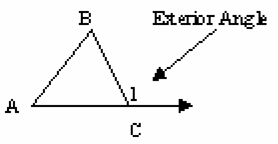
# GEOMETRY TEST REFERENCE INFORMATION

**The formulas given below may be helpful in answering some of the questions on a Geometry Test.**

## ANGLES




Triangle = 180°

Exterior angle of a triangle:
$m\angle 1 = m\angle A + m\angle B$

Measure of each interior angle of a regular n-gon:

$n-\text{gon}:\ \frac{1}{n}(n-2)(180°)$

Sum of the measure of the interior angles of a regular n-gon:

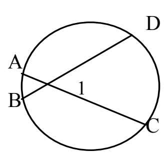
$n-gon: (n-2)(180^\circ)$

Sum of the measures of the exterior angles of a Convex polygon: 360°

Measure of each exterior angle of a regular n-gon:

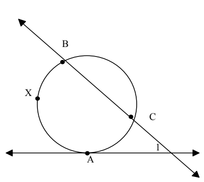
$n-\text{gon}:\ \frac{1}{n}(360°)$

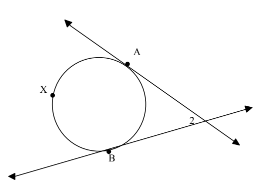
Angle formed by two chords:




$m\angle 1 = \frac{1}{2}(m\widehat{CD} + m\widehat{AB})$

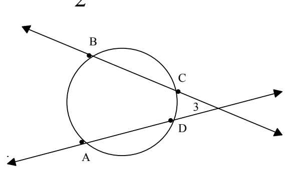
Angles formed by tangent and secant, two tangents or two secants:




$m\angle 1 = \frac{1}{2}(m\widehat{AXB} - m\widehat{AC})$

$m\angle 2 = \frac{1}{2}(m\widehat{AXB} - m\widehat{AB})$




$m\angle 3 = \frac{1}{2}(m\widehat{AB} - m\widehat{CD})$

## SURFACE AREA

$B =$ area of the base, $P =$ perimeter

$h =$ height, $r =$ radius, $\ell =$ slant height

Right rectangular prism:

$SA = 2(L \times W) + 2(L \times H) + 2(W \times H)$

Right cylinder: $S = 2\pi r^2 + 2\pi rh$

Regular pyramid: $S = B + \frac{1}{2}P\ell$

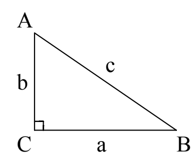
Right cone: $S = \pi r^2 + \pi r\ell$

Sphere: $S = 4\pi r^2$

## RIGHT TRIANGLE

Pythagorean Theorem:

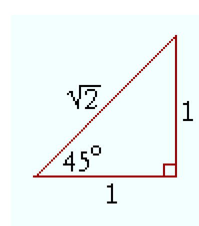
$a^2 + b^2 = c^2$



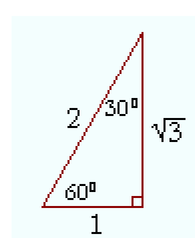

Trigonometric ratios:

$\sin A = \frac{a}{c},\quad \cos A = \frac{b}{c},\quad \tan A = \frac{a}{b}$

45°–45°–90°




30°–60°–90°

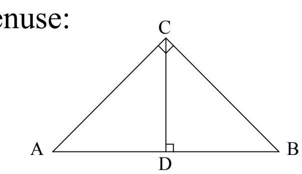



Ratio of Sides:
$1 : 1 : \sqrt{2}$

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

Altitude to the hypotenuse:

$CD = \sqrt{AD \cdot BD}$



## AREA

$A = area,\ s = side,\ b = base,\ h = height$

$l = length,\ w = width,\ d = diagonal,$

$a = apothem,\ P = perimeter,\ r = radius$

Square: $A = s^2$

Rectangle: $A = lw$

Parallelogram: $A = bh$

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

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

Kite and Rhombus: $A = \frac{1}{2}d_1 d_2$

Equilateral triangle: $A = \frac{1}{4}\sqrt{3}s^2$

Regular polygon: $A = \frac{1}{2}aP$

Quadrilateral with $\perp$ Diagonals: $A = \frac{1}{2}d_1 d_2$

## VOLUME

$V =$ volume, $B =$ area of base, $h =$ height,

$r =$ radius, $s =$ side

Cube: $V = s^3$

Prism: $V = Bh$

Cylinder: $V = \pi r^2 h$

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

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

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

## MISCELLANEOUS

Arithmetic mean of *a* and *b*: $\frac{1}{2}(a + b)$

Geometric mean of *a* and *b*: $\sqrt{ab}$

Given similar solids with corresponding sides of lengths *a* and *b*:

Ratio of areas $= a^2 : b^2$

Ratio of volumes $= a^3 : b^3$

## CIRCLES

$A = area,\ C = circumference,\ r = radius,$

$d = diameter,\ \ell = arc\ length$

$A = \pi r^2$

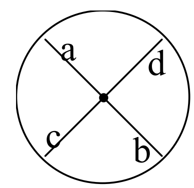
$C = 2\pi r$ or $C = \pi d$

Arc Length: $\ell = \frac{\text{degrees in corresponding arc}}{360°} 2\pi r$

Sector: $A = \frac{\text{degrees in corresponding arc}}{360°} \pi r^2$

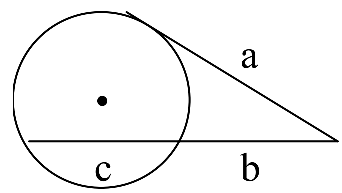
chord-chord

$a \cdot b = c \cdot d$



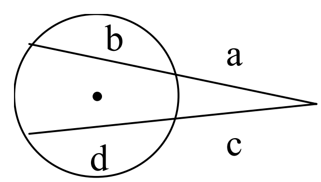

tangent-secant

$a \cdot a = b(b + c)$




secant-secant

$a(a + b) = c(c + d)$




## Lines

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

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

Midpoint of $\overline{AB}$ $= (\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$

Slope of $\overleftrightarrow{AB} = (\frac{y_2 - y_1}{x_2 - x_1})$

Slope-intercept form of a linear equation with Slope *m* and y-intercept *b*: y = *m*x + *b*