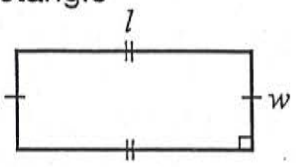
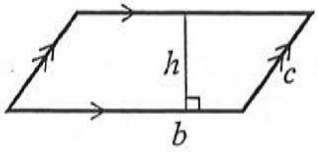
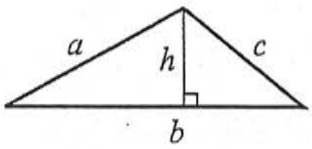
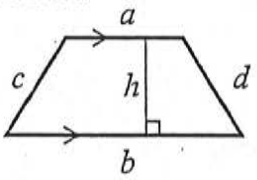
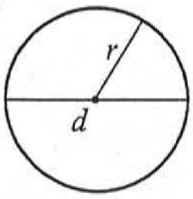
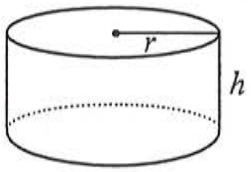
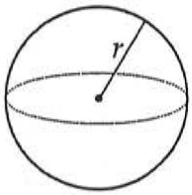
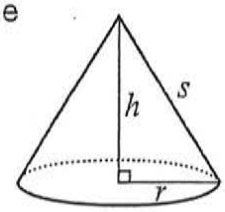
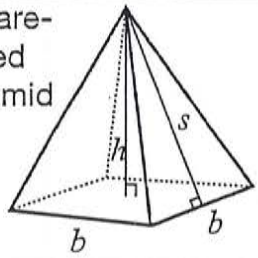
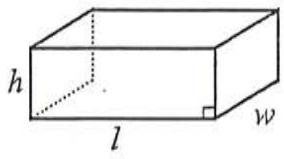
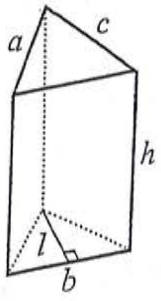
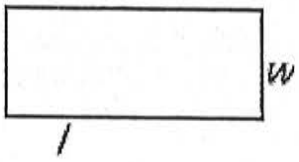
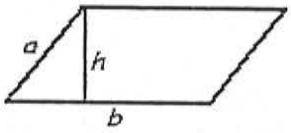
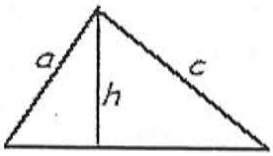
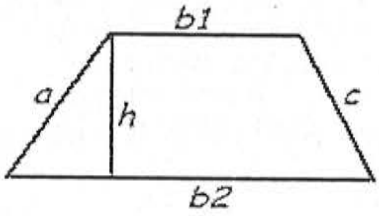
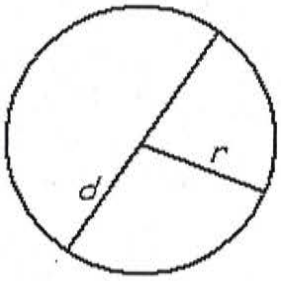
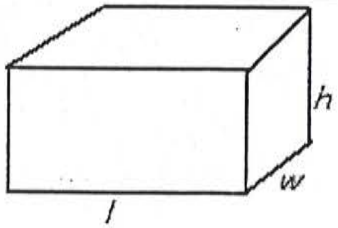
Formula Sheet
Grade 9 Academic

Geometric Figure	Perimeter	Area
Rectangle 	$P = l + l + w + w$ or $P = 2(l + w)$	$A = lw$
Parallelogram 	$P = b + b + c + c$ or $P = 2(b + c)$	$A = bh$
Triangle 	$P = a + b + c$	$A = \frac{bh}{2}$ or $A = \frac{1}{2}bh$
Trapezoid 	$P = a + b + c + d$	$A = \frac{(a+b)h}{2}$ or $A = \frac{1}{2}(a + b)h$
Circle 	$C = \pi d$ or $C = 2\pi r$	$A = \pi r^2$

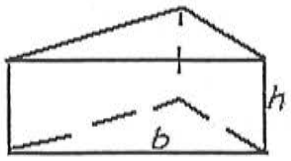
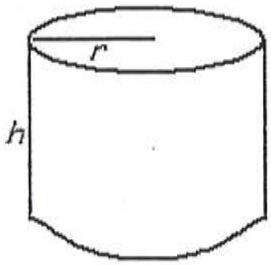
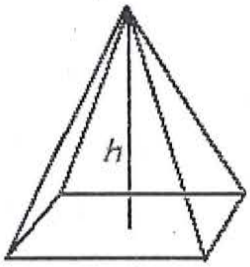
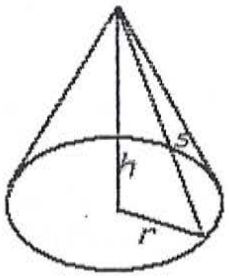
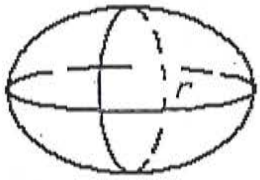
Geometric Figure	Surface Area	Volume
Cylinder 	$A_{\text{base}} = \pi r^2$ $A_{\text{lateral surface}} = 2\pi rh$ $A_{\text{total}} = 2A_{\text{base}} + A_{\text{lateral surface}}$ $= 2\pi r^2 + 2\pi rh$	$V = (A_{\text{base}})(\text{height})$ $V = \pi r^2 h$
Sphere 	$A = 4\pi r^2$	$V = \frac{4}{3}\pi r^3$ or $V = \frac{4\pi r^3}{3}$
Cone 	$A_{\text{lateral surface}} = \pi rs$ $A_{\text{base}} = \pi r^2$ $A_{\text{total}} = A_{\text{lateral surface}} + A_{\text{base}}$ $= \pi rs + \pi r^2$	$V = \frac{(A_{\text{base}})(\text{height})}{3}$ $V = \frac{1}{3}\pi r^2 h$ or $V = \frac{\pi r^2 h}{3}$
Square-based pyramid 	$A_{\text{triangle}} = \frac{1}{2}bs$ $A_{\text{base}} = b^2$ $A_{\text{total}} = 4A_{\text{triangle}} + A_{\text{base}}$ $= 2bs + b^2$	$V = \frac{(A_{\text{base}})(\text{height})}{3}$ $V = \frac{1}{3}b^2 h$ or $V = \frac{b^2 h}{3}$
Rectangular prism 	$A = 2(wh + lw + lh)$	$V = (A_{\text{base}})(\text{height})$ $V = lwh$
Triangular prism 	$A_{\text{base}} = \frac{1}{2}bl$ $A_{\text{rectangles}} = ah + bh + ch$ $A_{\text{total}} = A_{\text{rectangles}} + 2A_{\text{base}}$ $= ah + bh + ch + bl$	$V = (A_{\text{base}})(\text{height})$ $V = \frac{1}{2}blh$ or $V = \frac{blh}{2}$

FORMULAS FOR PERIMETER, AREA, SURFACE, VOLUME

Shapes	Formulas
	**Rectangle** **Area** = Length X Width $A = lw$ **Perimeter** = 2 X Lengths + 2 X Widths $P = 2l + 2w$
	**Parallelogram** **Area** = Base X Height $A = bh$ **Perimeter** = add the length of all sides $P = 2a + 2b$
	**Triangle** **Area** = 1/2 of the base X the height $A = \frac{1}{2} bh$ **Perimeter** = $a + b + c$ (add the length of the three sides)
	**Trapezoid** **Area** = 1/2 of the base X the height $A = (\frac{b1+b2}{2})h$ **Perimeter** = add lengths of all sides $P = a + b1 + b2 + c$
	**Circle** **Radius** = the distance from the center to a point on the circle (r). **Diameter** = the distance between two points on the circle through the center (d = 2r). **Circumference** = the distance around the circle ($C = \pi d = 2\pi r$). (Assume $\pi \approx 3.14$) **Area** = πr^2
	**Rectangular Solid** **Volume** = Length X Width X Height $V = lwh$ **Surface** = $2lw + 2lh + 2wh$

Edited by Joanna Gutt-Lehr, PIN Learning Lab, 2007
http://math.about.com/library/blmeasurement.htm

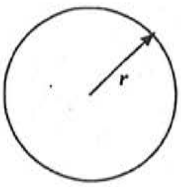
FORMULAS FOR PERIMETER, AREA, SURFACE, VOLUME

	**Prisms** **Volume** = Base X Height $V = bh$ **Surface** = $2b + Ph$ *(b is the area of the base P is the perimeter of the base)*
	**Cylinder** **Volume** = πr^2 X height $V = \pi r^2 h$ **Surface** = 2π radius X height $S = 2\pi rh + 2\pi r^2$
	**Pyramid** **Volume** = 1/3 area of the base X height $V = \frac{1}{3} bh$ b is the area of the base **Surface Area:** Add the area of the base to the sum of the areas of all of the triangular faces. The areas of the triangular faces will have different formulas for different shaped bases.
	**Cones** **Volume** = 1/3 area of the base x height $V = \frac{1}{3} \pi r^2 h$ **Surface** $S = \pi r^2 + \pi rs$ $= \pi r^2 + \pi r\sqrt{r^2 + h^2}$
	**Sphere** **Volume** $V = \frac{4}{3} \pi r^3$ **Surface** $S = 4\pi r^2$

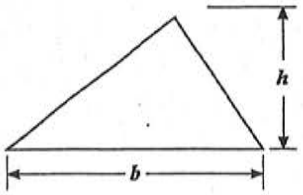
Edited by Joanna Gutt-Lehr, PIN Learning Lab, 2007
http://math.about.com/library/blmeasurement.htm

Formula Sheet

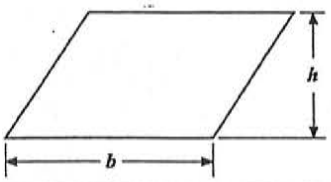
Area of a circle: πr^2



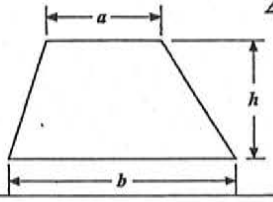
Area of a triangle: $\frac{bh}{2}$



Area of a parallelogram: bh

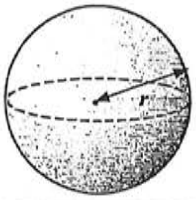


Area of a trapezoid: $\frac{1}{2}(a+b)h$

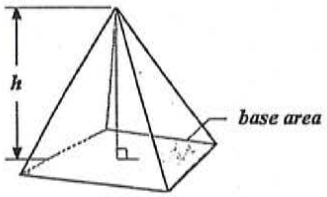


Surface area of a sphere: $4\pi r^2$

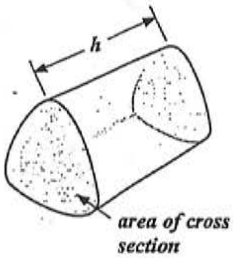
Volume of a sphere: $\frac{4}{3}\pi r^3$



Volume of a pyramid: $\frac{1}{3}$ *base area* $\times h$

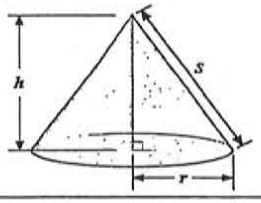


Volume of a prism: area of cross section × height



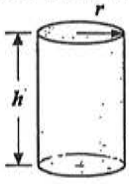
Volume of a cone: $\frac{1}{3}\pi r^2 h$

Curved surface area of cone: πrs



Volume of a cylinder: $\pi r^2 h$

Curved surface area of cylinder: $2\pi rh$



Volume of a rectangular prism: lwh

Surface area of rectangular prism: $2(wh+lh+wl)$