Apothem of an n-sided Polygon:

Apothem =

Where *s* the length of any side and n = the number of sides of the polygon.

\*The apothem is the radius of an inscribed circle.

Arc of a Circle:  
*s* = *r*Ɵ

Where s = arc length, r = the radius of the circle, and Ɵ = the measure of the central angle in radians.

Area of an Equilateral Triangle:

A =

Where s = the length of any side.

Area of a Kite/Rhombus:

A = (0.5)(d1)(d2)

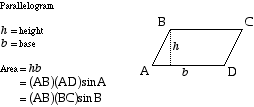
Where d1 = the long diagonal of the kite and d2 = the shorter diagonal of the kite.

\*Diagonals in a kite are always perpendicular to each other.

Area of a Parallelogram:

A = hb

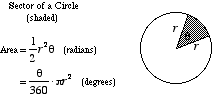
Where h = height of the parallelogram and b = the base of the parallelogram



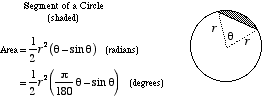
Area of a Polygon:

Apothem = see (Apothem of an n-sided Polygon)

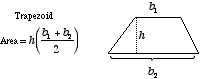
)

Area of a Sector of a Circle:  


Area of a Segment of a Circle:



Area of a Trapezoid:



Area of a Triangle:

where s = (a+b+c)/2

Where r = radius of inscribed circle and R = radius of circumcircle.

Centroid Formula:

The center of mass (in Cartesian coordinates) for any set of points.

Chord:

A line on the inside of a circle whose endpoints are a part of the circumference of the circle.

Circumcenter Formula for Triangles:

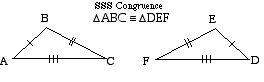
1. Calculate the midpoints of sides AB, BC, CA.
2. Calculate the slope of one line.
3. Find the equation of the line in the form of
4. Repeat 2 and 3 for the second line.
5. Solve the equation by setting the two equal to each other.

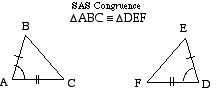
Circumcircle:

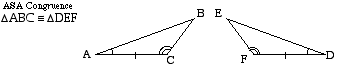
A circle that passes through all vertices of a plane figure and contains the entire figure in its interior. Let R = the radius of the circumcircle.

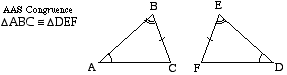
where r = the inradius and s = semiperimeter

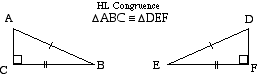
Congruence Tests for Triangles:











Diagonal of a Polygon:

A line segment connecting non-adjacent vertices of a polygon. An n-gon has diagonals.

Distance Formula:

in 2D space.

in 3D space.

Euler’s Formula (Polyhedra):

for all convex polyhedral.

Geometric Mean:

To find the geometric mean of a set of n numbers:

Golden Mean:

Arises especially in settings involving the Fibonacci Sequence.

Incenter:

The incenter is located at the point of intersection of the polygon’s angle bisectors.

Coordinates of the incenter of a triangle:

Inradius of a Regular Polygon:

Law of Cosines:

Law of Sines:

Where d = the diameter of the circumcircle.

Law of Tangents:

Where a and b can be any side lengths of a triangle and A and B are their respective angles.

Law of Cotangents:

Where r = the radius of the inscribed circle. *r* also equals

Median of a Triangle:

A line segment drawn from one vertex to the midpoint of the opposite segment. The three medians of a triangle intersect at the centroid.

Midpoint Formula:

in 2D space.

in 3D space.

Point Rotation:

\*This rotates a point around the origin. If one wanted to rotate around a specific point, treat that point as the origin, perform the rotation, and then readd the original point.

Ex:

Rotating (20,10) around (10,10) is the same as rotating (20-10, 10-10) around (0,0). After finishing that, readd the original x (10) and the original y (10) and that is the finished point.

Point of Intersection Between 2 Lines:

Must have two equations of a line (in standard, slope-intercept, point-slope, etc. form).

Set those equations equal to each other and solve for x.

After finding x, plug x into the equation to get y.

Point on a Line Segment Closest to Point P:

Given a line in the form of and a point *p* denoted by the coordinates of the point closest to *p* is:

If the line is horizontal, then check to see if the point is above or below the line. If so, it’s simply the difference in their y-values. If not, the closest point to *p* on the segment is one of the segment’s end points.

If the line is vertical, then check to see if the point is on the right or left side of the line. If so, it’s simple the difference in their x-values. If not, the closest point to *p* on the segment is one of the segment’s end points.