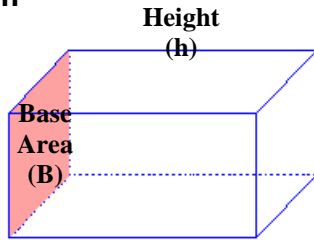


Volume of Prisms & Cylinder

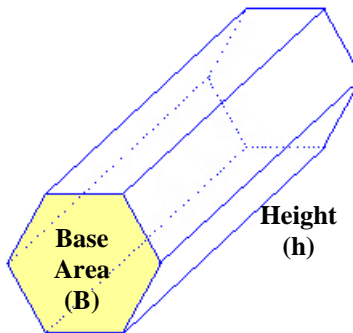
A **prism** is a 3D shape with two identical parallel bases (top and bottom are the same). All other faces are rectangles.

To find the volume of ANY prism, find the area of the base and multiply it by the height.

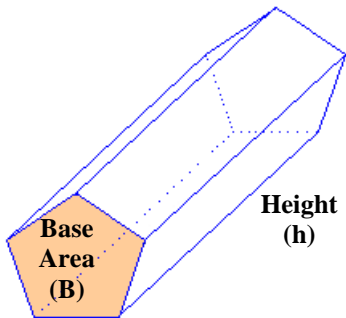
Any Prism



Rectangular prism



Hexagonal prism



Pentagonal prism

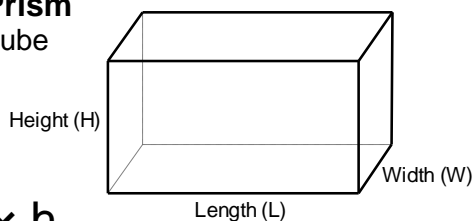
This formula is for
ANY PRISM:

$$V = B \times h$$

*B is the area of the base
(shaded region on the
diagrams)*

Rectangular Prism

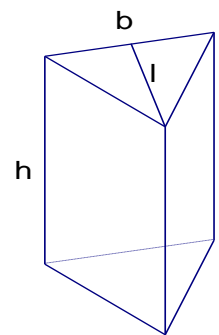
- also includes cube



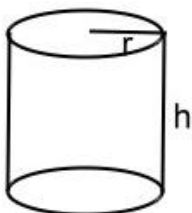
$$V = l \times w \times h$$

Triangular Prism

$$V = \frac{b \times l \times h}{2}$$



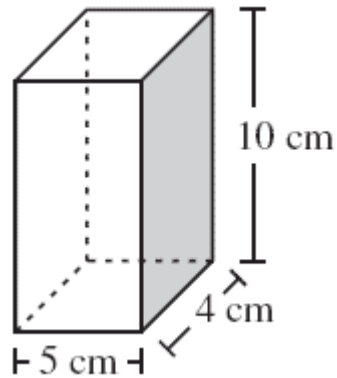
Cylinder – Basically, a circle-based prism



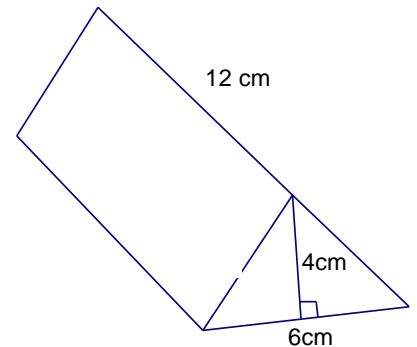
$$V = \pi r^2 h$$

Remember: $\pi = 3.14$ (or, there is a π button on your calculator)

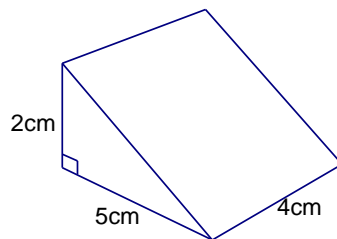
Example 1: Determine the volume of this prism



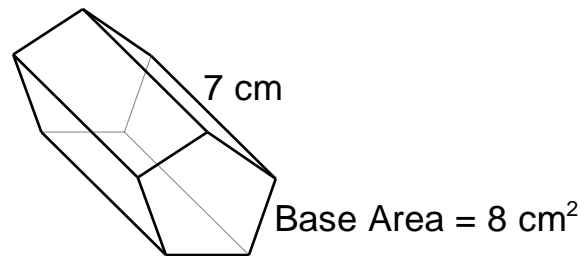
Example 2: Determine the volume of this prism in cm^3 .



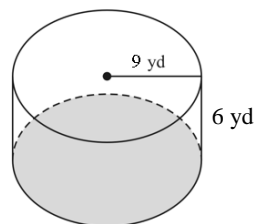
Example 3: Determine the volume of this prism in cm^3 .



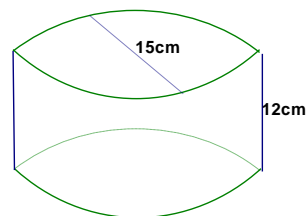
Example 4: Determine the volume of this prism in cm^3 .



Example 5: Determine the volume of this cylinder in yd^3 .

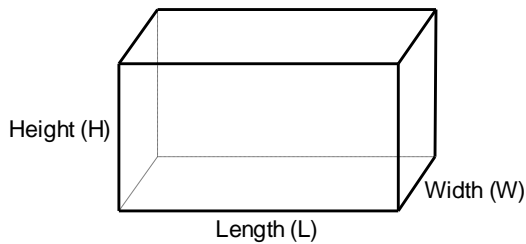


Example 6: Determine the volume of this cylinder in cm^3 .



Surface Area of Prisms

Prism (Rectangular/Right)

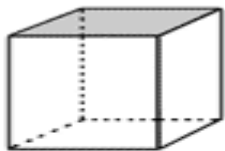


Add the area of all the faces

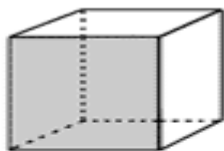
$$A = 2(\text{top} + \text{front} + \text{side})$$

$$A = 2(lw + lh + wh)$$

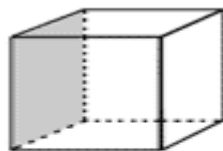
Surface Area of a Prism



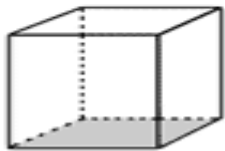
Top



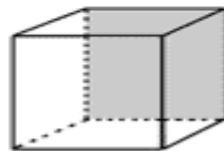
Front



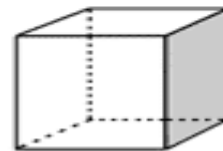
Left



Bottom

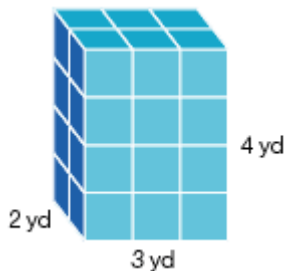


Back

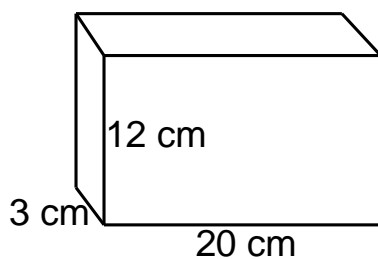


Right

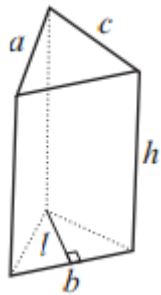
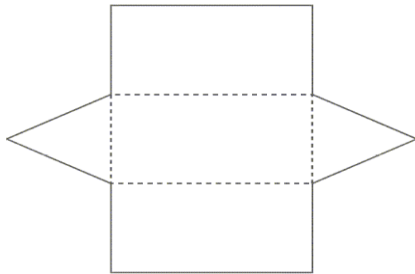
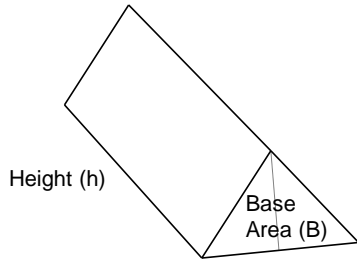
Example 1: Determine the surface area of this prism in yd^2 .



Example 2: Determine the surface area of this box which has **NO LID**.



Any Other Prism (e.g. Triangular)



Add the area of all the faces

Each side will be a rectangle,
 Use the Area of a Rectangle
 formula: $A = L \times W$

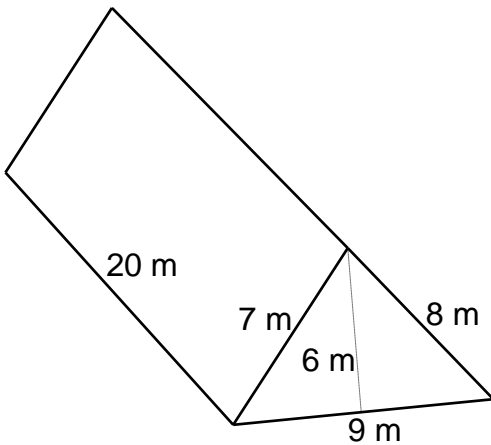
In this case, the Base of the
 prism is a triangle. Use the Area
 of a Triangle formula:

$$A = \frac{bh}{2}$$

If the Base is not a triangle, the
 area of the base will be given.

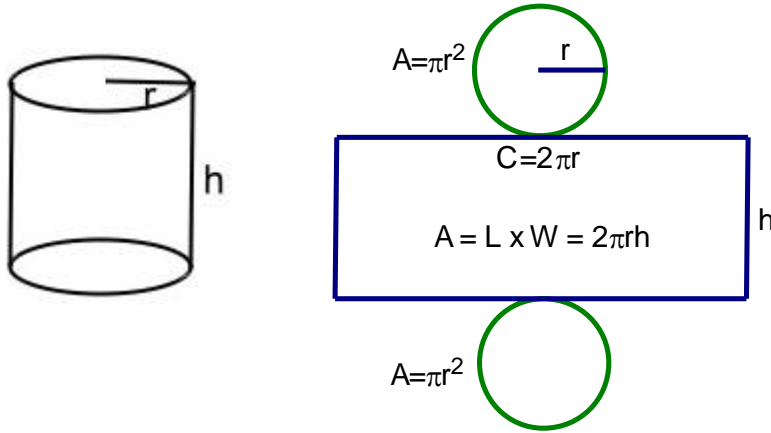
$$A_{\text{total}} = A_{\text{rectangles}} + 2A_{\text{base}} \\ = ah + bh + ch + bl$$

Example 3: Determine the surface area of this prism in m^2 .



Surface Area of Cylinders

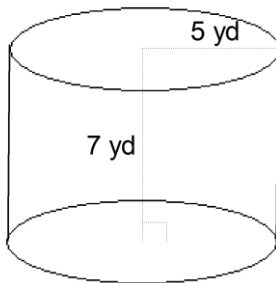
Cylinder (Basically – a Circle Based Prism)



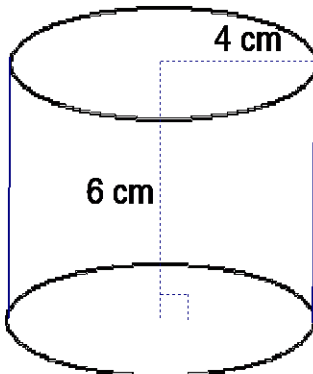
$A = 2(\text{top}) + \text{side}$
The top/bottom is a circle

$$A = 2(\pi r^2) + 2\pi r h$$

Example 1: Determine the surface area of this cylinder in yd^2 .

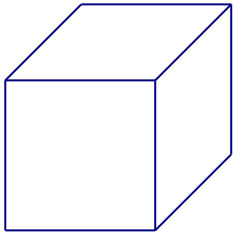
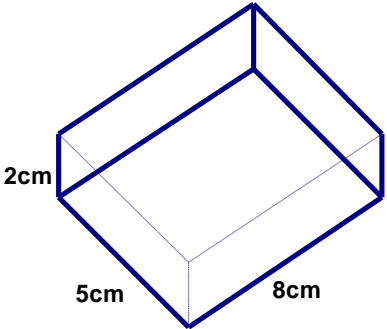


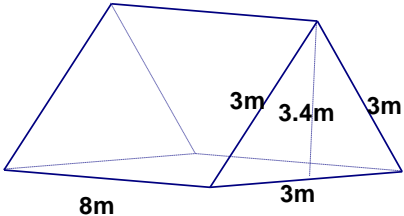
Example 2: Determine the surface area of this drinking glass.


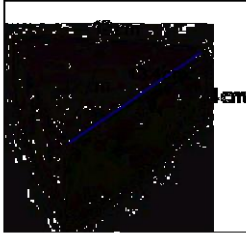


Volume and Surface Area of Prisms - Practice

Find the volume & surface area of the following shapes (round to 1d.p. where needed):

<p>a.</p> <div style="text-align: center;">  <p>3.5in</p> </div>	<p>b.</p> <div style="text-align: center;">  </div>
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<p>c.</p> <div style="text-align: center;">  </div>	<p>d. A rectangular prism has a length of 16m and a height of 12m. If the surface area of this prism is 664m^2, determine the width and volume.</p>
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<p>e. A toy chest is in the shape of a rectangular prism. Determine the surface area of the toy chest.</p> <div style="text-align: center;">  </div>	<p>f. A piece of cheese is in the shape of an isosceles triangular prism. The cheese needs to be wrapped with saran wrap. Determine the surface area of the cheese to find out how much wrap would cover this cheese.</p> <div style="text-align: center;">  </div>
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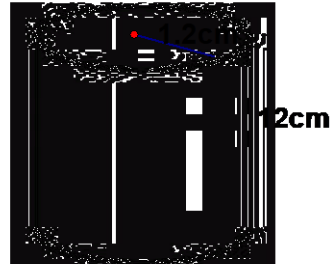
ANSWERS: a. 73.5in^2 , 42.9in^3 b. 132cm^2 , 80cm^3 c. 82.2m^2 , 40.8m^3 d. 5m, 960m^3
 e. 55.5ft^2 , 23.6ft^3 f. 299.2cm^2 , 288cm^3

Volume and Surface Area of Cylinders – Practice

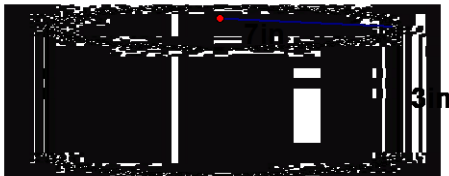
Find the volume and surface area of the following shapes. Round answers to 1d.p. where necessary. Use 3.14 or the pi button for π .

a. Find the surface area of a cylinder with a height of 3m and a diameter of 3m

b.



c.



d. If a cylinder has a surface area of 178.98cm^2 , and a radius of 3cm, determine the height of the cylinder.

ANSWERS: a. $42.4\text{m}^2, 21.2\text{m}^3$ b. $99.5\text{cm}^2, 54.3\text{cm}^3$ c. $439.6\text{in}^2, 461.8\text{in}^3$
d. $h=6.5\text{cm}, 183.8\text{cm}^3$