Geometry Formulas

Midpoint Formula
(on a line with endpoints a and b)

$$M(\frac{a+b}{2})$$

Midpoint Formula
(on a plane with endpoints (x_1, y_1) and (x_2, y_2)

$$M(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$$

Distance Formula
(on a plane with endpoints (x_1, y_1) and (x_2, y_2)

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

Square

$P = 4s$

$A = s^2$

Rectangle

$P = 2b + 2h$

$A = bh$

Conditional Statements

Conditional	$\rightarrow$	$a \rightarrow b$
Converse	$\rightarrow$	$b \rightarrow a$
Inverse	$\rightarrow$	$\sim a \rightarrow \sim b$
Contrapositive	$\rightarrow$	$\sim b \rightarrow \sim a$

Triangle

$P = a + b + c$

$A = \frac{1}{2}bh$

Circle

$C = d\pi$

$C = 2\pi r$

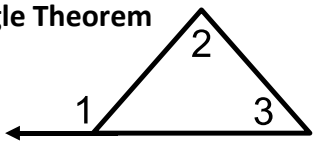
$A = \pi r^2$

Triangle Angle-Sum Theorem

$m\angle A + m\angle B + m\angle C = 180°$

Triangle Exterior Angle Theorem

$m\angle 1 = m\angle 2 + m\angle 3$



Properties of Congruence

Reflexive Property	$\angle A \cong \angle A$
Symmetric Property	If $\angle A \cong \angle B$, then $\angle B \cong \angle A$
Transitive Property	If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$

Slope
(on a plane with endpoints (x_1, y_1) and (x_2, y_2)

$$m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$$

Polygon Angle-Sum Theorem
Angle sum of a polygon is

$(n-2)180$

n = number of sides/vertices

Forms of Linear Equations

$y = mx + b$
$m = slope \quad b = y - intercept$

$y - y_1 = m(x - x_1)$
$m = slope \quad (x_1, y_1)$ is a point on the line

Corollary to the Polygon Angle-Sum Theorem
One angle of a regular polygon is

$$\frac{(n-2)180}{n}$$

n = number of sides/vertices

Polygon Exterior Angle-Sum Theorem

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

Trapezoid Midsegment Theorem

The midsegment of a trapezoid is the average of the bases.

Geometry Formulas

Pythagorean Theorem

$leg_1{}^2 + leg_2{}^2 = hypotenuse^2$

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

$45° - 45° - 90°$ Triangle Theorem

$hypotenuse = leg \cdot \sqrt{2}$

Trigonometric Ratios

Sine $\sin(angle) = \frac{Opposite\ leg}{Hypotenuse}$

Cosine $\cos(angle) = \frac{Adjacent\ leg}{Hypotenuse}$

Tangent $\tan(angle) = \frac{Opposite\ leg}{Adjacent\ leg}$

$30° - 60° - 90°$ Triangle Theorem

$hypotenuse = 2 \cdot short\ leg$

$long\ leg = short\ leg \cdot \sqrt{3}$

Rotations in the Coordinate Plane

$r_{(90°,O)}(x, y) = (-y, x)$

$r_{(180°,O)}(x, y) = (-x, -y)$

$r_{(270°,O)}(x, y) = (y, -x)$

$r_{(360°,O)}(x, y) = (x, y)$

Parallelogram

$A = bh$

Trapezoid

$A = \frac{1}{2}h(b_1 + b_2)$

Rhombus

$A = \frac{1}{2}d_1 d_2$

Kite

$A = \frac{1}{2}d_1 d_2$

Regular Polygon

$A = \frac{1}{2}ap$

Triangle (given SAS)

$A = \frac{1}{2}side_1 \cdot side_2 \cdot \sin(included\ angle)$

Arc Length

$length\ of\ \text{arc} = \frac{arc\ measure}{360} \cdot d\pi$

Area of a Sector

$Sector\ Area = \frac{arc\ measure}{360} \cdot \pi r^2$

Area of a Segment

$Sector\ Area - Triangle\ Area = Segment\ Area$

Euler's Formula

$F + V = E + 2$

Density

$D = \frac{m}{V}$

Cylinder

$LA = \pi dh$

$SA = \pi dh + 2\pi r^2$

$V = \pi r^2 h$

Pyramid

$LA = \frac{1}{2}pl$

$SA = \frac{1}{2}pl + B$

$V = \frac{1}{3}Bh$

Cone

$LA = \pi rl$

$SA = \pi rl + \pi r^2$

$V = \frac{1}{3}\pi r^2 h$

Sphere

$SA = 4\pi r^2$

$V = \frac{4}{3}\pi r^3$

Equation of a Circle

(h,k) is the center of the circle

$(x - h)^2 + (y - k)^2 = r^2$