

Angles

Classification

Acute

Right

Obtuse

Complementary \angle 's – 2 \angle 's whose sum is 90

Supplementary \angle 's – 2 \angle 's whose sum is 180

Angle Addition Postulate

If the exterior sides of two adj \angle 's lie in a line, they are supplementary

If the exterior sides of two adj \angle 's lie in perpendicular lines, they are complementary

All vertical \angle 's are equal

Angle bisector – ray AX is said to be the bisector of \angle BAC if X lies in the interior and \angle BAX = \angle XAC

Angles formed by parallel lines

If two parallel lines are cut by a transversal, then

The corresponding \angle 's are equal

The alt int \angle 's are equal

The alt ext \angle 's are equal

The same side interior \angle 's = 180°

Angles formed by polygons

The sum of the interior angles of a triangle is 180°

The exterior \angle of a triangle is equal to the sum of the 2 remote int \angle 's

The sum of the interior angles of a convex polygon is given by $(n - 2)180^\circ$

The sum of the exterior angles of a convex polygon is 360°

Opposite \angle 's of a parallelogram are equal

Diagonals of a rhombus bisect a pair of opposite \angle 's

Angles formed with circles

Central \angle is equal to its intercepted arc

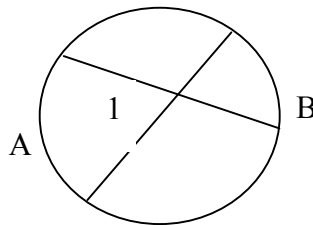
Inscribed \angle is equal to HALF the intercepted arc

If a quad is inscribed in a circle, the opposite \angle 's are supplementary

An \angle inscribed in a semicircle is a right angle

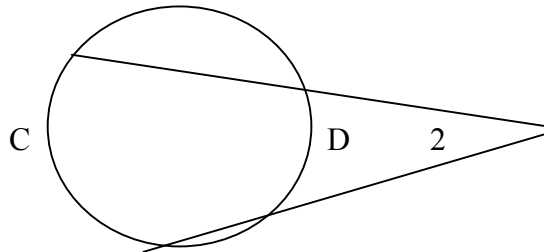
Two secants intersect in the interior of a circle, the measure of the \angle formed is equal to one half the sum of the intercepted arcs.

$$\angle 1 = \frac{1}{2}(A + B)$$



Two secants are drawn to a circle from an exterior point, the \angle formed is equal to one half the difference of the intercepted arcs.

$$\angle 2 = \frac{1}{2}(C - D)$$



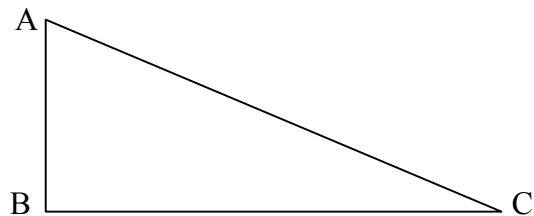
Right Triangle Trigonometry

SOHCAHTOA

$$\sin A = \frac{\text{opp}}{\text{hyp}}$$

$$\cos A = \frac{\text{adj}}{\text{hyp}}$$

$$\tan A = \frac{\text{opp}}{\text{adj}}$$



Triangles

Congruence Methods

SSS	HL
SAS	LL
ASA	HA
AAS	LA

Triangles

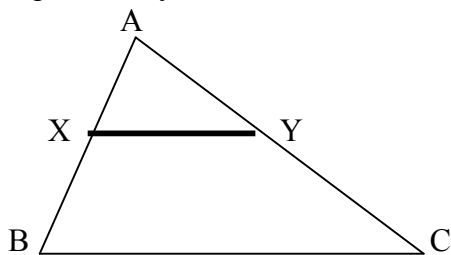
The sum of the interior angles of a triangle is 180°

If two angles of one triangle are equal to two angles of another triangle, the third angles must be equal.

The exterior angle of a triangle is equal to the sum of the 2 remote interior \angle 's

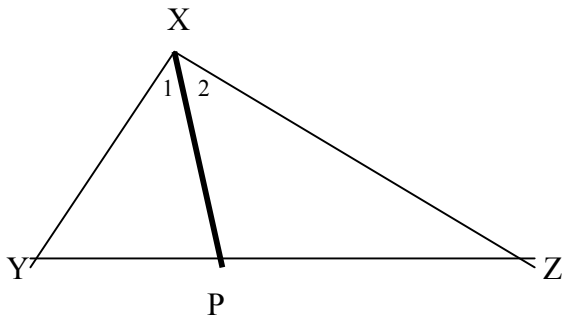
If 2 \angle 's of a triangle are congruent, the sides opposite those \angle 's are congruent

If a line is parallel to one side of a triangle and intersects the other 2 sides, it divides them proportionally.



$$\frac{AX}{XB} = \frac{AY}{YC}$$

If a ray bisects an angle of a triangle, it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.



$$\frac{YP}{YZ} = \frac{XP}{XZ}$$

The segment joining the midpoints of 2 sides of a triangle is parallel to the third side and half the length of the third side

The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

If one side of a triangle is longer than a second side, then the angle opposite the first side is larger than the angle opposite the second side.

Angle-Angle Postulate – If 2 \angle 's of one triangle are equal to 2 \angle 's of another triangle, the triangles are similar.

Right Triangles

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

Pythagorean Theorem – In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the legs.

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

Special Right Triangles

45-45-90 If each acute angle of a right triangle has measure 45, the hypotenuse is $\sqrt{2}$ times as long as the leg

30-60-90 If the acute angles of a right triangle have measures of 30° and 60° ; the hypotenuse is twice as long as the shorter leg and the longer leg is $\sqrt{3}$ times the shorter leg.

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Area

lw	rectangle
bh	parallelogram
$\frac{1}{2}bh$	triangle
$\frac{1}{2}(B+b)h$	trapezoid
$\frac{1}{2}ap$	regular polygon
πr^2	circle

To find the lateral area, find the area of all the sides.

To find surface area, find the lateral area and add the areas of the top and bottom

To find the volume of prisms, multiply the area of the base by the height of the prism.

To find the volume of a pyramid, multiply the area of the base by the height of the pyramid, divide that result by 3.

Circumference is $2\pi r$ or πd

Line Segments

If M is the midpoint of AB, then $AM = MB$

Betweenness – If T lies on AC, the $AT + TC = AC$

A radius is perpendicular to a tangent

To determine the number of sides in a regular polygon, divide 360 by the exterior \angle .

$c^2 = a^2 + b^2$ - Pythagorean Theorem

Use the Pythagorean Theorem to find the sides of a right triangle, to find the heights of triangles, prisms, etc.

Distance Formula

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

Midpoint Formula

$$mdpt = \left(\frac{x + x_1}{2}, \frac{y + y_1}{2} \right)$$

Slope

$$m = \frac{y - y_1}{x - x_1}$$

Parallel lines have the same slope

Perpendicular lines have negative reciprocal slopes

The diagonals of a parallelogram bisect each other.

The diagonals of a rectangle are equal

The diagonals of a rhombus are perpendicular

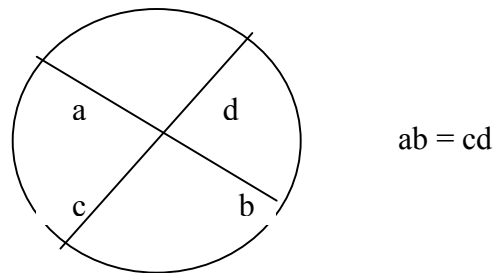
The segment joining the midpoints of two sides of a triangle is parallel to the third side and equal to half the length of the third side.

The median of a trapezoid is parallel to the bases and equal to one half the sum of the bases.

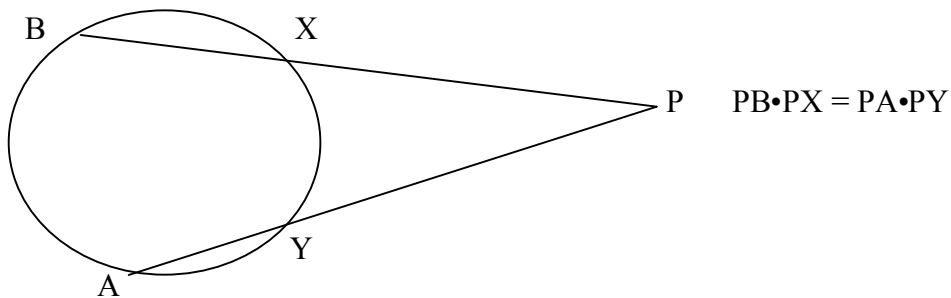
If a line is parallel to one side of a triangle, it divides them proportionately.

Circles

When 2 chords intersect within a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other.



If 2 secants are drawn to a circle from an exterior point, the product of the lengths of one secant and its external segment is equal to the product of the lengths of the other secant and its external segment.



If a tangent and secant are drawn to a circle from an exterior point, the square of the length of the tangent is equal to product of the secant and its external segment.