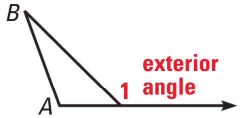
Formulas

Angles

Sum of the measures of the interior angles of a triangle: 180° *(p. 218)*

Sum of the measures of the interior angles of a convex n-gon: $(n - 2) \cdot 180^\circ$ *(p. 507)*

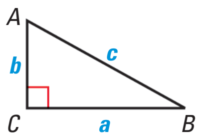
Exterior angle of a triangle:
$m\angle 1 = m\angle A + m\angle B$ *(p. 219)*



Sum of the measures of the exterior angles of a convex polygon: 360° *(p. 509)*

Right Triangles

Pythagorean Theorem:
$c^2 = a^2 + b^2$ *(p. 433)*



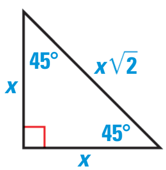
Trigonometric ratios:

$\sin A = \dfrac{BC}{AB}$ *(p. 473)* $\sin^{-1} \dfrac{BC}{AB} = m\angle A$ *(p. 483)*

$\cos A = \dfrac{AC}{AB}$ *(p. 473)* $\cos^{-1} \dfrac{AC}{AB} = m\angle A$ *(p. 483)*

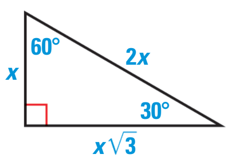
$\tan A = \dfrac{BC}{AC}$ *(p. 466)* $\tan^{-1} \dfrac{BC}{AC} = m\angle A$ *(p. 483)*

45°-45°-90° triangle *(p. 457)*



Ratio of sides:
$1 : 1 : \sqrt{2}$

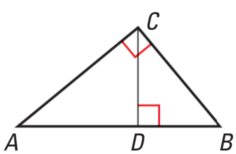
30°-60°-90° triangle *(p. 459)*



Ratio of sides:
$1 : \sqrt{3} : 2$

$\triangle ABC \sim \triangle ACD \sim \triangle CBD$
(p. 449)

$\dfrac{BD}{CD} = \dfrac{CD}{AD}, \dfrac{AB}{CB} = \dfrac{CB}{DB}, \dfrac{AB}{AC} = \dfrac{AC}{AD}$
(p. 451)



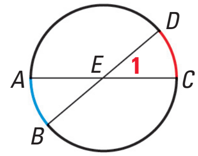
$\dfrac{BD}{CD} = \dfrac{CD}{AD}$, and $CD = \sqrt{AD \cdot DB}$ *(pp. 359, 452)*

Circles

Angle and segments formed by two chords:

$m\angle 1 = \frac{1}{2}(m\overset{\frown}{CD} + m\overset{\frown}{AB})$ *(p. 681)*

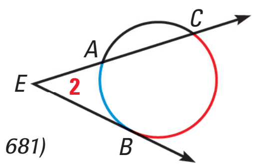
$EA \cdot EC = EB \cdot ED$ *(p. 689)*



Angle and segments formed by a tangent and a secant:

$m\angle 2 = \frac{1}{2}(m\overset{\frown}{BC} - m\overset{\frown}{AB})$ *(p. 681)*

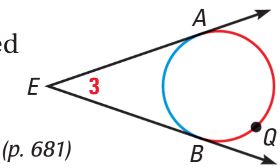
$EB^2 = EA \cdot EC$ *(p. 691)*



Angle and segments formed by two tangents:

$m\angle 3 = \frac{1}{2}(m\overset{\frown}{AQB} - m\overset{\frown}{AB})$ *(p. 681)*

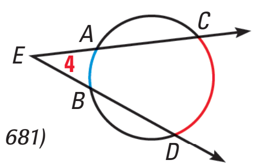
$EA = EB$ *(p. 654)*



Angle and segments formed by two secants:

$m\angle 4 = \frac{1}{2}(m\overset{\frown}{CD} - m\overset{\frown}{AB})$ *(p. 681)*

$EA \cdot EC = EB \cdot ED$ *(p. 690)*



Coordinate Geometry

Given: points $A(x_1, y_1)$ and $B(x_2, y_2)$

Midpoint of $\overline{AB} = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$ *(p. 16)*

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ *(p. 17)*

Slope of $\overleftrightarrow{AB} = \dfrac{\text{rise}}{\text{run}} = \dfrac{y_2 - y_1}{x_2 - x_1}$ *(p. 171)*

Slope-intercept form of a linear equation with slope m and y-intercept b: $y = mx + b$ *(p. 180)*

Standard equation of a circle with center (h, k) and radius r: $(x - h)^2 + (y - k)^2 = r^2$ *(p. 699)*

Taxicab distance $AB = |x_2 - x_1| + |y_2 - y_1|$
(p. 198)

Perimeter

P = perimeter, C = circumference,
s = side, ℓ = length, w = width,
a, b, c = lengths of the sides of a triangle,
r = radius

Polygon:	P = sum of side lengths	(p. 49)
Square:	$P = 4s$	(p. 49)
Rectangle:	$P = 2\ell + 2w$	(p. 49)
Triangle:	$P = a + b + c$	(p. 49)
Regular n-gon:	$P = ns$	(pp. 49, 765)
Circle:	$C = 2\pi r$	(p. 49)
Arc length of $\widehat{AB}$	$= \frac{m\widehat{AB}}{360^\circ} \cdot 2\pi r$	(p. 747)

Area

A = area, s = side, b = base, h = height,
ℓ = length, w = width, d = diagonal,
a = apothem, P = perimeter, r = radius

Square:	$A = s^2$	(pp. 49, 720)
Rectangle:	$A = lw$	(pp. 49, 720)
Triangle:	$A = \frac{1}{2}bh$	(pp. 49, 721)
Parallelogram:	$A = bh$	(p. 721)
Trapezoid:	$A = \frac{1}{2}h(b_1 + b_2)$	(p. 730)
Rhombus:	$A = \frac{1}{2}d_1 d_2$	(p. 731)
Kite:	$A = \frac{1}{2}d_1 d_2$	(p. 731)
Equilateral triangle:	$A = \frac{1}{4}\sqrt{3}s^2$	(pp. 726, 766)
Regular polygon:	$A = \frac{1}{2}aP$	(p. 763)
Circle:	$A = \pi r^2$	(pp. 49, 755)
Area of a sector:	$A = \frac{m\widehat{AB}}{360^\circ} \cdot \pi r^2$	(p. 756)

Surface Area

B = area of a base, P = perimeter,
C = circumference, h = height, r = radius,
ℓ = slant height

Right prism:	$S = 2B + Ph$	(p. 804)
Right cylinder:	$S = 2B + Ch = 2\pi r^2 + 2\pi rh$	(p. 805)
Regular pyramid:	$S = B + \frac{1}{2}P\ell$	(p. 811)
Right cone:	$S = B + \frac{1}{2}C\ell = \pi r^2 + \pi r\ell$	(p. 812)
Sphere:	$S = 4\pi r^2$	(p. 838)

Volume

V = volume, B = area of a base,
h = height, r = radius, s = side length

Cube:	$V = s^3$	(p. 819)
Prism:	$V = Bh$	(p. 820)
Cylinder:	$V = Bh = \pi r^2 h$	(p. 820)
Pyramid:	$V = \frac{1}{3}Bh$	(p. 829)
Cone:	$V = \frac{1}{3}Bh = \frac{1}{3}\pi r^2 h$	(p. 829)
Sphere:	$V = \frac{4}{3}\pi r^3$	(p. 840)

Miscellaneous

Geometric mean of a and b: $\sqrt{a \cdot b}$ (p. 359)

Euler's Theorem for Polyhedra, F = faces,
V = vertices, E = edges: $F + V = E + 2$ (p. 795)

Given: similar polygons or similar solids with a scale factor of $a:b$

Ratio of perimeters $= a:b$ (p. 374)

Ratio of areas $= a^2:b^2$ (p. 737)

Ratio of volumes $= a^3:b^3$ (p. 848)

Given a quadratic equation $ax^2 + bx + c = 0$,
the solutions are given by the formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ (pp. 641, 883)

TABLES