Glossary

A

Addition Property of Equality

The addition property of equality states: "If $a = b$, then $a + c = b + c$."

Example

If $x = 2$, then $x + 5 = 2 + 5$, or $x + 5 = 7$ is an example of the Addition Property of Equality.

Addition Rule for Probability

The Addition Rule for Probability states: "The probability that Event *A* occurs or Event *B* occurs is the probability that Event *A* occurs plus the probability that Event *B* occurs minus the probability that both *A* and *B* occur."

$$P(A \text{ or } B) = P(A) + P(B) = P(A \text{ and } B)$$

Example

You flip a coin two times. Calculate the probability of flipping a heads on the first flip or flipping a heads on the second flip.

Let *A* represent the event of flipping a heads on the first flip. Let *B* represent the event of flipping a heads on the second flip.

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$P(A \text{ or } B) = \frac{1}{2} + \frac{1}{2} - \frac{1}{4}$

$P(A \text{ or } B) = \frac{3}{4}$

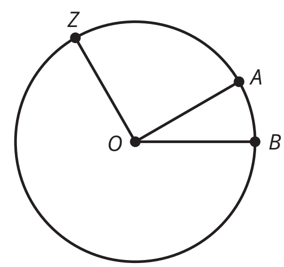
So, the probability of flipping a heads on the first flip or flipping a heads on the second flip is $\frac{3}{4}$.

adjacent arcs

Adjacent arcs are two arcs of the same circle sharing a common endpoint.

Example

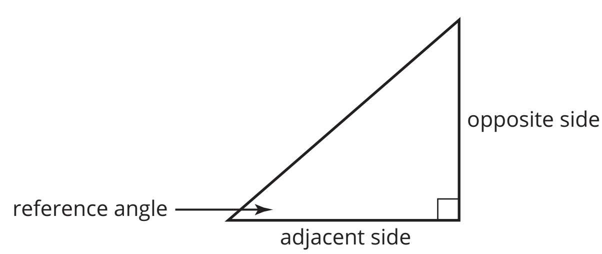
Arcs *ZA* and *AB* are adjacent arcs.



adjacent side

The adjacent side of a triangle is the side adjacent to the reference angle that is not the hypotenuse.

Example

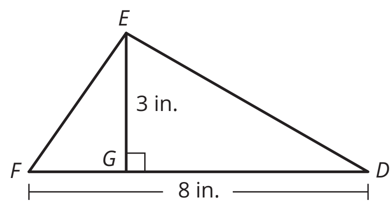


altitude

An altitude is a line segment drawn from a vertex of a triangle perpendicular to the line containing the opposite side.

Example

Segment *EG* is an altitude of △*FED*.



angle

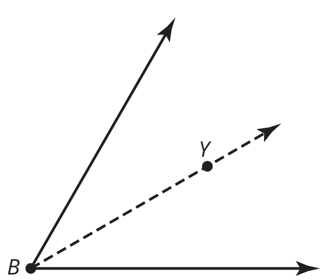
An angle is formed by two rays that share a common endpoint.

angle bisector

An angle bisector is a ray drawn through the vertex of an angle that divides the angle into two angles of equal measure, or two congruent angles.

Example

Ray *BY* is an angle bisector.

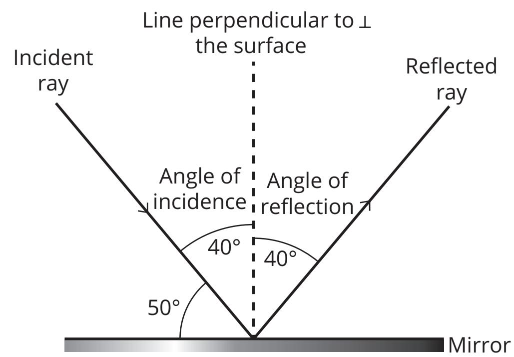


angle of incidence

The angle of incidence is the angle formed by the incidence ray and a line perpendicular to the surface of a mirror.

Example

The angle of incidence measures 40°.

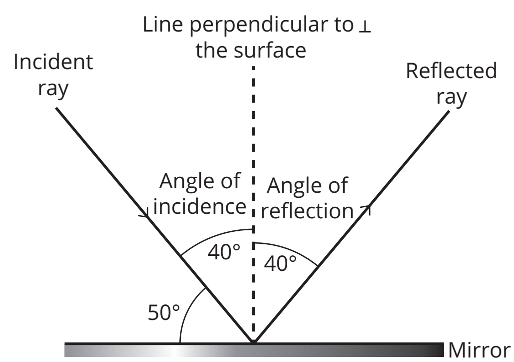


angle of reflection

The angle of reflection is the angle formed by the reflected ray and a line perpendicular to the surface of a mirror.

Example

The angle of reflection measures 40°.



arc length

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

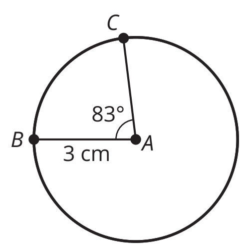
arc length $= 2\pi r \cdot \frac{x°}{360°}$

Example

In circle *A*, the radius $\overline{AB}$ is 3 centimeters and the measure of $\overset{\frown}{BC}$ is 83 degrees.

$$(2\pi r)\left(\frac{m\overset{\frown}{BC}}{360°}\right) = 2\pi(3)\left(\frac{83}{360°}\right)$$
$$\approx 4.35$$

So, the length of $\overset{\frown}{BC}$ is approximately 4.35 centimeters.

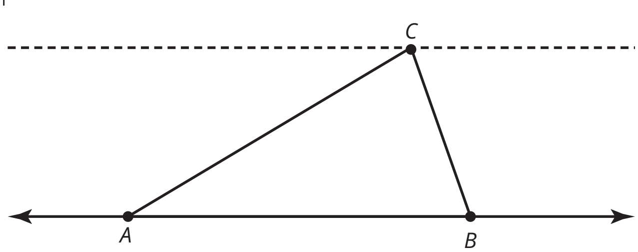


auxiliary line

An auxiliary line is a line that is drawn to help complete a geometric proof.

Example

An auxiliary line is drawn parallel to $\overleftrightarrow{AB}$ through point *C*.



B

base angles of an isosceles triangle

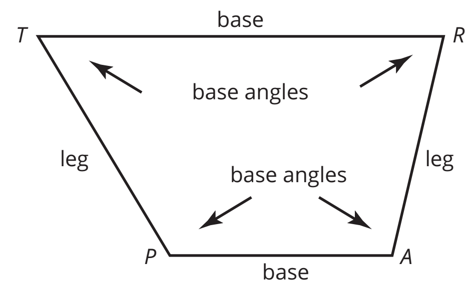
The congruent sides of an isosceles triangle are called the legs. The other side is called the base and the angle between the base and the congruent sides are called base angles.

base angles of a trapezoid

The base angles of a trapezoid are either pair of angles that share a base as a common side.

Example

Angle *T* and angle *R* are one pair of base angles of trapezoid *PART*. Angle *P* and angle *A* are another pair of base angles.



biconditional statement

A biconditional statement is a statement written in the form "if and only if *p*, then *q*." It is a combination of both a conditional statement and the converse of that conditional statement. A biconditional statement is true only when the conditional statement and the converse of the statement are both true.

Example

Consider the property of an isosceles trapezoid: "The diagonals of an isosceles trapezoid are congruent." The property states that if a trapezoid is isosceles, then the diagonals are congruent. The converse of this statement is true: "If the diagonals of a trapezoid are congruent, then the trapezoid is an isosceles trapezoid." So, this property can be written as a biconditional statement: "A trapezoid is isosceles if and only if its diagonals are congruent."

C

categorical data (qualitative data)

Categorical data are data that each fit into exactly one of several different groups, or categories. Categorical data are also called "qualitative data."

Example

Animals: lions, tigers, bears, etc.
U.S. Cities: Los Angeles, Atlanta, New York City, Dodge City, etc.

The set of animals and the set of U.S. cities are two examples of categorical data sets.

Cavalieri's Principle

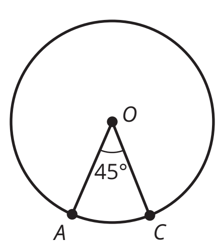
Cavalieri's Principle states that if all one-dimensional slices of two-dimensional figures have the same lengths, then the two-dimensional figures have the same area. The principle also states that given two solid figures included between parallel planes, if every plane cross section parallel to the given planes has the same area in both solids, then the volumes of the solids are equal.

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 circle O, $\angle AOC$ is a central angle and $\overparen{AC}$ is its intercepted arc. If $m\angle AOC = 45°$, then $m\overparen{AC} = 45°$.

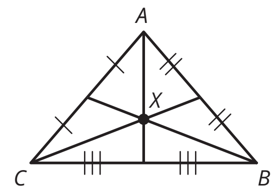


centroid

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

Example

Point X is the centroid of triangle $\triangle ABC$.

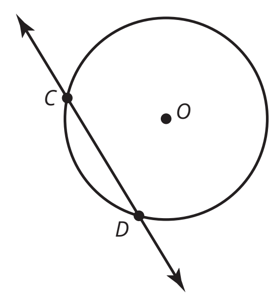


chord

A chord is a line 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.



circular permutation

A circular permutation is a permutation in which there is no starting point and no ending point. The circular permutation of n objects is $(n - 1)!$.

Example

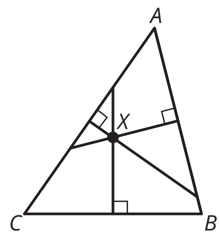
A club consists of four officers: a president (P), a vicepresident (VP), a secretary (S), and a treasurer (T). There are $(4 - 1)!$, or 6 ways for the officers to sit around a round table.

circumcenter

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

Example

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

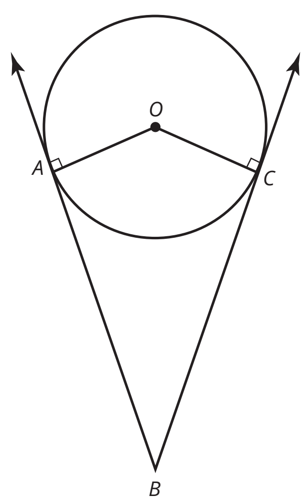


circumscribed angle

A circumscribed angle has its two sides tangent to a circle.

Example

Angle *ABC* is circumscribed in circle *O*.

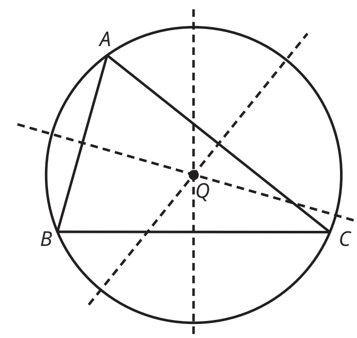


circumscribed circle

A circumscribed circle is a circle that passes through all the vertices of a polygon.

Example

Circle *Q* is circumscribed around $\triangle ABC$.



coincident

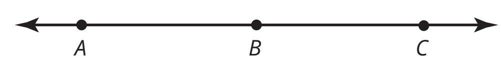
Two line segments are coincident if they lie exactly on top of each other.

collinear points

Collinear points are points that are located on the same line.

Example

Points *A*, *B*, and *C* are collinear.



combination

A combination is an unordered collection of items. One notation for the combinations of *r* elements taken from a collection of *n* elements is:

$$_{n}C_{r} = C(n, r) = C^{n}{}_{r}$$

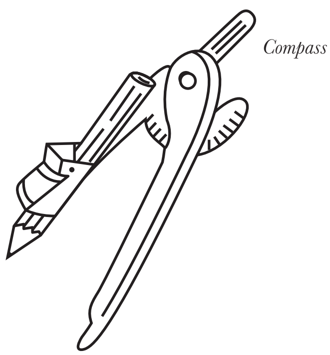
Example

The two-letter combinations of the letters *A*, *B*, and *C* are: *AB*, *AC*, *BC*.

compass

A compass is a tool used to create arcs and circles.

Example



complement of an event

The complement of an event is an event that contains all the outcomes in the sample space that are not outcomes in the event. In mathematical notation, if E is an event, then the complement of E is often denoted as $\overline{E}$ or E^c.

Example

A number cube contains the numbers 1 though 6. Let E represent the event of rolling an even number. The complement of Event E is rolling an odd number.

composite figure

A composite figure is a figure that is formed by combining different shapes.

compound event

A compound event combines two or more events, using the word "and" or the word "or."

Example

You roll a number cube twice. Rolling a six on the first roll and rolling an odd number on the second roll are compound events.

conclusion

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

Example

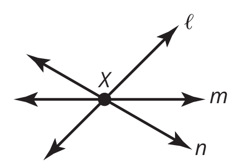
In the statement "If two positive numbers are added, then the sum is positive," the conclusion is "the sum is positive."

concurrent

Concurrent lines, rays, or line segments are three or more lines, rays, or line segments intersecting at a single point.

Example

Lines ℓ, m, and n are concurrent lines.



conditional statement

A conditional statement is a statement that can be written in the form "If p, then q."

conditional probability

A conditional probability is the probability of event B, given that event A has already occurred. The notation for conditional probability is $P(B|A)$, which reads, "the probability of event B, given event A."

Example

The probability of rolling a 4 or less on the second roll of a number cube, given that a 5 is rolled first, is an example of a conditional probability.

conjecture

A conjecture is a hypothesis that something is true. The hypothesis can later be proved or disproved.

construct

When you construct geometric figures, you create exact figures without measurements, using paper folding or a compass and a straightedge—and geometric reasoning.

contingency table

A two-way frequency table, also called a contingency table, shows the number of data points and their frequencies for two variables. One variable is divided into rows, and the other is divided into columns

converse

To state the converse of a conditional statement, interchange the hypothesis and the conclusion.
 Conditional Statement: If p, then q.
 Converse: If q, then p.

Example

Conditional Statement: If $a = 0$ or $b = 0$, then $ab = 0$.
Converse: If $ab = 0$, then $a = 0$ or $b = 0$.

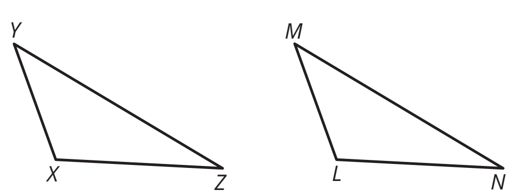
corresponding parts of congruent triangles are congruent (CPCTC)

CPCTC states that if two triangles are congruent, then each part of one triangle is congruent to the corresponding part of the other triangle.

Example

In the triangles shown, $\triangle XYZ \cong \triangle LMN$. Because corresponding parts of congruent triangles are congruent (CPCTC), the following corresponding parts are congruent.

- $\angle X \cong \angle L$
- $\angle Y \cong \angle M$
- $\angle Z \cong \angle N$
- $\overline{XY} \cong \overline{LM}$
- $\overline{YZ} \cong \overline{MN}$
- $\overline{XZ} \cong \overline{LN}$



cosine (cos)

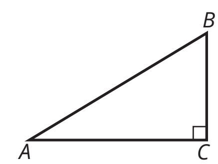
The cosine (cos) of an acute angle in a right triangle is the ratio of the length of the side adjacent to the angle to the length of the hypotenuse.

Example

In $\triangle ABC$, the cosine of $\angle A$ is:

$$\cos A = \frac{\text{length of side adjacent to } \angle A}{\text{length of hypotenuse}} = \frac{AC}{AB}$$

The expression "cos A" means "the cosine of angle A."



counterexample

A counterexample is a single example that shows that a statement is not true.

Example

Your friend claims that you add fractions by adding the numerators and then adding the denominators. A counterexample is $\frac{1}{2} + \frac{1}{2}$. The sum of these two fractions is 1. Your friend's method results in $\frac{1+1}{2+2}$, or $\frac{1}{2}$. Your friend's method is incorrect.

Counting Principle

The Counting Principle states that if action A can occur in m ways and for each of these m ways action B can occur in n ways, then actions A and B can occur in $m \cdot n$ ways.

Example

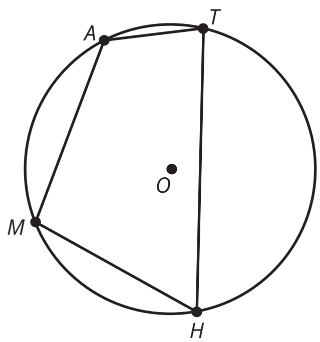
In the school cafeteria, there are 3 different main entrées and 4 different sides. So, there are $3 \cdot 4$, or 12 different lunches that can be created.

cyclic quadrilateral

A cyclic quadrilateral is a quadrilateral whose vertices all lie on a single circle.

Example

Quadrilateral *MATH* is a cyclic quadrilateral whose vertices all lie on circle *O*.



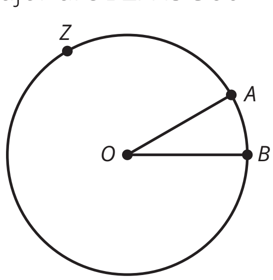
D

degree measure of an arc

The degree measure of a minor arc is equal to the degree measure of its central angle. The degree measure of a major arc is determined by subtracting the degree measure of the minor arc from 360°.

Example

The measure of minor arc *AB* is 30°. The measure of major arc *BZA* is $360° - 30° = 330°$.



dependent events

Dependent events are events for which the occurrence of one event has an impact on the occurrence of subsequent events.

Example

A jar contains 1 blue marble, 1 green marble, and 2 yellow marbles. You randomly choose a yellow marble without replacing the marble in the jar, and then randomly choose a yellow marble again. The events of randomly choosing a yellow marble first and randomly choosing a yellow marble second are dependent events because the 1st yellow marble was not replaced in the jar.

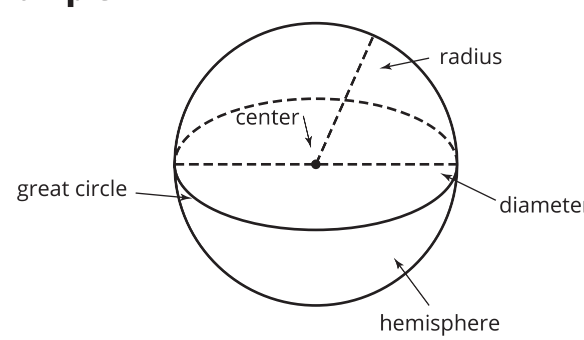
diagonal

A diagonal is a line segment joining two vertices of a polygon but is not a side of the polygon.

diameter of a sphere

The diameter of a sphere is a line segment with each endpoint on the sphere that passes through the center of the sphere.

Example

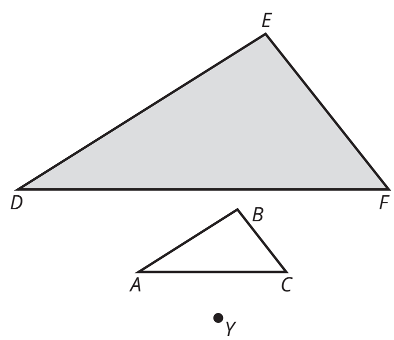


dilation

A dilation is a transformation of the figure in which the figure stretches or shrinks with respect to a fixed point, or center of dilation.

Example

Triangle *DEF* is a dilation of $\triangle ABC$. The center of dilation is point *Y*.

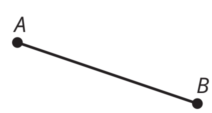


directed line segment

A directed line segment is assigned a direction from one endpoint to the other.

Example

Directed line segment *AB* is mathematically different from directed line segment *BA*.



disc

A disc is the set of all points on a circle and in the interior of a circle

Distance Formula

The Distance Formula states that if (x_1, y_1) and (x_2, y_2) are two points on the coordinate plane, then the distance d between (x_1, y_1) and (x_2, y_2) is given by $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

Example

To find the distance between the points (–1, 4) and (2, −5), substitute the coordinates into the Distance Formula.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(2 + 1)^2 + (-5 - 4)^2}$$

$$d = \sqrt{3^2 + (-9)^2}$$

$$d = \sqrt{9 + 81}$$

$$d = \sqrt{90}$$

$$d \approx 9.49$$

So, the distance between the points (–1, 4) and (2, −5) is approximately 9.49 units.

disjoint sets

Two or more sets are disjoint sets if they do not have any common elements.

Example

Let *N* represent the set of 9th grade students. Let *T* represent the set of 10th grade students. The sets *N* and *T* are disjoint sets because the two sets do not have any common elements. Any student can be in one grade only.

draw

To draw is to create a geometric figure using tools such as a ruler, straightedge, compass, or protractor. A drawing is more accurate than a sketch.

E

element

A member of a set is called an element of that set.

Example

Set B contains the elements a, b, and c.

$B = \{a, b, c\}$

Euclidean geometry

Euclidean geometry is a geometry of straight lines and flat planes based on postulates developed by the ancient Greek mathematician Euclid. There are other types of geometry, such as spherical geometry and hyperbolic geometry, which are used to study curved space.

event

An event is an outcome or a set of outcomes in a sample space.

Example

A number cube contains the numbers 1 through 6. Rolling a 6 is one event. Rolling an even number is another event.

expected value

The expected value is the average value when the number of trials in a probability experiment is large.

exterior angle

An exterior angle of a polygon is an angle that forms a linear pair with an interior angle of the polygon

extract the roots

To extract a root is the process of removing all perfect square numbers from under the radical symbol.

Example

To extract the root for $\sqrt{18}$, remove all perfect square numbers that are factors of 18.

$$\begin{aligned}\sqrt{18} &= \sqrt{9} \cdot 2 \\ &= \sqrt{3^2} \cdot 2 \\ &= 3\sqrt{2}\end{aligned}$$

F

factorial

The factorial of n, written as $n!$, is the product of all non-negative integers less than or equal to n.

Example

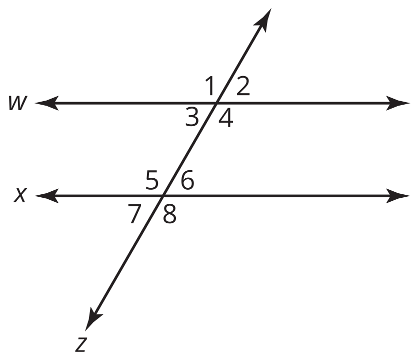
$3! = 3 \times 2 \times 1 = 6$

flow chart proof

A flow chart proof is a proof in which the steps and corresponding reasons are written in boxes. Arrows connect the boxes and indicate how each step and reason is generated from one or more steps and reasons.

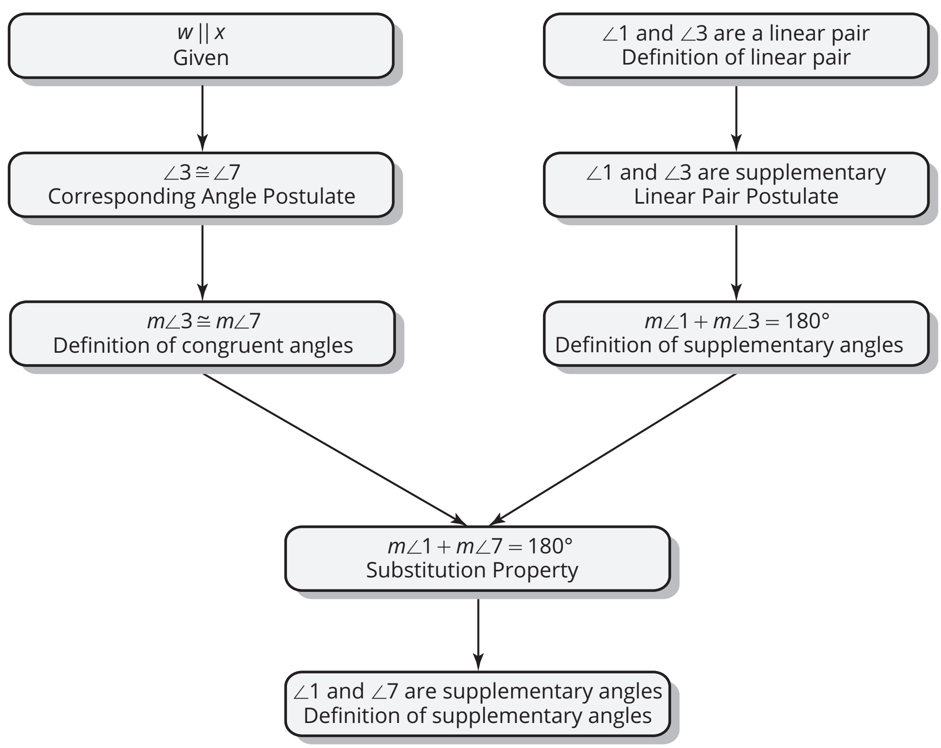
Example

Create a flow chart proof to prove that angle 1 and angle 7 are supplementary angles.



Given: $w \parallel x$, z is a transversal

Prove: $\angle 1$ and $\angle 7$ are a supplementary angles



frequency table

A frequency table shows the frequency of an item, number, or event appearing in a sample space.

Example

The frequency table shows the number of times a sum of two number cubes occurred.

Sum of Two Number Cubes	Frequency
2	1
3	2
4	3
5	4
6	5
7	6
8	5
9	4
10	3
11	2
12	1

G

geometric mean

The geometric mean of two positive numbers a and b is the positive number x such that $\frac{a}{x} = \frac{x}{b}$.

Example

The geometric mean of 3 and 12 is 6.

$\frac{3}{x} = \frac{x}{12}$

$x^2 = 36$

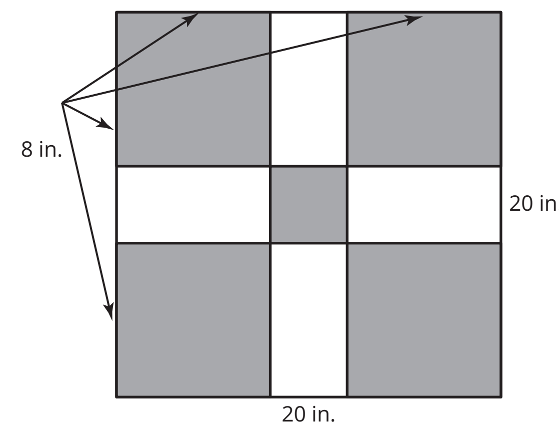
$x = 6$

geometric probability

Geometric probability is probability that involves a geometric measure, such as length, area, volume, and so on.

Example

A dartboard has the size and shape shown. The gray shaded area represents a scoring section of the dartboard. Calculate the probability that a dart that lands on a random part of the target will land in a gray scoring section.



Calculate the area of the dartboard: 20(20) = 400 in.^{2}

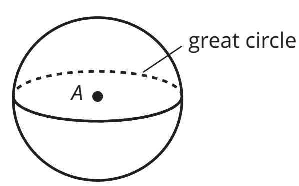
There are 4 gray scoring squares with 8-in. sides and a gray scoring square with 20 − 8 − 8 = 4-in. sides. Calculate the area of the gray scoring sections: 4(8)(8) + 4(4) = 272 in.^{2}

Calculate the probability that a dart will hit a gray scoring section: $\frac{272}{400} = 0.68 = 68\%$.

great circle of a sphere

The great circle of a sphere is a cross section of a sphere when a plane passes through the center of the sphere.

Example



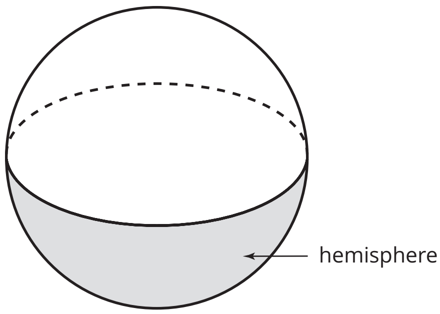
H

hemisphere

A hemisphere is half of a sphere bounded by a great circle.

Example

A hemisphere is shown.



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 "If the last digit of a number is a 5."

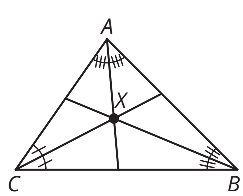
I

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 $\triangle ABC$.

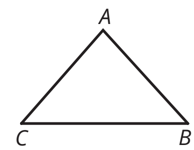


included angle

An included angle is an angle formed by two consecutive sides of a figure.

Example

In $\triangle ABC$, $\angle A$ is the included angle formed by consecutive sides $\overline{AB}$ and $\overline{AC}$.

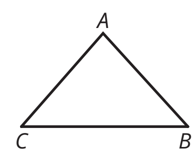


included side

An included side is a line segment between two consecutive angles of a figure.

Example

In $\triangle ABC$, $\overline{AB}$ is the included side formed by consecutive angles A and B.



independent events

Independent events are events for which the occurrence of one event has no impact on the occurrence of the other event.

Example

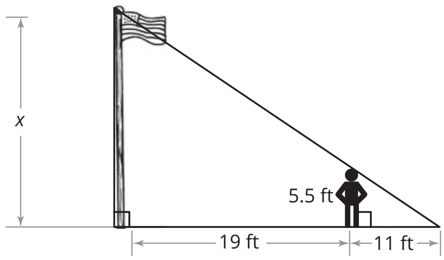
You randomly choose a yellow marble, replace the marble in the jar, and then randomly choose a yellow marble again. The events of randomly choosing a yellow marble first and randomly choosing a yellow marble second are independent events because the 1st yellow marble was replaced in the jar.

indirect measurement

Indirect measurement is a technique that uses proportions to determine a measurement when direct measurement is not possible.

Example

You can use a proportion to solve for the height *x* of the flagpole.



$$\frac{x}{5.5} = \frac{19 + 11}{11}$$

$$\frac{x}{5.5} = \frac{30}{11}$$

$$11x = 165$$

$$x = 15$$

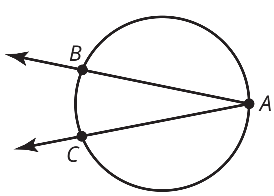
The flagpole is 15 feet tall.

inscribed angle

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

Example

Angle *BAC* is an inscribed angle. The vertex of angle *BAC* is on the circle and the sides of angle *BAC* contain the chords $\overline{AB}$ and $\overline{AC}$.

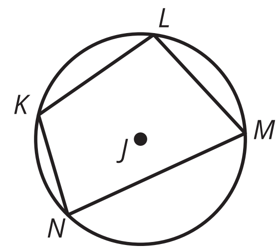


inscribed polygon

An inscribed polygon is a polygon drawn inside another polygon or circle in which all the vertices of the interior polygon lie on the outer figure.

Example

Quadrilateral *KLMN* is inscribed in circle *J*.

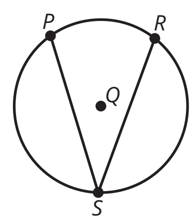


intercepted arc

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 of inscribed angle *PSR*.

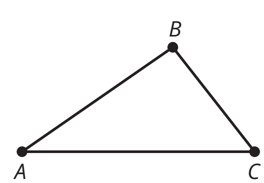


interior angle of a polygon

An interior angle of a polygon is an angle which is formed by consecutive sides of the polygon or shape.

Example

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



intersecting sets

Two or more sets are intersecting sets if they have common elements.

Example

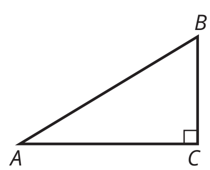
Let *V* represent the set of students who are on the girls' volleyball team. Let *M* represent the set of students who are in the math club. Julia is on the volleyball team and belongs to the math club. The sets *V* and *M* are intersecting sets because the two sets have at least one common element, Julia.

inverse cosine

The inverse cosine, or arccosine, of x is the measure of an acute angle whose cosine is x.

Example

In right triangle *ABC*, if $\cos A = x$, then $\cos^{-1} x = m\angle A$.

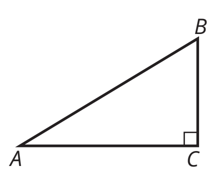


inverse sine

The inverse sine, or arcsine, of x is the measure of an acute angle whose sine is x.

Example

In right triangle *ABC*, if $\sin A = x$, then $\sin^{-1} x = m\angle A$.

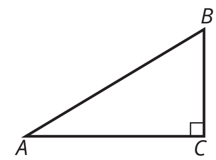


inverse tangent

The inverse tangent (or arctangent) of x is the measure of an acute angle whose tangent is x.

Example

In right triangle *ABC*, if $\tan A = x$, then $\tan^{-1} x = m\angle A$.

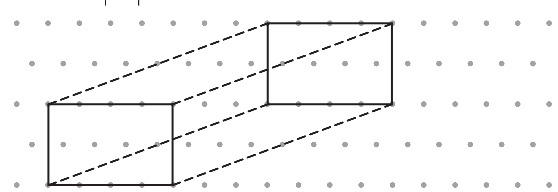


isometric paper

Isometric paper is often used by artists and engineers to create three-dimensional views of objects in two dimensions.

Example

The rectangular prism is shown on isometric paper.



isometry

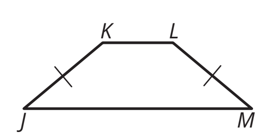
An isometry is a rigid motion transformation that preserves size and shape.

isosceles trapezoid

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

Example

In trapezoid *JKLM*, side $\overline{KL}$ is parallel to side $\overline{JM}$, and the length of side $\overline{JK}$ is equal to the length of side $\overline{LM}$, so trapezoid *JKLM* is an isosceles trapezoid.



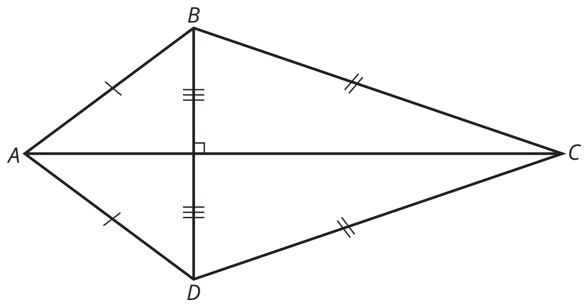
K

kite

A kite is a quadrilateral with two pairs of equal adjacent sides. If the diagonals of a quadrilateral are perpendicular, non-congruent, and only one bisects the other, it can only be classified as a kite.

Example

Quadrilateral *ABCD* is a kite.



L

Law of Reflection

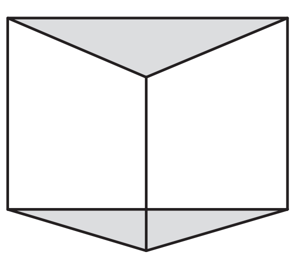
The Law of Reflection states that the measure of the angle of incidence equals the measure of the angle of reflection.

lateral face

A lateral face of a three-dimensional object is a face that is not a base.

Example

Each lateral face of a right triangular prism is a rectangle.



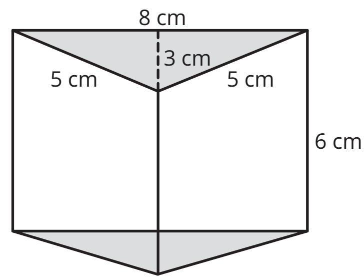
lateral surface area

The lateral surface area of a three-dimensional figure is the sum of the areas of its lateral faces.

Example

The lateral surface area of the right triangular prism is 108 square centimeters.

$$\begin{aligned}\text{Lateral surface area} &= (5 \times 6) + (5 \times 6) + (8 \times 6)\\ &= 30 + 30 + 48\\ &= 108\end{aligned}$$

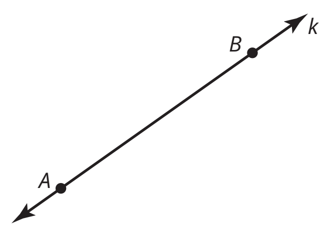


line

A line is made up of an infinite number 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*.



line segment

A line segment is a portion of a line that includes two points and all of the collinear points between the two points.

Example

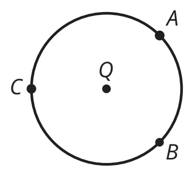
The line segment shown is named $\overline{AB}$ or $\overline{BA}$.

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.

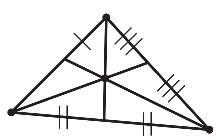


median

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

Example

The 3 medians are drawn on the triangle shown.

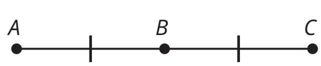


midpoint

A midpoint is a point that is exactly halfway between two given points.

Example

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



Midpoint Formula

The Midpoint Formula states that if (x_1, y_1) and (x_2, y_2) are two points on the coordinate plane, then the midpoint of the line segment that joins these two points is given by $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

Example

To find the midpoint between the points (−1, 4) and (2, −5), substitute the coordinates into the Midpoint Formula.

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) = \left(\frac{-1 + 2}{2}, \frac{4 - 5}{2}\right)$$
$$= \left(\frac{1}{2}, \frac{-1}{2}\right)$$

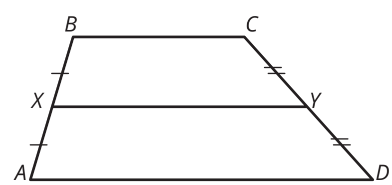
So, the midpoint between the points (−1, 4) and (2, −5) is $\left(\frac{1}{2}, -\frac{1}{2}\right)$.

midsegment

A midsegment of a polygon is any line segment that connects two midpoints of the sides of the polygon.

Example

Segment *XY* is a midsegment of trapezoid *ABCD*.

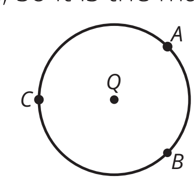


minor arc

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.



minor axis

The minor axis is the shortest line segment that runs through the center of an ellipse.

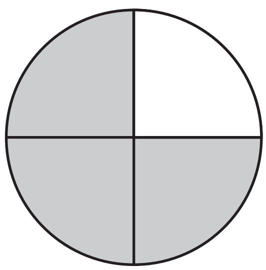
N

non-uniform probability model

When all probabilities in a probability model are not equivalent to each other, it is called a non-uniform probability model.

Example

Spinning the spinner shown represents a non-uniform probability model because the probability of landing on a shaded space is not equal to the probability of landing on a non-shaded space.



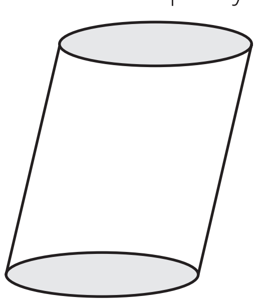
O

oblique cylinder

When a circle is translated through space in a direction that is not perpendicular to the plane containing the circle, the solid formed is an oblique cylinder.

Example

The prism shown is an oblique cylinder.

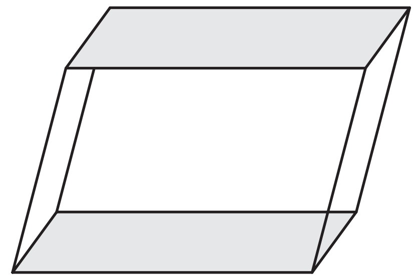


oblique rectangular prism

When a rectangle is translated through space in a direction that is not perpendicular to the plane containing the rectangle, the solid formed is an oblique rectangular prism.

Example

The prism shown is an oblique rectangular prism.

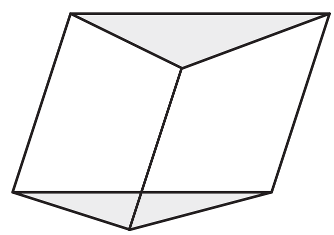


oblique triangular prism

When a triangle is translated through space in a direction that is not perpendicular to the plane containing the triangle, the solid formed is an oblique triangular prism.

Example

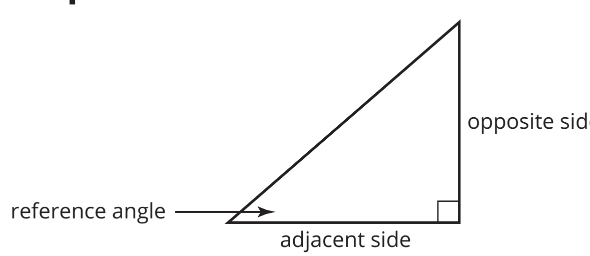
The prism shown is an oblique triangular prism.



opposite side

The opposite side of a triangle is the side opposite the reference angle.

Example



organized list

An organized list is a visual model for determining the sample space of events.

Example

The sample space for flipping a coin 3 times can be represented as an organized list.

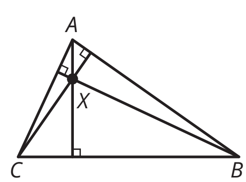
HHH	THH
HHT	THT
HTH	TTH
HTT	TTT

orthocenter

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

Example

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



outcome

An outcome is the result of a single trial of an experiment.

Example

Flipping a coin has two outcomes: heads or tails.

P

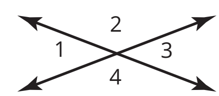
paragraph proof

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 shown is a paragraph proof that vertical angles 1 and 3 are congruent.

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 Supplement Theorem.

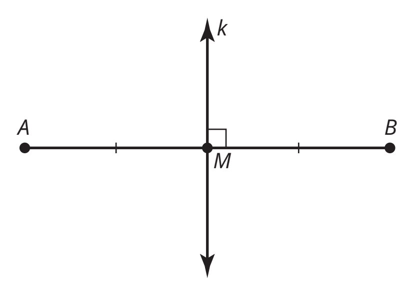


perpendicular bisector

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

Example

Line *k* is the perpendicular bisector of $\overline{AB}$. It is perpendicular to $\overline{AB}$, and intersects $\overline{AB}$ at midpoint *M* so that $AM = MB$.



permutation

A permutation is an ordered arrangement of items without repetition.

Example

The permutations of the letters *A*, *B*, and *C* are:

ABC *ACB*

BAC *BCA*

CAB *CBA*

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

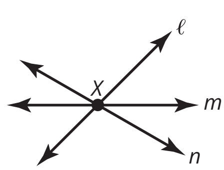
Point *A* is shown.

point of concurrency

A 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*.



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.

probability

The probability of an event is the ratio of the number of desired outcomes to the total number of possible outcomes, $P(A) = \frac{\text{desired outcomes}}{\text{possible outcomes}}$.

Example

When flipping a coin, there are 2 possible outcomes: heads or tails. The probability of flipping a heads is $\frac{1}{2}$.

probability model

A probability model lists the possible outcomes and the probability for each outcome. In a probability model, the sum of the probabilities must equal 1.

Example

The table shows a probability model for flipping a fair coin once.

Outcomes	Head (H)	Tails (H)
Probability	$\frac{1}{2}$	$\frac{1}{2}$

proof

A proof is a series of statements and corresponding reasons forming a valid argument that starts with a hypothesis and arrives at a conclusion.

Q

qualitative data

Qualitative data, or categorical data, are data for which each piece of data fits exactly one of several different groups or categories.

Examples

Animals: lions, tigers, bears, etc.
Colors: blue, green, red, ect.

R

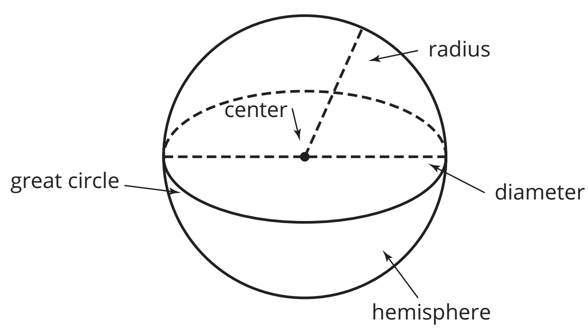
radian

One radian is defined as the measure of a central angle whose arc length is the same as the radius of the circle.

radius of a sphere

The radius of a sphere is a line segment with one endpoint on the sphere and one endpoint at the center.

Example



rationalize the denominator

To rationalize the denominator is the process of eliminating a radical from the denominator of an expression. To rationalize the denominator, multiply by a form of one so that the radicand of the radical in the denominator is a perfect square.

Example

Rationalize the denominator of the expression $\frac{5}{\sqrt{3}}$.

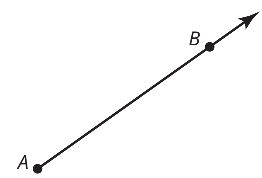
$$\frac{5}{\sqrt{3}} = \frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$
$$= \frac{5\sqrt{3}}{\sqrt{9}}$$
$$= \frac{5\sqrt{3}}{3}$$

ray

A ray is a portion of a line that begins with a single point and extends infinitely in one direction.

Example

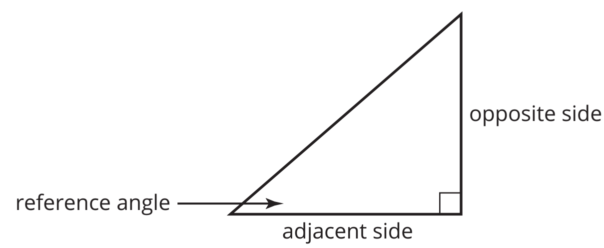
The ray shown is ray *AB*.



reference angle

A reference angle is the angle of the right triangle being considered. The opposite side and adjacent side are named based on the reference angle.

Example

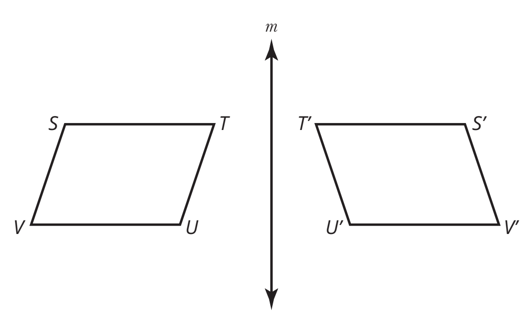


reflection

A reflection is a rigid motion that "flips" a figure across a line. A reflection as a function, R_ℓ, takes as its input, P, the location of a point with respect to some line of reflection ℓ and outputs $R_\ell(P)$, or the opposite of the location of P with respect to the line of reflection.

Example

$R_m(STUV) = S'T'U'V'$

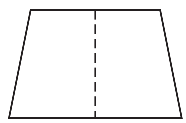


reflectional symmetry

A plane figure has reflectional 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

The figure shown has reflectional symmetry.



Reflexive Property

The reflexive property states that $a = a$.

Example

The statement $2 = 2$ is an example of the Reflexive Property.

relative frequency

A relative frequency is the ratio or percent of occurrences within a category to the total of the category.

Example

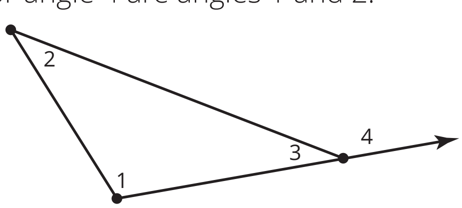
John surveys 100 students in his school about their favorite school subject. Of the 100 students, 37 chose math as their favorite subject. The relative frequency of students show selected math as their favorite subject is $\frac{37}{100}$, or 37%.

remote interior angles

The remote interior angles of a triangle are the two angles that are not adjacent to the specified exterior angle.

Example

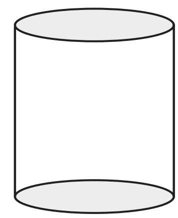
The remote interior angles with respect to exterior angle 4 are angles 1 and 2.



right cylinder

A disc translated through space in a direction perpendicular to the plane containing the disc forms a right cylinder.

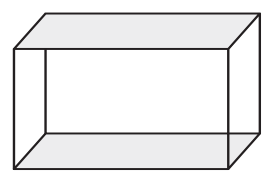
Example



right rectangular prism

A rectangle translated through space in a direction perpendicular to the plane containing the rectangle forms a right rectangular prism.

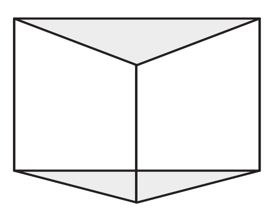
Example



right triangular prism

A triangle translated through space in a direction perpendicular to the plane containing the triangle forms a right triangular prism.

Example



rigid motion

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

Examples

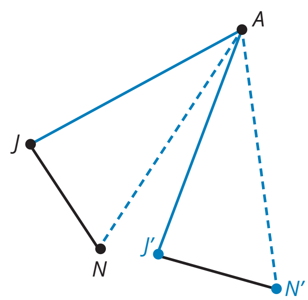
Translations, reflections, and rotations are examples of rigid motion transformations.

rotation

A rotation is a rigid motion that "spins" a figure about a point. A rotation as a function maps its input, a point *P*, to another location, *f*(*P*). This movement to a new location is defined by a center of rotation, *E*, and a rotation angle, *t*. For this reason, a rotation function is written as $R_{E,t}(P)$.

Example

$R_{A,\,40}(\overline{JN}) = \overline{J'N'}$

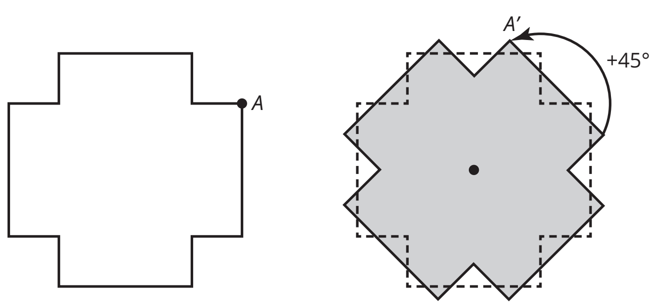


rotation angle

A rotation angle is a directed angle based on a circle. Positive rotation angles turn counterclockwise, and negative rotation angles turn clockwise.

Example

The rotation angle shown rotates point *A* 45° counterclockwise.

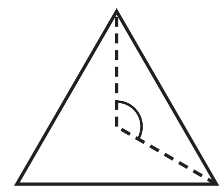


rotational symmetry

A plane figure can also have rotational symmetry if you can rotate the figure more than 0° but less than 360° and the resulting figure is the same as the original figure in the original position.

Example

The figure shown has rotational symmetry.



Rule of Compound Probability involving *and*

The Rule of Compound Probability involving *and* states: "If Event *A* and Event *B* are independent, then the probability that Event *A* happens and Event *B* happens is the product of the probability that Event *A* happens and the probability that Event *B* happens, given that Event *A* has happened."

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

Example

You flip a coin two times. Calculate the probability of flipping a heads on the first flip and flipping a heads on the second flip.

Let *A* represent the event of flipping a heads on the first flip. Let *B* represent the event of flipping a heads on the second flip.

$P(A \text{ and } B) = P(A) \cdot P(B)$

$P(A \text{ and } B) = \frac{1}{2} \cdot \frac{1}{2}$

$P(A \text{ or } B) = \frac{1}{4}$

So, the probability of flipping a heads on the first flip and flipping a heads on the second flip is $\frac{1}{4}$.

S

sample space

A list of all possible outcomes of an experiment is called a sample space.

Example

Flipping a coin two times consists of four outcomes: HH, HT, TH, and TT.

secant (sec)

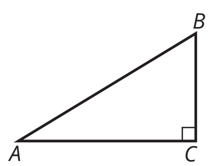
The secant (sec) of an acute angle in a right triangle is the ratio of the length of the hypotenuse to the length of the side adjacent to the angle.

Example

In $\triangle ABC$, the secant of $\angle A$ is:

$$\sec A = \frac{\text{length of hypotenuse}}{\text{length of side adjacent to } \angle A} = \frac{AB}{AC}$$

The expression "sec *A*" means "the secant of angle *A*."

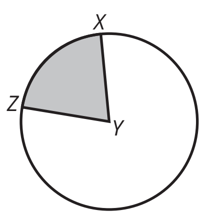


sector of a circle

A sector of a circle is a region of the circle bounded by two radii and the included arc.

Example

In circle *Y*, $\overset{\frown}{XZ}$, radius $\overline{XY}$, and radius $\overline{YZ}$ form a sector.

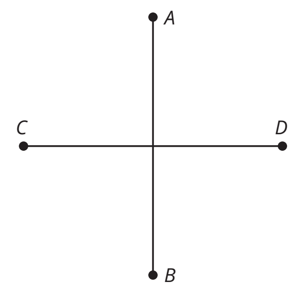


segment bisector

A segment bisector is a line, line segment, or ray that divides a line segment into two line segments of equal measure, or two congruent line segments.

Example

$\overline{AB}$ is a segment bisector of $\overline{CD}$.

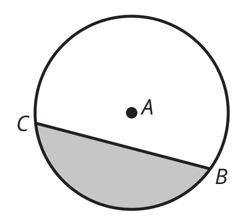


segment of a circle

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

Example

In circle *A*, chord $\overline{BC}$ and $\overset{\frown}{BC}$ are the boundaries of a segment of the circle.



set

A set is a collection of items. If *x* is a member of set *B*, then *x* is an element of set *B*.

Example

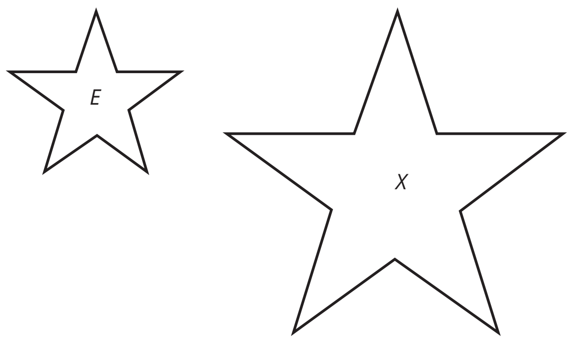
Let *E* represent the set of even whole numbers.
$E = \{2, 4, 6, 8, \ldots\}$

similar figures

Similar figures are geometric figures where all pairs of corresponding angles are congruent and the lengths of all corresponding sides are proportional. Dilations produce similar figures.

Example

Figures *E* and *X* are similar figures.

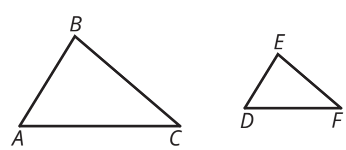


similar triangles

Similar triangles are triangles that have all pairs of corresponding angles congruent and all corresponding sides are proportional.

Example

$\triangle ABC \sim \triangle DEF$



sine (sin)

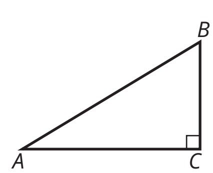
The sine (sin) of an acute angle in a right triangle is the ratio of the length of the side opposite the angle to the length of the hypotenuse.

Example

In $\triangle ABC$, the sine of $\angle A$ is:

$$\sin A = \frac{\text{length of side opposite } \angle A}{\text{length of hypotenuse}} = \frac{BC}{AB}$$

The expression "sin *A*" means "the sine of angle *A*."



sketch

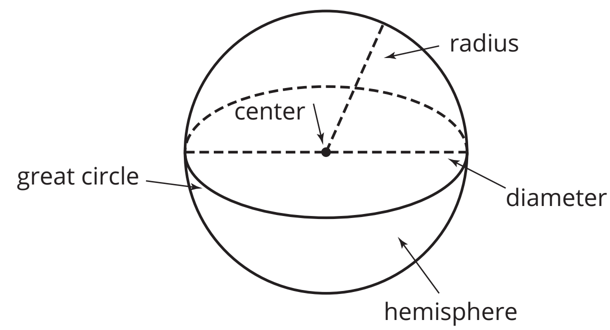
To sketch is to create a geometric figure without using tools such as a ruler, straightedge, compass, or protractor. A drawing is more accurate than a sketch.

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

A sphere is shown.



Spherical Geometry

Spherical geometry is a geometry that substitutes a sphere for a plane.

straightedge

A straightedge is a ruler with no numbers.

Substitution Property

The Substitution Property of Equality states: "If *a* and *b* are real numbers and $a = b$, then a can be substituted for *b*."

Example

If $x = 2$ and $3x + 4 = 10$, then $3(2) + 4 = 10$.

Subtraction Property of Equality

The Subtraction Property of Equality states: "If $a = b$, then $a - c = b - c$."

Example

If $x + 5 = 7$, then $x + 5 - 5 = 7 - 5$, or $x = 2$ is an example of the Subtraction Property of Equality.

T

tangent (tan)

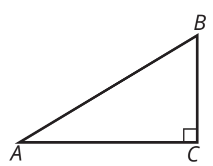
The tangent (tan) of an acute angle in a right triangle is the ratio of the length of the side opposite the angle to the length of the side adjacent to the angle.

Example

In $\triangle ABC$, the tangent of $\angle A$ is:

$$\tan A = \frac{\text{length of side opposite } \angle A}{\text{length of side adjacent to } \angle A} = \frac{BC}{AC}$$

The expression "tan A" means "the tangent of angle A."

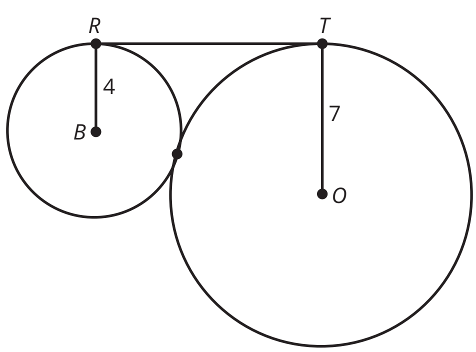


tangent circles

Tangent circles are circles that lie in the same plane and intersect at exactly one point.

Example

Circles O and B are tangent circles.

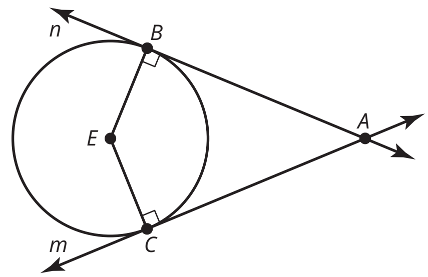


tangent segment

A tangent segment is a line segment formed by connecting a point outside of the circle to a point of tangency.

Example

Line segment AB and line segment AC are tangent segments.



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 $a^2 + b^2 = c^2$.

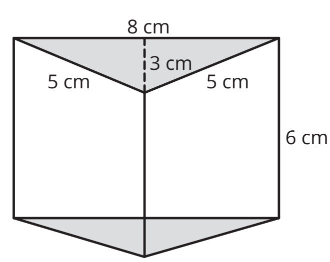
total surface area

The total surface area of a three-dimensional figure is the sum of the areas of its bases and lateral faces.

Example

The total surface area of the right triangular prism is 132 square centimeters.

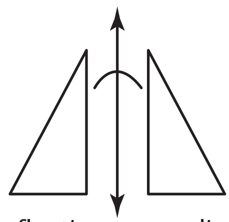
$$\begin{aligned}\text{Total surface area} &= (5 \times 6) + (5 \times 6) + (8 \times 6) \\ &\quad + \tfrac{1}{2}(8 \times 3) + \tfrac{1}{2}(8 \times 3) \\ &= 30 + 30 + 48 + 12 + 12 \\ &= 132\end{aligned}$$



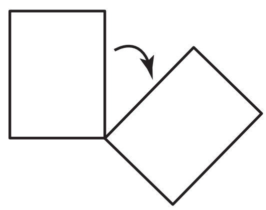
transformation

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.

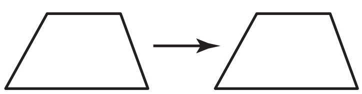
Example



reflection over a line



rotation about a point



translation

Transitive Property

The Transitive Property states: "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 rigid motion that "slides" a figure up, down, left, or right. A translation as a function, T_{AB}, takes as its input a set of pre-image points and outputs a set of image points. The pre-image points are translated a distance of AB in the direction AB.

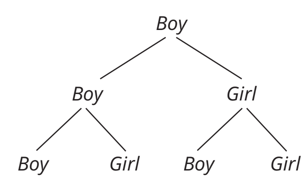
Example

$T_{AB}(P) = P'$ and $T_{AC}(P) = P''$

tree diagram

A tree diagram is a diagram that illustrates sequentially the possible outcomes of a given situation.

Example



truth table

A truth table is a table that summarizes all possible truth values for a conditional statement $p \rightarrow q$.

truth value

The truth value of a conditional statement is whether the statement is true or false.

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 shown is a two-column proof.

Statements	Reasons
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 Supplement Theorem

two-way frequency table (contingency table)

A two-way frequency table, also called a contingency table, shows the number of data points and their frequencies for two variables. One variable is divided into rows, and the other is divided into columns.

Example

The two-way frequency table shows the hand(s) favored by people who do and do not participate in individual or team sports.

Sports Participation

Favored Hand	Individual	Team	Does Not Play	Total
Left	3	13	8	24
Right	6	23	4	33
Mixed	1	3	2	6
Total	10	39	14	63

two-way relative frequency table

A two-way relative frequency table displays the relative frequencies for two categories of data.

Example

The two-way relative frequency table shows the hand(s) favored by people who do and do not participate in individual or team sports.

	Individual	Team	Does Not Play	Total
Left	$\frac{3}{63} \approx 4.8\%$	$\frac{13}{63} \approx 20.6\%$	$\frac{8}{63} \approx 12.7\%$	$\frac{24}{63} \approx 38.1\%$
Right	$\frac{6}{63} \approx 9.5\%$	$\frac{23}{63} \approx 36.5\%$	$\frac{4}{63} \approx 6.3\%$	$\frac{33}{63} \approx 52.4\%$
Mixed	$\frac{1}{63} \approx 1.6\%$	$\frac{3}{63} \approx 4.8\%$	$\frac{2}{63} \approx 3.2\%$	$\frac{6}{63} \approx 9.5\%$
Total	$\frac{10}{63} \approx 15.9\%$	$\frac{39}{63} \approx 61.9\%$	$\frac{14}{63} \approx 22.2\%$	$\frac{63}{63} = 100\%$

two-way table

A two-way table shows the relationship between two data sets, one data set is organized in rows and the other data set is organized in columns.

Example

The two-way table shows all the possible sums that result from rolling two number cubes once.

2nd Number Cube

1st Number Cube	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

U

uniform probability model

A uniform probability model occurs when all the probabilities in a probability model are equally likely to occur.

Example

Rolling a number cube represents a uniform probability model because the probability of rolling each number is equal.

union of sets

A union of sets is a set formed by combining all the members of the sets. A member may be listed only once.

Example

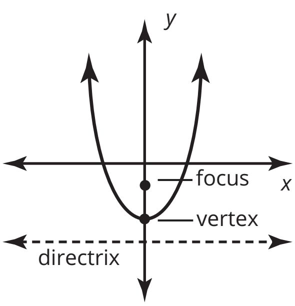
Let B represent the set of students in the 11th grade band. Let C represent the set of students in the 11th grade chorus. The union of these two sets would be all the students in the 11th grade band or the 11th grade chorus. A student in both would be listed only once.

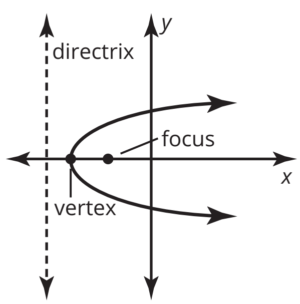
V

vertex of a parabola (conic section)

The vertex of a parabola is the point on the axis of symmetry which is exactly midway between the focus and the directrix. It is also the point where the parabola changes direction.

Example





vertices

The endpoints of the major axis of an ellipse are the vertices.

Postulates and Theorems

30°-60°-90° Triangle Theorem

The length of the hypotenuse in a 30°-60°-90° triangle is 2 times the length of the shorter leg, and the length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.

45°-45°-90° Triangle Theorem

The length of the hypotenuse in a 45°-45°-90° triangle is $\sqrt{2}$ times the length of a leg.

Alternate Exterior Angles Theorem

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

Alternate Exterior Angles Converse Theorem

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

Alternate Interior Angles Theorem

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

Alternate Interior Angles Converse Theorem

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

Angle Addition Postulate

If point D lies in the interior of $\angle ABC$, then $m\angle ABD + m\angle DBC = m\angle ABC$.

Angle-Side-Angle Congruence Theorem (ASA)

If two angles and the included side of one triangle are congruent to the corresponding two angles and the included side of another triangle, then the triangles are congruent.

Angle-Angle-Side Congruence Theorem

If two angles and the non-included side of one triangle are congruent to two angles and the non-included side of another triangle, then the two triangles are congruent.

Angle-Angle Similarity Theorem

If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.

Angle Bisector/Proportional Side Theorem

A bisector of an angle in a triangle divides the opposite side into two segments whose lengths are in the same ratio as the lengths of the sides adjacent to the angle.

Arc Addition Postulate

The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

Congruent Chord-Congruent Arc Theorem

If two chords of the same circle or congruent circles are congruent, then their corresponding arcs are congruent.

Congruent Chord-Congruent Converse Arc Theorem

If arcs of the same circle or congruent circles are congruent, then their corresponding chords are congruent.

Congruent Supplement Theorem

If two angles are supplements of the same angle or of congruent angles, then the angles are congruent.

Converse of the Triangle Proportionality Theorem

If a line divides two sides of a triangle proportionally, then it is parallel to the third side.

Corresponding Angles Theorem

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

Corresponding Angles Converse Theorem

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

Diameter-Chord Theorem

If a circle's diameter is perpendicular to a chord, then the diameter bisects the chord and bisects the arc determined by the chord.

Equidistant Chord Theorem

If two chords of the same circle or congruent circles are congruent, then they are equidistant from the center of the circle.

Equidistant Chord Converse Theorem

If two chords of the same circle or congruent circles are equidistant from the center of the circle, then the chords are congruent.

Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles.

Exterior Angles of a Circle Theorem

If an angle is formed by two intersecting chords or secants of a circle such that the vertex of the angle is in the exterior of the circle, then the measure of the angle is half of the difference of the measures of the arcs intercepted by the angle.

Hypotenuse-Angle (HA) Congruence Theorem

If the hypotenuse and an acute angle of one right triangle are congruent to the hypotenuse and an acute angle of another right triangle, then the two triangles are congruent.

Hypotenuse-Leg (HL) Congruence Theorem

If the hypotenuse and leg of one right triangle are congruent to the hypotenuse and leg of another right triangle, then the triangles are congruent.

Inscribed Angle Theorem

The measure of an inscribed angle is half the measure of its intercepted arc.

Inscribed Right Triangle-Diameter Theorem

If a triangle is inscribed in a circle such that one side of the triangle is a diameter of the circle, then the triangle is a right triangle.

Inscribed Quadrilateral-Opposite Angles Theorem

If a quadrilateral is inscribed in a circle, then the opposite angles are supplementary.

Interior Angles of a Circle Theorem

If an angle is formed by two intersecting chords or secants of a circle such that the vertex of the angle is in the interior of the circle, then the measure of the angle is half of the sum of the measures of the arcs intercepted by the angle and its vertical angle.

Isosceles Triangle Base Angles Theorem

If two sides of a triangle are congruent, then the angles opposite these sides are congruent.

Isosceles Triangle Base Angles Converse Theorem

If two angles of a triangle are congruent, then the sides opposite these angles are congruent.

Leg-Angle (LA) Congruence Theorem

If the leg and an acute angle of one right triangle are congruent to the corresponding leg and acute angle of another right triangle, then the triangles are congruent.

Leg-Leg (LL) Congruence Theorem

If the two corresponding shorter legs of two right triangles are congruent, then the two triangles are congruent.

Linear Pair Postulate

If two angles form a linear pair, then the angles are supplementary.

Parallelogram/Congruent-Parallel Side Theorem

If one pair of opposite sides of a quadrilateral is both congruent and parallel, then the quadrilateral is a parallelogram.

Perpendicular Bisector Theorem

Points on a perpendicular bisector of a line segment are equidistant from the segment's endpoints.

Perpendicular Bisector Converse Theorem

If a point is equidistant from the endpoints of a line segment, then the point lies on the perpendicular bisector of the segment.

Perpendicular/Parallel Line Theorem

If two lines are perpendicular to the same line, then the two lines are parallel to each other.

Proportional Segments Theorem

If three parallel lines intersect two transversals, then they divide the transversals proportionally.

Right Angle Congruence Postulate

All right angles are congruent.

Right Triangle/Altitude Similarity Theorem

If an altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.

Right Triangle Altitude/Hypotenuse Theorem

The measure of the altitude drawn from the vertex of the right angle of a right triangle to its hypotenuse is the geometric mean between the measures of the two segments of the hypotenuse.

Right Triangle Altitude/Leg Theorem

If the altitude is drawn to the hypotenuse of a right triangle, each leg of the right triangle is the geometric mean of the hypotenuse and the segment of the hypotenuse adjacent to the leg.

Same-Side Exterior Angles Theorem

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

Same-Side Exterior Angles Converse Theorem

If two lines intersected by a transversal form supplementary same-side exterior angles, then the lines are parallel.

Same-Side Interior Angles Theorem

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

Same-Side Interior Angles Converse Theorem

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

Segment Addition Postulate

If point B is on $\overline{AC}$ and between points A and C, then $AB + BC = AC$.

Side-Angle-Side Congruence Theorem (SAS)

If two sides and the included angle of one triangle are congruent to the corresponding sides and the included angle of the second triangle, then the triangles are congruent.

Side-Angle-Side Similarity Theorem

If two of the corresponding sides of two triangles are proportional and the included angles are congruent, then the triangles are similar.

Side-Side-Side Congruence Theorem (SSS)

If three sides of one triangle are congruent to the corresponding sides of another triangle, then the triangles are congruent.

Side-Side-Side Similarity Theorem

If all three corresponding sides of two triangles are proportional, then the triangles are similar.

Tangent Segment Theorem

If two tangent segments are drawn from the same point on the exterior of a circle, then the tangent segments are congruent.

Tangent to a Circle Theorem

A line drawn tangent to a circle is perpendicular to a radius of the circle drawn to the point of tangency.

Trapezoid Midsegment Theorem

The midsegment that connects the legs of the trapezoid is parallel to each of the bases and its length is one half the sum of the lengths of the bases.

Triangle Midsegment Theorem

The midsegment of a triangle is parallel to the third side of the triangle and is half the measure of the third side of the triangle.

Triangle Proportionality Theorem

If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.

Triangle Sum Theorem

The sum of the measures of the interior angles of a triangle is equal to 180°.

Vertical Angle Theorem

Vertical angles are congruent.