure *ABCD* is a rhombus.

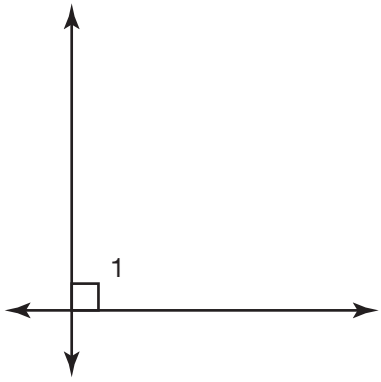


right angle

A right angle is an angle with a measure of 90 degrees.

Example

Angle 1 is a right angle, so its measure is 90°.

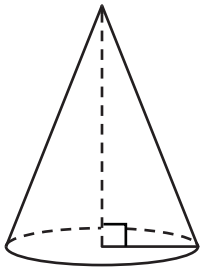


right cone

A right cone is cone in which the height meets the base at its center.

Example

The cone shown below is a right cone.

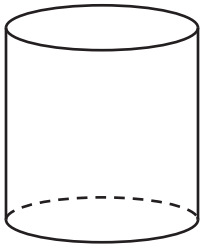


right cylinder

A right cylinder is a cylinder in which the segment that connects the centers of the bases is perpendicular to the bases.

Example

The cylinder shown below is a right cylinder.

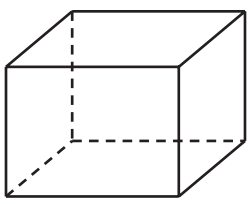


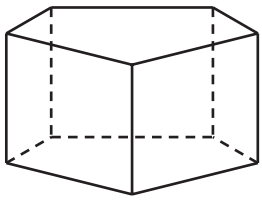
right prism

A right prism is a prism whose lateral edges are perpendicular to both bases. All of the lateral faces of a right prism are rectangles.

Examples

The prisms below are right prisms.



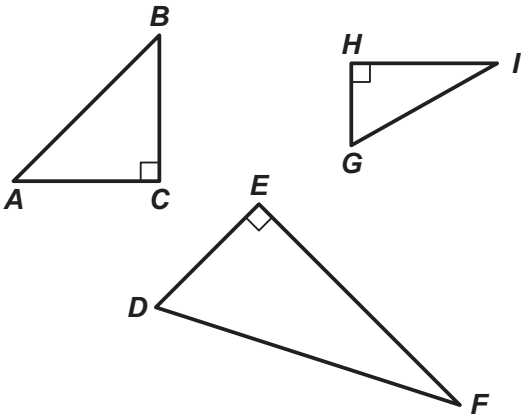


right triangle

A right triangle is a triangle that contains a right angle.

Examples

Triangle *ABC*, triangle *DEF*, and triangle *GHI* are right triangles.

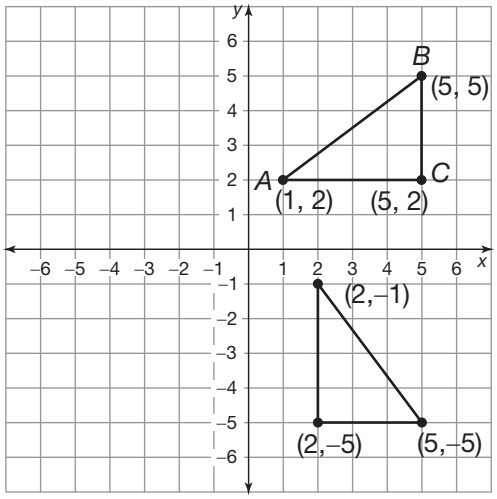


rotated 90° clockwise about the origin

If a point (x, y) is rotated 90° clockwise about the origin, then its image is the point $(y, -x)$.

Example

Triangle *ABC* is rotated 90° clockwise about the origin. The preimage points (1, 2), (5, 2), and (5, 5) are transformed to the points (2, –1), (2, –5), and (5, –5).



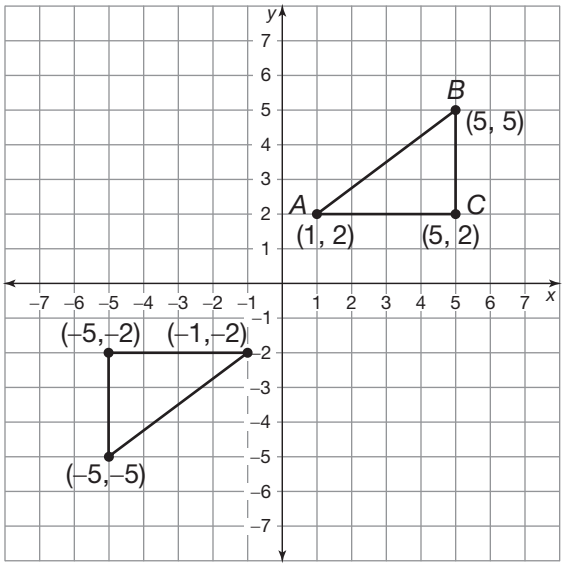
Glossary

rotated 180° counterclockwise about the origin

If a point (x, y) is rotated 180° counterclockwise about the origin, then its image is the point $(-x, -y)$.

Example

Triangle *ABC* is rotated 180° counterclockwise about the origin. The preimage points (1, 2), (5, 2), and (5, 5) are transformed to the points (–1, –2), (–5, –2), and (–5, –5).

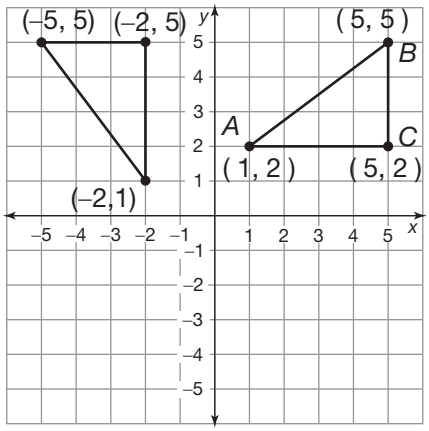


rotated 90° counterclockwise about the origin

If a point (x, y) is rotated 90° counterclockwise about the origin, then its image is the point $(-y, x)$.

Example

Triangle *ABC* is rotated 90° counterclockwise about the origin. The preimage points (1, 2), (5, 2), and (5, 5) are transformed to the points (–2, 1), (–2, 5), and (–5, 5).

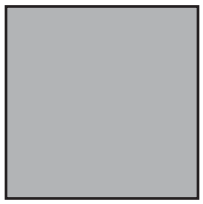


rotational symmetry

A figure has rotation symmetry if you can rotate the figure less than or equal to 180° and the resulting figure is the same as the original figure in the same position.

Example

A square has rotational symmetry because if a square is rotated 90°, the resulting figure is in the same position as the original square.



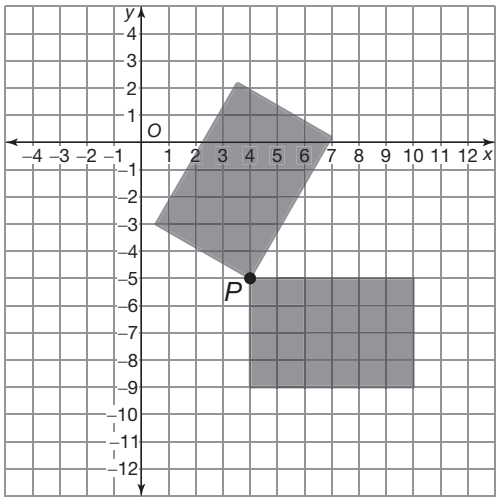
Glossary

rotation

A rotation is a transformation in which a figure is turned about a fixed point called the center of rotation.

Example

The rectangle at the bottom is a rotation of the rectangle at the top of 150 degrees counterclockwise about the center of rotation *P*.

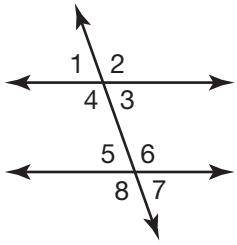


same-side exterior angles

Two angles are same-side exterior angles if they lie outside two lines on the same side of a transversal.

Examples

Angle 1 and angle 8 are same-side exterior angles. Angle 2 and angle 7 are also same-side exterior angles.

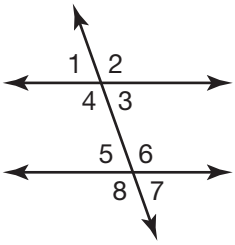


same-side interior angles

Two angles are same-side interior angles if they lie between two lines on the same side of a transversal.

Examples

Angle 4 and angle 5 are same-side interior angles. Angle 3 and angle 6 are also same-side interior angles.

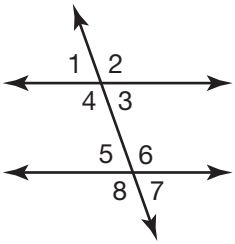


same-side interior angles theorem

If two parallel lines are intersected by a transversal, then the pairs of same-side interior angles are supplementary.

Examples

Angle 4 and angle 5 are supplementary. Angle 3 and angle 6 are also supplementary.



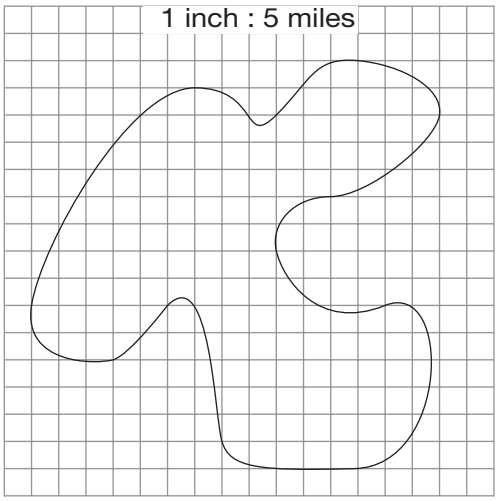
Glossary

scale

A scale is a ratio that represents the relationship between the measurements of a scale drawing or scale model and the actual measurements of an object.

Example

In the map of the lake below, the scale 1 inch : 5 miles means that 1 inch on the map is equal to 5 miles of actual distance.

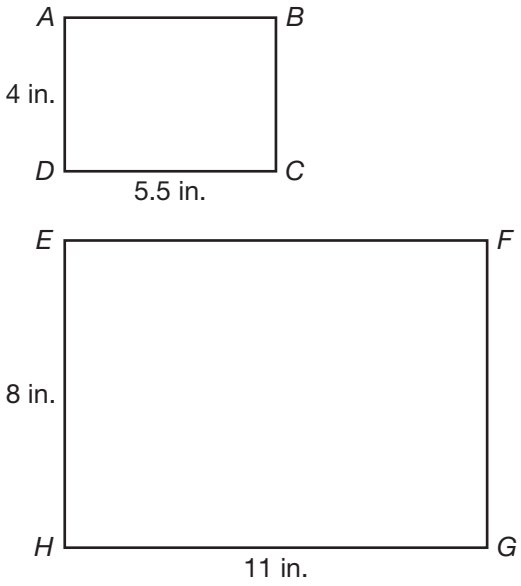


scale factor

A scale factor is a ratio that compares a measurement of a scale model or drawing to the corresponding measurement of an original object. A scale factor is also called a dilation factor.

Example

A photograph has a width of 4 inches and a length of 5.5 inches, as shown below. An enlargement of the photograph has a width of 8 inches and a length of 11 inches. The scale factor of the enlargement to the original photograph is $\frac{EH}{AD} = \frac{8}{4} = 2$.



Glossary

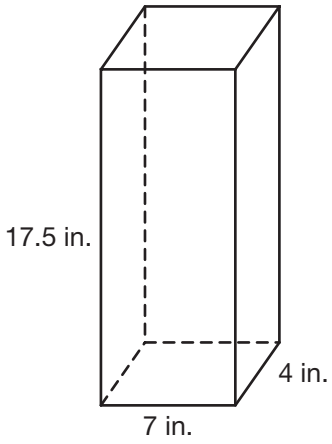
scale model

A scale model is a three-dimensional drawing that is similar to the actual object that it represents. It is drawn using measurements that are proportional to the measurements of the actual object.

Example

The model below is a scale drawing of an office building. One inch on the drawing is equal to 15 feet on the actual office building. The height of the actual office building is $(17.5 \text{ inches})\left(\frac{15 \text{ feet}}{1 \text{ inch}}\right) = 262.5 \text{ feet}$.

The width of the actual office building is $(4 \text{ inches})\left(\frac{15 \text{ feet}}{1 \text{ inch}}\right) = 60 \text{ feet}$.

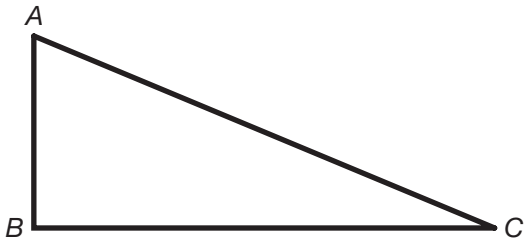


scalene triangle

A scalene triangle is a triangle with no sides of equal length.

Examples

None of the side lengths of triangle *ABC* are the same. So, triangle *ABC* is a scalene triangle. None of the side lengths of triangle *DEF* are the same. So, triangle *DEF* is a scalene triangle.

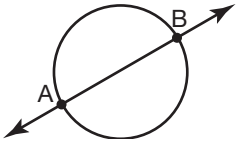


secant

A secant of a circle is a line that intersects the circle at two points.

Example

The line intersecting the circle through points *A* and *B* is a secant.

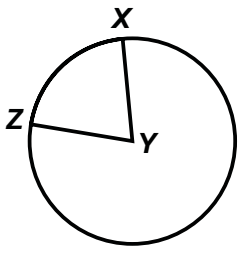


sector of a circle

A sector is a portion of a circle bounded by two radii of the circle and one of the arcs that they intercept.

Example

In circle *Y*, arc *XZ*, radius *XY*, and radius *YZ* form a sector.

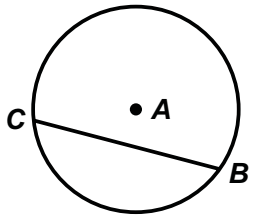


segment of a circle

A segment of a circle is the region bounded by a chord of a circle and the arc that the chord creates.

Example

In circle *A,* chord *BC* and arc *BC* are the boundaries of a segment of the circle.

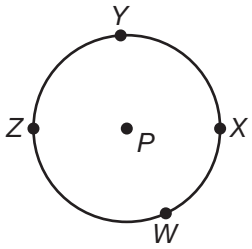


semicircle

A semicircle is an arc whose endpoints form the endpoints of a diameter of the circle.

Example

Arc *XYZ* and arc *ZWX* are semicircles of circle *P*.

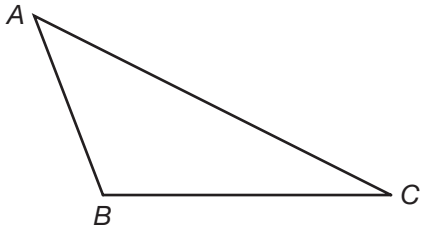


side

A side of a polygon is one of any of the line segments that form the polygon.

Example

Line segments *AB*, *BC*, and *AC* are the sides of triangle *ABC*.

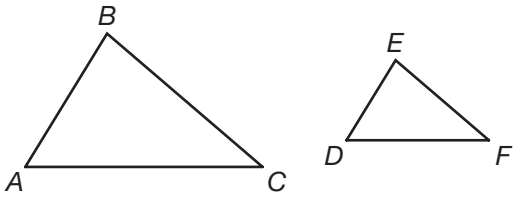


similar figures

Two figures are similar if they have the same shape, but not necessarily the same size.

Example

Triangle *ABC* is similar to triangle *DEF.*

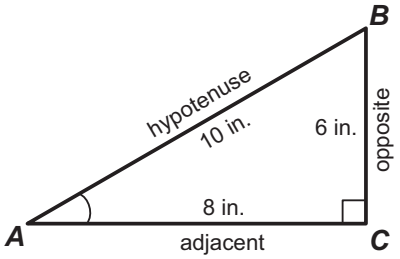


sine

In a right triangle, the sine of an angle is equal to the ratio of the length of the side opposite the angle to the length of the hypotenuse.

Example

In triangle *ABC*, the length of the side opposite angle *A* is 6 inches, and the length of the hypotenuse is 10 inches. So, the sine of angle *A,* or sin *A*, is $\frac{6}{10} = \frac{3}{5}$.

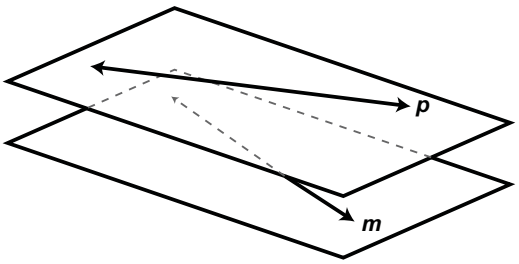


skew lines

Skew lines are two lines that do not intersect and are not parallel. Skew lines do not lie in the same plane.

Example

Line *m* and line *p* are skew lines.

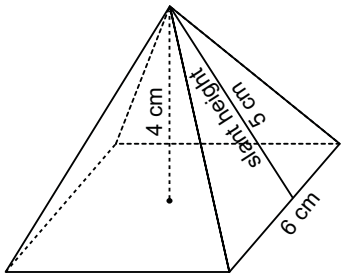


slant height

The slant height of a polyhedron is the altitude of a lateral face of the polyhedron.

Example

The slant height of the pyramid is 5 centimeters.

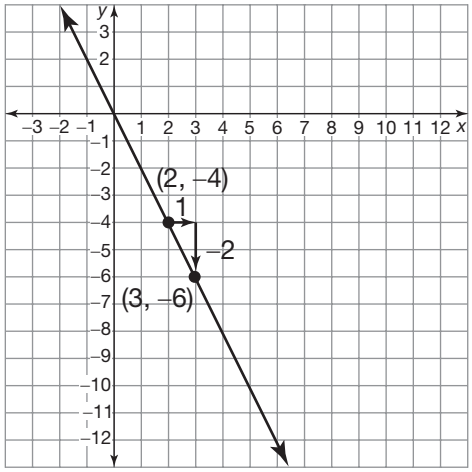


slope

The slope of a nonvertical line is the ratio of the vertical change to the horizontal change.

Example

The slope of the line that passes through the points (3, –6) and (2, –4) is –2 because the vertical change is –2 units and the horizontal change is 1 unit.



slope-intercept form of a linear equation

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

Example

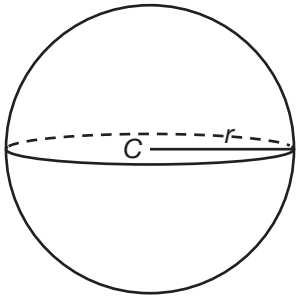
The linear equation $y = 2x + 1$ is written in slope-intercept form. The slope of the line is 2, and the y-intercept is 1.

sphere

A sphere is the set of all points in space that are a given distance from a fixed point called the center of the sphere.

Example

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



square root

A number b is a square root of a if $b^2 = a$.

Example

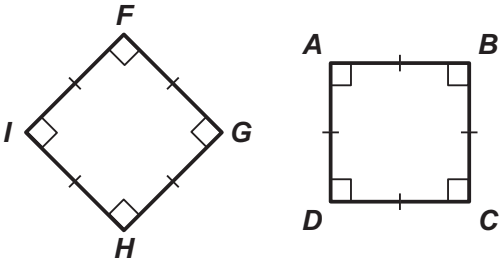
The square roots of 25 are 5 and –5.

squares

A square is a parallelogram with congruent sides and four right angles.

Examples

Figure *FGHI* and figure *ABCD* are squares.



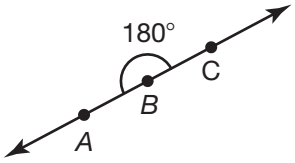
Glossary

straight angle

A straight angle is an angle whose measure is 180 degrees.

Example

The measure of angle *ABC* is 180 degrees, so angle *ABC* is a straight angle.



subtraction property

The subtraction property states that if a = *b*, then a – *c* = *b* – *c*.

Example

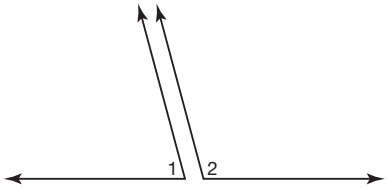
If *x* = 7 then *x* – 5 = 2 is an example of the subtraction property.

supplementary

Two angles are supplementary if the sum of their measures is 180 degrees.

Example

Angle 1 and angle 2 are supplementary angles. If $m\angle 1 = 75°$, then $m\angle 2 = 180° - 75° = 105°$.



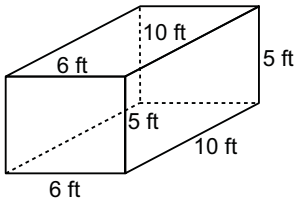
surface area

The surface area of a polyhedron is the sum of the areas of its faces.

Example

The surface area of the prism is the sum of the areas of each of its six rectangular faces.

S = 2(10)(6) + 2(5)(6) + 2(10)(5) = 280 square feet



symmetric property

The symmetric property states that if *a* = *b*, then *b* = *a*.

Example

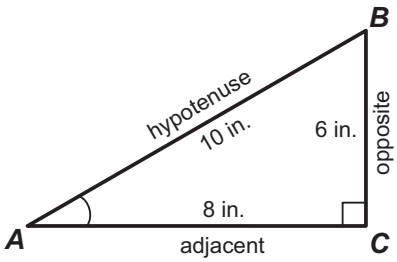
If 2 = *x* then *x* = 2 is an example of the symmetric property.

tangent of an angle

In a right triangle, the tangent of an angle is equal to the ratio of the length of the side opposite the angle to the length of the side adjacent to the angle.

Example

In triangle *ABC*, the length of the side opposite angle *A* is 6 inches, and the length of the side adjacent to angle *A* is 8 inches. So, the tangent of angle *A*, or tan *A*, is $\frac{6}{8} = \frac{3}{4}$.



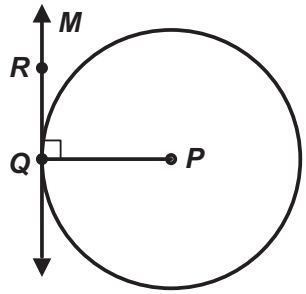
Glossary

tangent of a circle

A tangent of a circle is a line that intersects the circle in exactly one point, called the point of tangency.

Example

Line *M* intersects the circle *P* in exactly one point. So, Line *M* is tangent to circle *P* at the point of tangency *Q*.

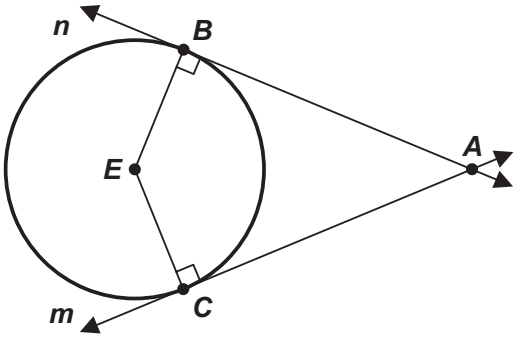


tangent segments

Segments that are drawn tangent to a circle from an exterior point have the same length.

Example

Line *m* is tangent to circle *E* at point *C*, and line *n* is tangent to circle *E* at point *B*. So, the length of segment *AB* is equal to the length of segment *AC*.

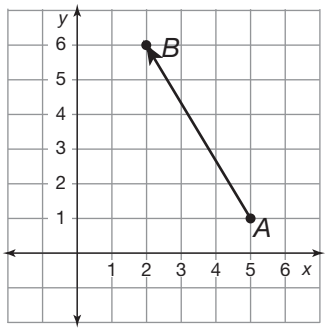


terminal point

A terminal point is the endpoint of a vector.

Example

Vector *AB* has a terminal point of (2, 6).



tessellation

A tessellation of a plane is a collection of polygons that are arranged so that they cover the plane with no holes or gaps.

Example

The figures below are tessellations.

theorem

A theorem is a statement that has been proven to be true.

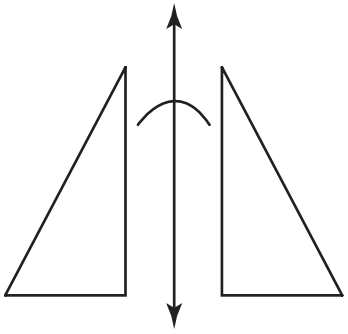
Example

The Pythagorean theorem states that if a right triangle has legs of lengths *a* and *b* and hypotenuse of length *c*, then $a^2 + b^2 = c^2$.

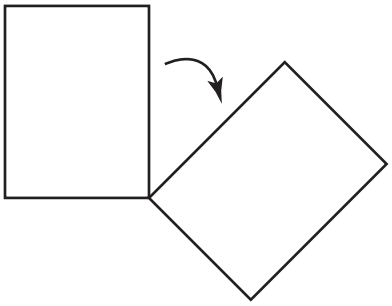
Glossary

transformation

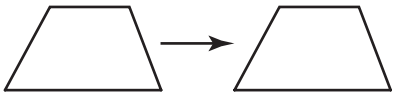
A transformation is an operation that maps, or moves, a figure, called the preimage, to form a new figure called the image. Three types of transformations are reflections, rotations, and translations.



reflection in a line



rotation about a point



translation

transitive property

The transitive property states that if $a = b$ and $b = c$, then $a = c$.

Example

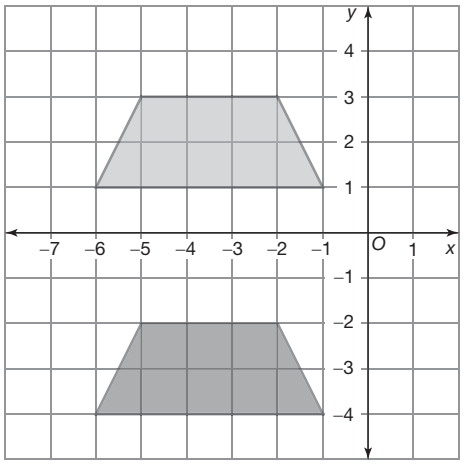
If $x = y$ and $y = 2$ then $x = 2$ is an example of the transitive property.

translation

A translation is a transformation in which a figure is shifted so that each point of the figure moves the same distance in the same direction. The shift can be in a horizontal direction, a vertical direction, or both.

Example

The top trapezoid is a vertical translation of the bottom trapezoid by 5 units.

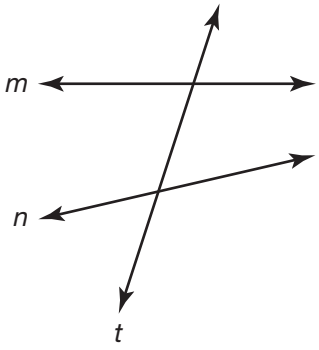


transversal

A transversal is a line that intersects two or more lines in the same plane at different points.

Example

Line t is a transversal that intersects line m and line n.

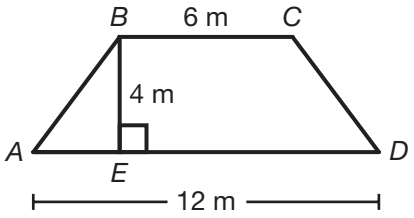


trapezoid

A trapezoid is a quadrilateral with exactly one pair of parallel sides. The parallel sides are called bases and the nonparallel sides are called legs. The perpendicular distance between the bases is the height of the trapezoid.

Example

Quadrilateral *ABCD* is a trapezoid. The height is 4 meters, the length of base *AD* is 12 meters, and the length of base *BC* is 6 meters.



trigonometric ratios

The sine, cosine, and tangent of an acute angle are called trigonometric ratios.

Examples

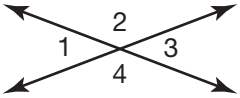
Sine, cosine, and tangent are trigonometric ratios.

two-column proof

A two-column proof is a proof consisting of two columns. In the left column are mathematical statements that are organized in logical steps. In the right column are the reasons for each mathematical statement.

Example

The proof below is a two-column proof.



Statement	Reason
1. $\angle 1$ and $\angle 3$ are vertical angles.	**1.** Given
2. $\angle 1$ and $\angle 2$ form a linear pair. $\angle 2$ and $\angle 3$ form a linear pair.	**2.** Definition of linear pair
3. $\angle 1$ and $\angle 2$ are supplementary. $\angle 2$ and $\angle 3$ are supplementary.	**3.** Linear Pair Postulate
4. $\angle 1 \cong \angle 3$	**4.** Congruent Supplements Theorem

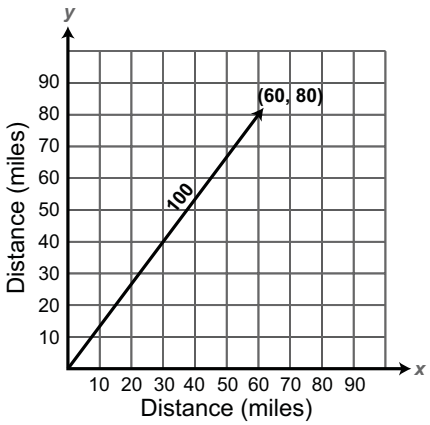
Glossary

vector

A vector is a directed line segment that has both a magnitude and a direction. A vector is represented by an ordered pair.

Example

The vector shown represents a person walking 60 miles east and then 80 miles north. The distance that the person is from the starting point (0, 0) is 100 miles.

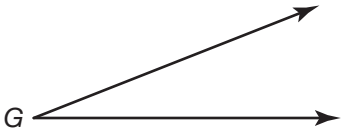


vertex of an angle

The vertex of an angle is the point where the two rays forming the angle intersect.

Example

Point *G* is the vertex of the angle below.

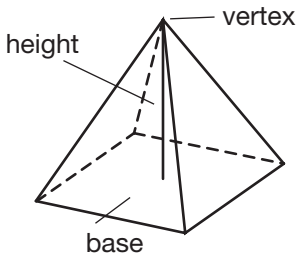


vertex of a solid

The vertex of a solid is the point where the edges meet.

Example

The vertex of the square pyramid is shown.



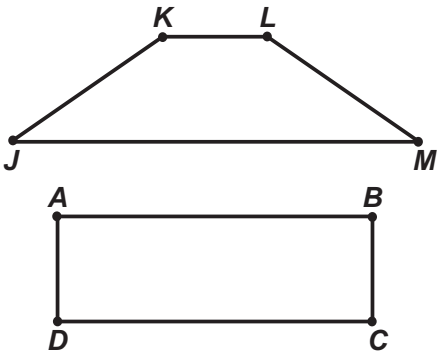
vertex of a polygon

A vertex of a polygon is a point where two sides of the polygon intersect. The plural of vertex is vertices.

Examples

In quadrilateral *JKLM*, *J* is a vertex, *K* is a vertex, *L* is a vertex, and *M* is a vertex.

In quadrilateral *ABCD*, *A* is a vertex, *B* is a vertex, *C* is a vertex, and *D* is a vertex.



Glossary

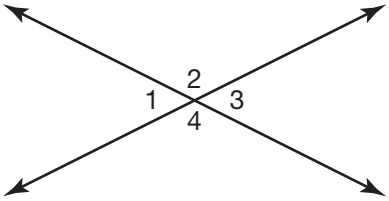
vertical angles

Two angles are vertical angles if their sides form two pairs of opposite rays.

Examples

Angles 1 and 3 are vertical angles.

Angles 2 and 4 are vertical angles.

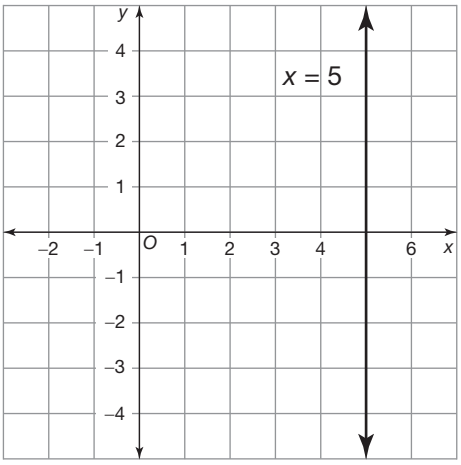


vertical line

A vertical line is a line of the form $x = a$, where a is a real number.

Example

The line represented by the equation $x = 5$ is a vertical line.

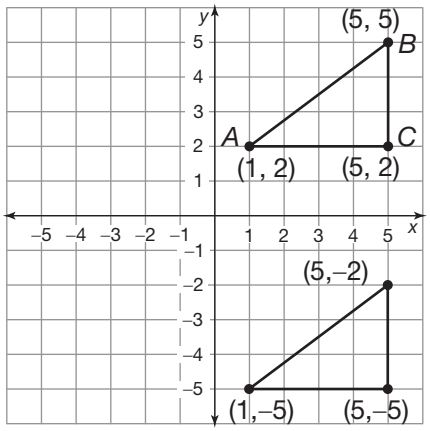


vertical translation

A vertical translation is a translation in which the preimage is moved either up or down to create the image.

Example

Triangle *ABC* is translated vertically 7 units down.

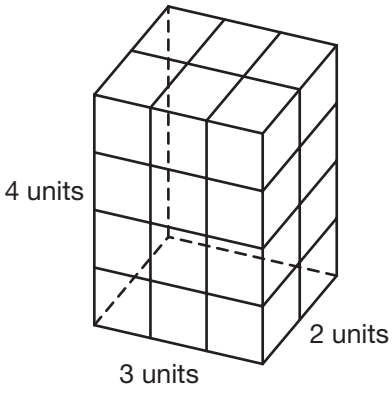


volume

The volume of a solid is the number of cubic units that will completely fill the interior of the solid.

Example

The volume of the right prism is 24 cubic units.



Glossary

Glossary