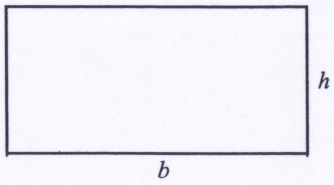
Formulas from Geometry

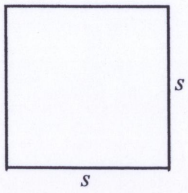
Rectangle

b = base, h = height
Area: $A = bh$
If $b = h$, the rectangle is a *square*.



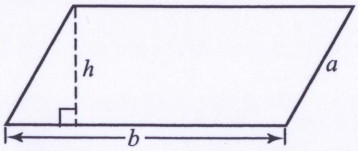
Square

s = side
Area: $A = s^2$



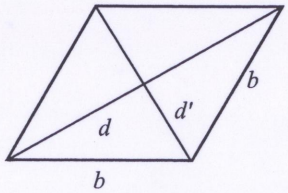
Parallelogram

b = base; h = height; a = side
Area: $A = bh$
If $a = b$, the parallelogram is a *rhombus*.



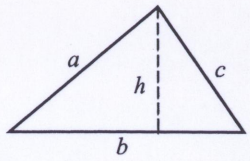
Rhombus

b = side; d, d' = diagonals
Area: $A = \frac{1}{2}dd'$



Triangle

b = base; h = height;
a, c = sides
Area: $A = \frac{1}{2}bh$

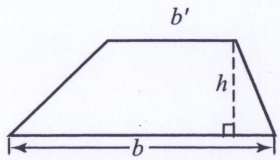


Heron's formula: $A = \sqrt{s(s-a)(s-b)(s-c)}$,
where $s = \frac{a+b+c}{2}$

Equilateral triangle: $A = \frac{a^2\sqrt{3}}{4}$,
where a = side of triangle

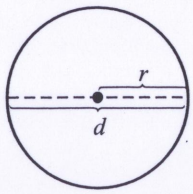
Trapezoid

b, b' = base; h = height
Area: $A = \frac{1}{2}(b + b')h$



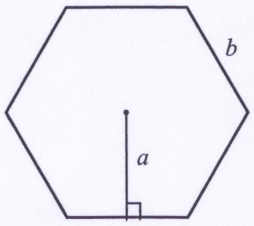
Circle

r = radius; d = diameter
Diameter: $d = 2r$
Circumference: $C = 2\pi r = \pi d$
Area: $A = \pi r^2$



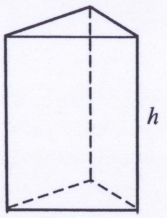
Regular Polygon

b = side; a = apothem; p = perimeter of polygon
Area: $A = \frac{1}{2}ap$



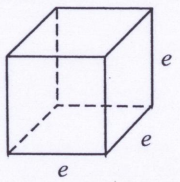
Right Prism

h = height; p = perimeter of base;
B = area of base
Lateral area: $LA = ph$
Surface area: $SA = LA + 2B$
Volume: $V = Bh$



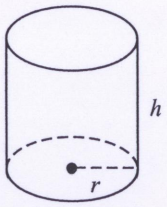
Cube

e = edge
Surface area: $SA = 6e^2$
Volume: $V = e^3$



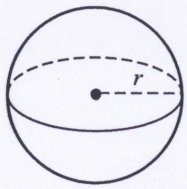
Right Circular Cylinder

r = radius; h = height
Lateral area: $LA = ph$ or $2\pi rh$
p = perimeter (circumference)
B = area of base
Surface area: $SA = LA + 2B$ or $2\pi rh + 2\pi r^2$
Volume: $V = Bh$ or $\pi r^2 h$



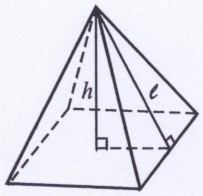
Sphere

r = radius
Surface area: $SA = 4\pi r^2$
Volume: $V = \frac{4}{3}\pi r^3$



Regular Pyramid

h = height; p = perimeter of base;
ℓ = slant height; B = area of base
Lateral area: $LA = \frac{1}{2}p\ell$
Surface area: $SA = LA + B$ or $\frac{1}{2}p\ell + B$
Volume: $V = \frac{1}{3}Bh$



Right Circular Cone

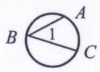
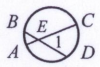
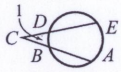
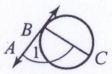
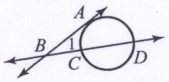
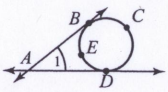
r = radius; h = height; ℓ = slant height
p = perimeter (circumference)
B = area of base
Lateral area: $LA = \frac{1}{2}p\ell$ or $\pi r\ell$
Surface area: $SA = LA + B$ or $\pi r\ell + \pi r^2$
Volume: $V = \frac{1}{3}Bh$ or $\frac{1}{3}\pi r^2 h$

Formulas and Basic Relationships

Angle Formulas

1. complement of $x°$: $90° - x°$
2. supplement of $x°$: $180° - x°$
3. sum of angles of a triangle: sum $= 180°$
4. sum of measures of interior angles of polygon with n sides: $S = 180°(n-2)$
5. measure of each interior angle of regular polygon with n sides: $\dfrac{180°(n-2)}{n}$
6. measure of each exterior angle of regular polygon with n sides: $\dfrac{360°}{n}$
7. measure of angle inscribed in semicircle: $90°$

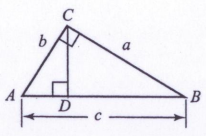
Angle and Segment Relationships in a Circle

	Diagram	Angle Relationships	Segment Relationships
8.		$m\angle 1 = m\overset{\frown}{AB}$	$OA = OB$
9.		$m\angle 1 = \frac{1}{2}\overset{\frown}{AC}$	no segment relationship
10.		$m\angle 1 = \frac{1}{2}(m\overset{\frown}{AB} + m\overset{\frown}{CD})$	$(AE)(EC) = (BE)(ED)$
11.		$m\angle 1 = \frac{1}{2}(m\overset{\frown}{AE} - m\overset{\frown}{BD})$	$(CA)(CB) = (CE)(CD)$
12.		$m\angle 1 = \frac{1}{2}(m\overset{\frown}{BC})$	no segment relationship
13.		$m\angle 1 = \frac{1}{2}(m\overset{\frown}{AD} - m\overset{\frown}{AC})$	$\dfrac{BD}{AB} = \dfrac{AB}{BC}$
14.		$m\angle 1 = \frac{1}{2}(m\overset{\frown}{BCD} - m\overset{\frown}{BED})$	$AB = AD$

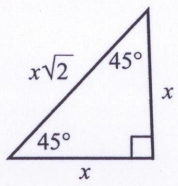
15. area of sector with arc measuring $m°$: $A = \dfrac{m}{360}\pi r^2$ 16. length of arc measuring $m°$: $L = \dfrac{m}{360}2\pi r$ or $\dfrac{m}{180}\pi r$

Right Triangle Formulas

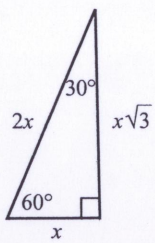
1. $a^2 + b^2 = c^2$
2. $\dfrac{AD}{CD} = \dfrac{CD}{DB}$
3. $\dfrac{BD}{CB} = \dfrac{CB}{AB}$
4. $\dfrac{AD}{AC} = \dfrac{AC}{AB}$



5.



6.



7. sine ratio $= \dfrac{\text{opposite leg}}{\text{hypotenuse}}$

cosine ratio $= \dfrac{\text{adjacent leg}}{\text{hypotenuse}}$

tangent ratio $= \dfrac{\text{opposite leg}}{\text{adjacent leg}}$

Analytic Geometry Formulas

1. distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
2. midpoint formula: $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$
3. slope formula: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
4. equation of line, general form: $ax + by + c = 0$
5. equation of line, point-slope form: $y - y_1 = m(x - x_1)$
6. equation of line, slope-intercept form: $y = mx + b$