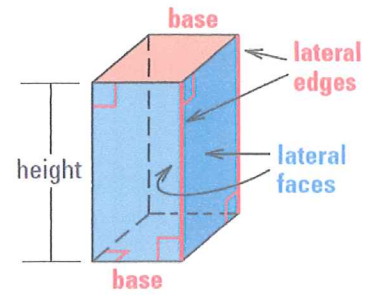


Name: Key

Basic Surface Area and Volume of Prisms - Notes

A **prism** is a polyhedron with two congruent faces, called **bases**, that lie in parallel planes. The other faces, called **lateral faces**, are parallelograms formed by connecting the corresponding vertices of the bases. The segments connecting these vertices are *lateral edges*.



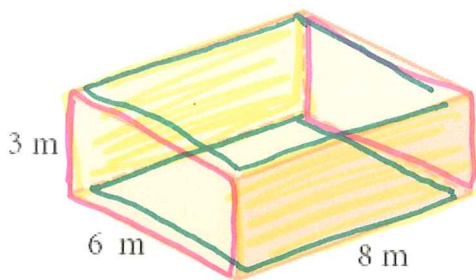
Right rectangular prism

The *altitude* or *height* of a prism is the perpendicular distance between its bases. In a **right prism**, each lateral edge is perpendicular to both bases. Prisms that have lateral edges that are not perpendicular to the bases are **oblique prisms**. The length of the oblique lateral edges is the *slant height* of the prism.

<p><u>Surface Area:</u> Add up all of the faces and bases</p>	<p><u>Lateral Area:</u> Add up all of the faces but NOT bases</p>	<p><u>Volume:</u> $V=BH$ B = AREA of BASE and H = Height connecting two bases.</p>
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Example 1:

Find the volume, lateral area and surface area of the prism.

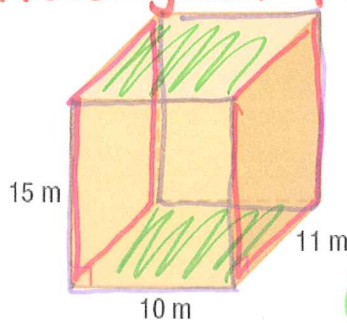


$2(8 \times 3)$
 $2(3 \times 6)$
 $2(6 \times 8)$
 $SA = 180m^2$

Volume
 $V = B \cdot h$
 area of the base
 (For rectangular Prisms)
 Just pick a base
 $B = 6 \times 8$
 $V = 6 \times 8 \times 3$

2. Name the figure, then find the volume, lateral area and surface area of the prism.

Rectangular Prism

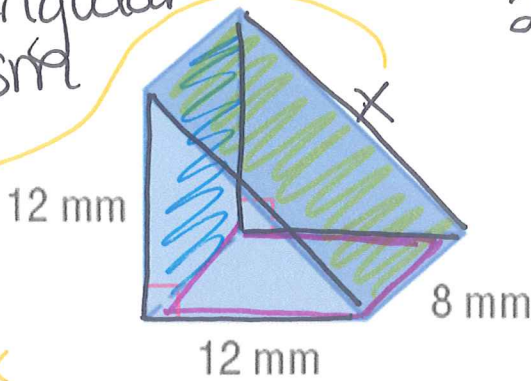


$2(15 \times 10)$
 $2(15 \times 11)$
 $2(10 \times 11)$
 $SA = 1345m^2$

$V = l \cdot w \cdot h$
 $V = 15 \times 10 \times 11$
 $V = 1650m^3$

3. Name the figure, then find the volume, lateral area and surface area of the prism. Hint: find the missing edge 1st.

Triangular Prism



$$2 \Delta s \quad 2 \left(\frac{1}{2} 12 \times 12 \right) \\ + 12 \times 8 \\ 12 \times 8 \\ 8 \times 12 \sqrt{2}$$

$$SA = 471.8 \text{ mm}^2$$

Find x

1st
 $12^2 + 12^2 = x^2$

$$12\sqrt{2} = x$$

Lateral Area:

$$12 \times 8$$

$$+ 12 \times 8$$

$$+ 8 \times 12\sqrt{2}$$

$$LA = 307.8 \text{ mm}^2$$

Volume:

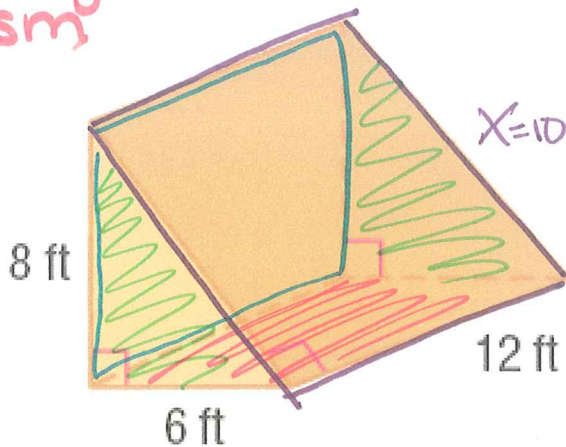
Area of Δ base

$$B = \frac{1}{2} 12 \times 12 \quad H = 8$$

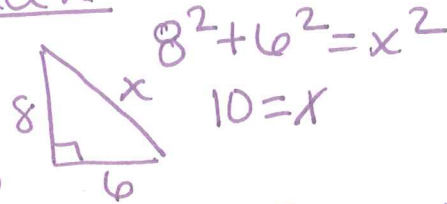
$$V = \frac{1}{2} 12 \times 12 \times 8 \quad V = 576 \text{ mm}^3$$

4. Name the figure, then find the volume, lateral area and surface area of the prism. Hint: find the missing edge 1st.

Triangular Prism



Find x



$$8^2 + 6^2 = x^2$$

$$10 = x$$

$$x = 10$$

Base is a Δ
 Area of the base

$$B = \frac{1}{2} 6 \times 8$$

$$V = \frac{1}{2} 6 \times 8 \times 12$$

$$V = 288 \text{ ft}^3$$

SA

$$12 \times 10$$

$$6 \times 12$$

$$8 \times 12$$

$$2 \left(\frac{1}{2} 8 \times 6 \right)$$

$$SA = 336 \text{ ft}^2$$

LA

$$12 \times 10$$

$$6 \times 12$$

$$8 \times 12$$

$$LA = 228 \text{ ft}^2$$