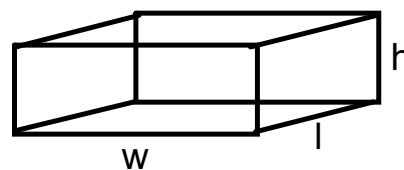# Surface Area of 3D shapes

Rectangular Prism

(surface area - the area of all the sides)
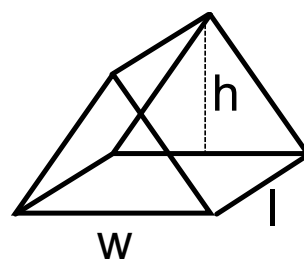
SA =

Diagram

Net

Triangular Prism

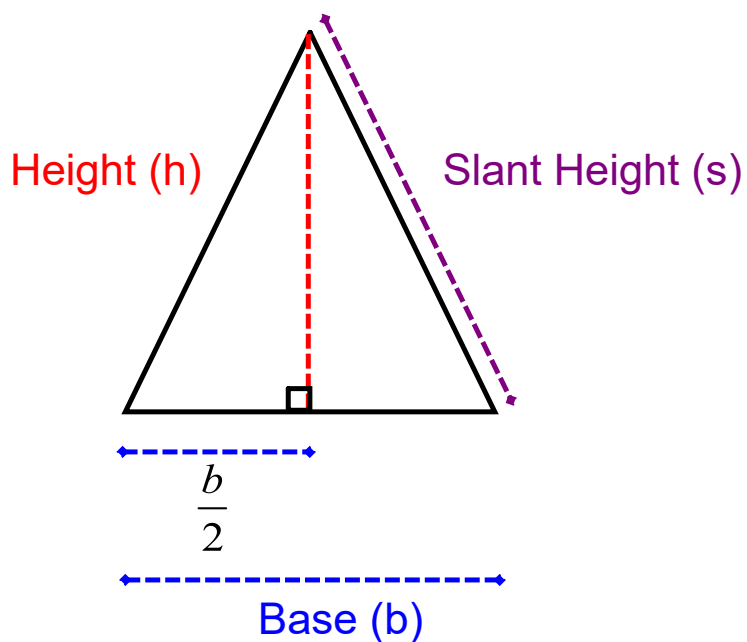(surface area - the area of all the sides)

SA =

Diagram

Net

SLANT Height is the length measurement of the side that is NOT perpendicular to the base. The side that is "leaning" is the slant height.

Slant height, the base, and the height can all be related together with the Pythagorean Theorem.
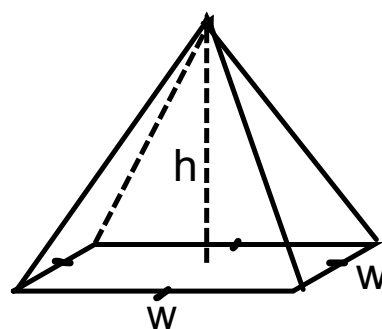
Height (h)   Slant Height (s)

$$\frac{b}{2}$$
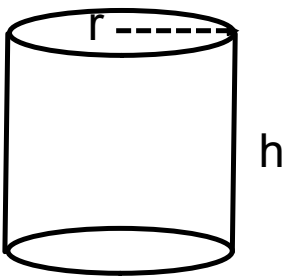
Base (b)

Square Based Pyramid

Diagram

(surface area - the area of all the sides)

SA =

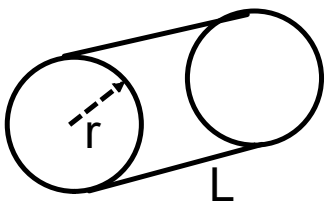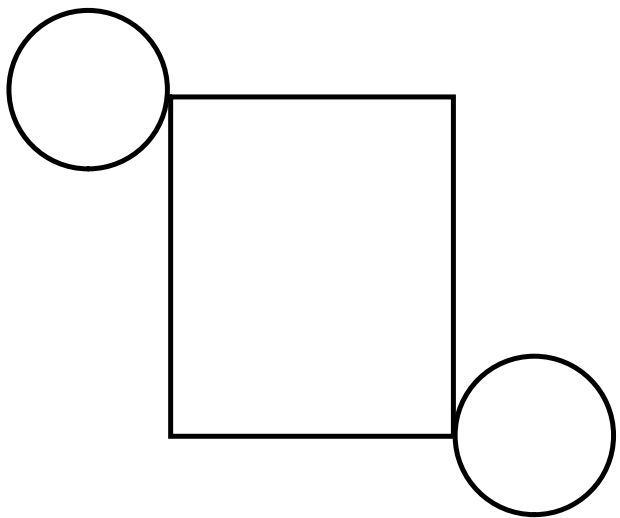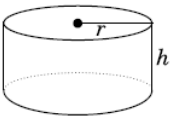Net

Circle Prism (cylinder)

Diagram

SA =

L

r

h
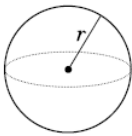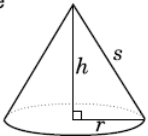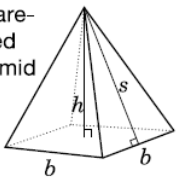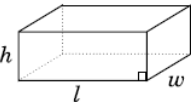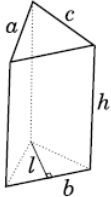
Net

3D Shapes

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

Determine the Surface Area and Volume of the following:

h = 10m

b=12m