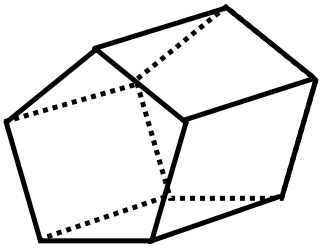
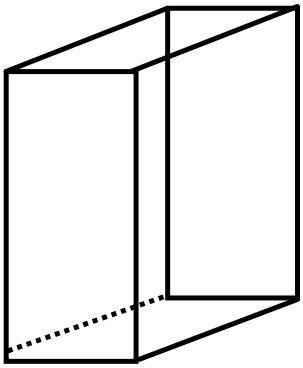
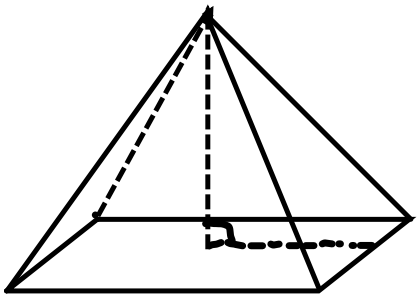
Drawing 3 Dimensional Shapes



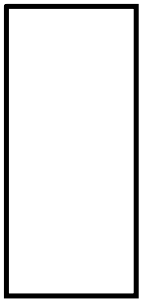
To draw a 3D shape, start with one of the faces first, and then use it to guide the addition of other lines.



Rectangular Prism



Square based Pyramid



Volume of 3 Dimensional Shapes

A PRISM is a 3-D figure with two, parallel, congruent, polygonal bases.

Prisms are named for their base shape, ie rectangular prism, triangular prism.

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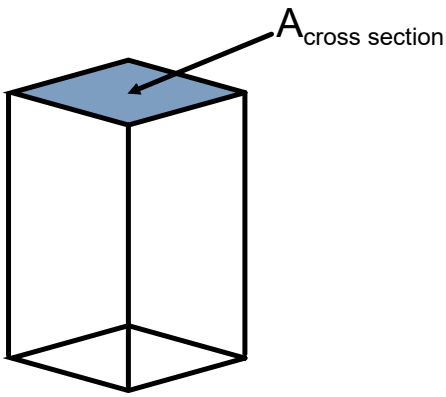
A PRISM has the same cross sectional shape along its entire length,
ie. a rubics cube, a shoe box, a soup can.

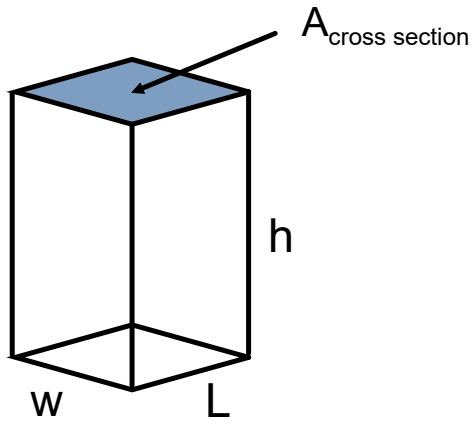


The volume of any prism is given by the following:

Rectangular Prism

Volume = ($A_{cross\ section}$) x (Length)

Volume =

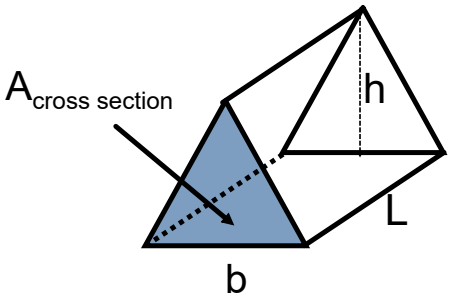


The volume of a triangular prism is given by the following:

Triangular Prism

Volume = ($A_{\text{cross section}}$) x (Length)

Volume =

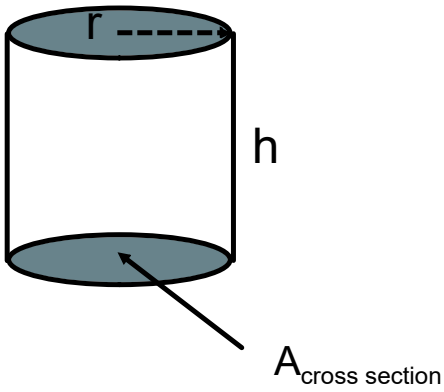


The volume of a prism is given by the following:

Circular Prism (aka cylinder)

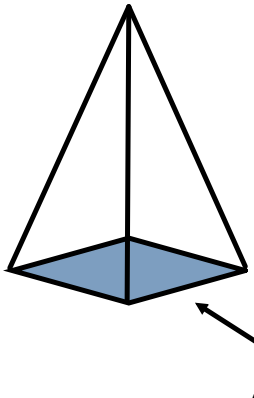
Volume = ($A_{\text{cross section}}$) x (Length)

Volume =

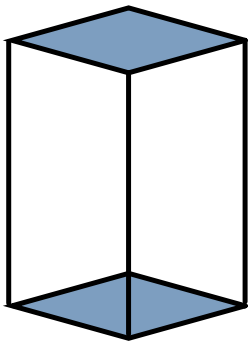


The volume of a right pyramid is given by the following:

Volume = $\frac{1}{3}$ ($A_{\text{cross section}}$) x (Length)

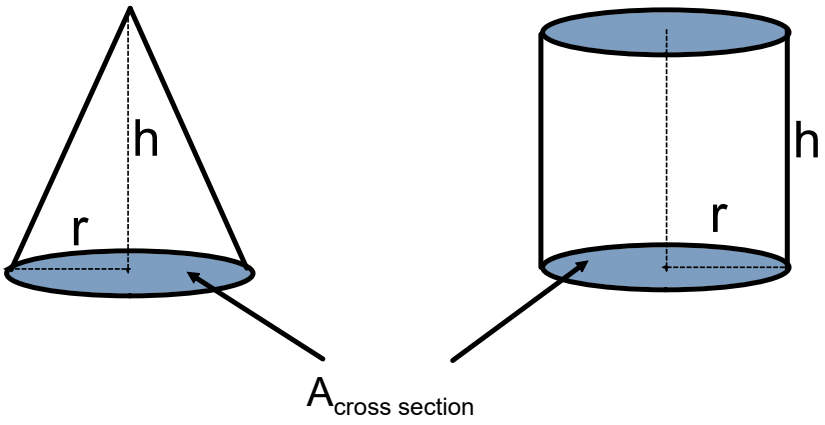


$A_{\text{cross section}}$

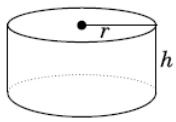
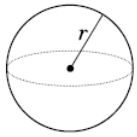
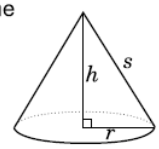
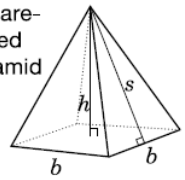
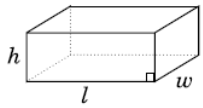
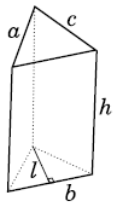


The volume of a right pyramid is given by the following:

$$\text{Volume} = \frac{1}{3}(A_{\text{cross section}}) \times (\text{Length})$$



3D Shapes

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

Find the volume of a can of soup that has a diameter of 12cm and a height of 22cm.

A cardboard box has a volume of 8 ft^3.
What might the dimensions of the box be?
Include a diagram.

Consolidation Questions:

Grade 9 Academic - page 464-65 #2,3,7

Grade 9 Academic - page 454-6 #2,3