

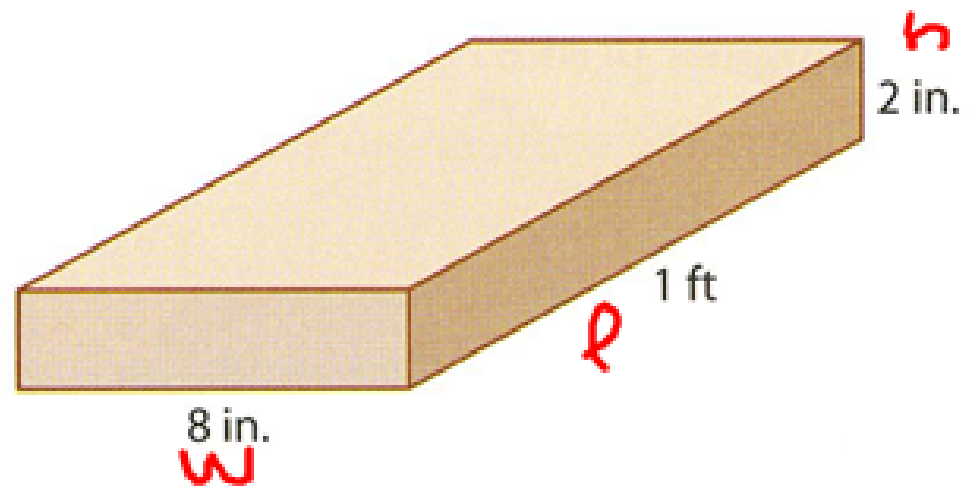
On Friday, we talked about finding the surface area of rectangular prisms by using the formula. Today, we'll be looking at finding the surface area of triangular prisms.

Remember: To find the surface area of a rectangular prism we need....

Length -  $l$

Width -  $w$

Height -  $h$



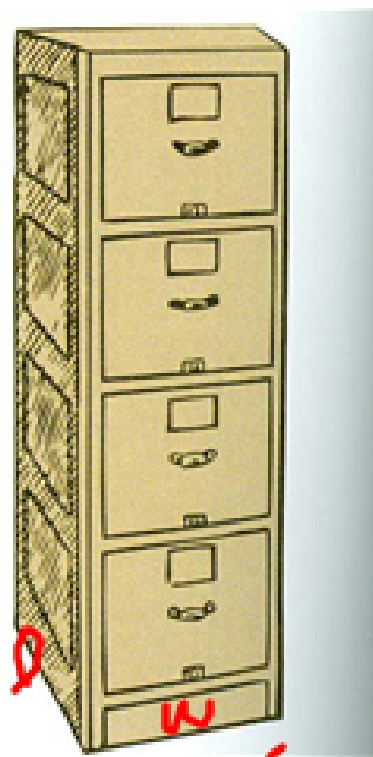
Surface Area of a Rectangular Prism:

$$SA = (2 \times \text{Bottom}) + (2 \times \text{End}) + (2 \times \text{Sides})$$

$$SA = 2wl + 2wh + 2lh$$

$$SA = 2(wl + wh + lh)$$

3. Kevin purchased a filing cabinet for his home office. He wants to paint the exterior a different colour. The dimensions of the cabinet are 140 cm high by 40 cm wide by 70 cm deep.



- a) Calculate the surface area of the filing cabinet.
- b) Kevin will not paint the bottom of the cabinet, since it sits on the floor. What is the total area that he will paint?

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

$$a) S.A = 2((70)(140) + (40)(140) + (70)(40))$$

$$S.A = 2(9800 + 5600 + 2800)$$

$$= 2(18200)$$

$$\Rightarrow 36400 \text{ cm}^2$$

$$b) \#1 \quad S.A = 2(lw + lh + wh)$$

$$S.A = lw + 2lh + 2wh$$

$$S.A = (70)(40) + 2(70)(140) + 2(40)(140)$$

$$= 2800 + 19600 + 11200$$

$$= 33600 \text{ cm}^2$$

---

$$\#2 \quad S.A_{\text{painted}} = S.A - lw$$

$$= 36400 - 2800$$

$$= 33600 \text{ cm}^2$$

First, we'll need to identify our variables.

Height  $h$

Slant Height  $s$

Length  $l$

Width  $w$

So the surface area of a triangular prism is given by:

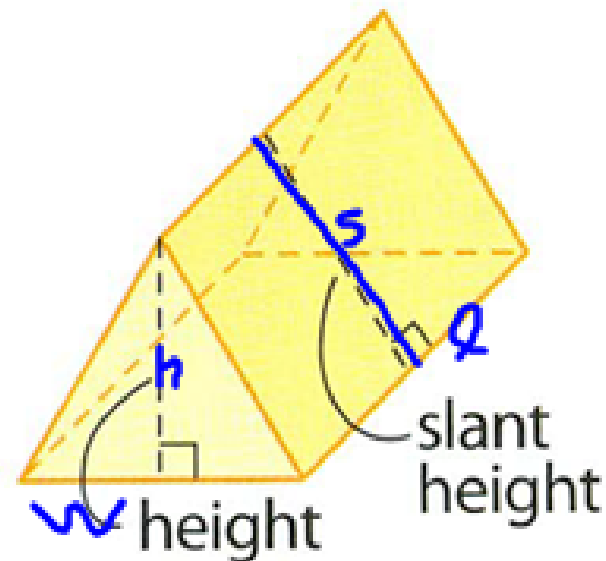
$$SA = \text{Bottom} + (2 \times \text{Side}) + (2 \times \text{End})$$

$$SA = lw + 2(ls) + 2\left(\frac{wh}{2}\right)$$

$$S.A. = lw + 2ls + wh$$

## slant height

- the shortest distance from the edge of the base of a 3-D figure to its highest point

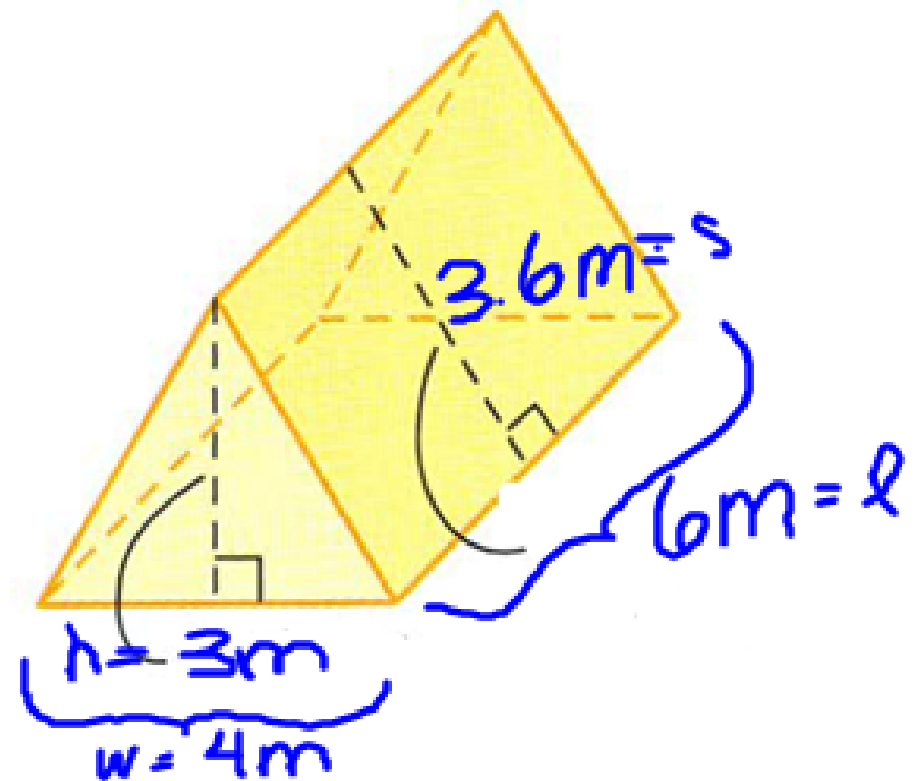


Case 1: We're given all of the information we need.

Meghan is building a greenhouse in the shape of a triangular prism. It will be 3 metres high, 4 metres wide, and 6 metres long. The **slant height** of the greenhouse will be 3.6 metres. Meghan needs to buy glass to start the job.

a) What is the surface area of the triangular prism?

b) What is the exposed surface area of the greenhouse?

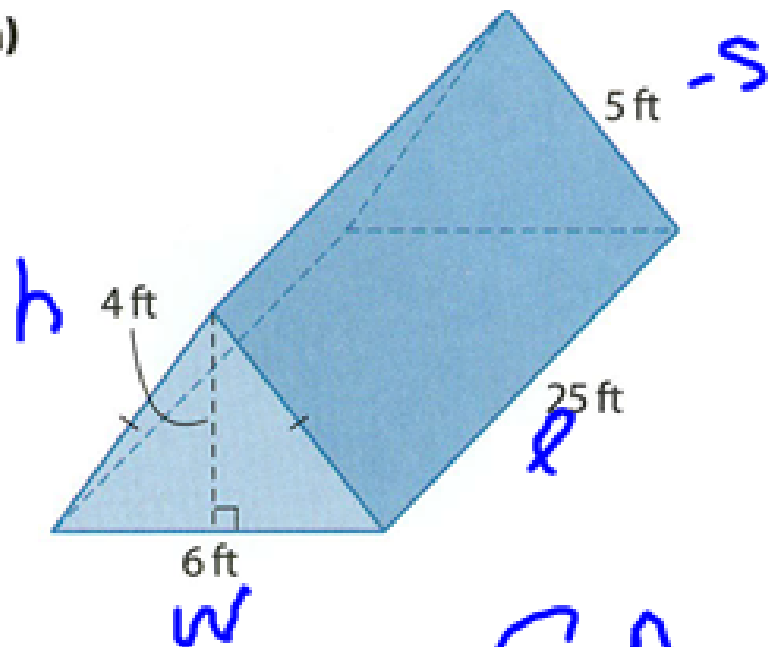


$$S.A = lw + 2ls + wh$$

$$\begin{aligned} SA &= (6)(4) + 2(6)(3.6) + (4)(3) \\ &= 24\text{m}^2 + 43.2\text{m}^2 + 12\text{m}^2 \\ &= 79.2\text{m}^2 \end{aligned}$$

$$\begin{aligned} \text{(b) } S.A &= \cancel{lw} + 2ls + wh \\ &= 2(6)(3.6) + (4)(3) \\ &= 43.2 + 12 \\ &= 55.2\text{m}^2 \end{aligned}$$

a)



$$S.A. = lw + 2ls + wh$$

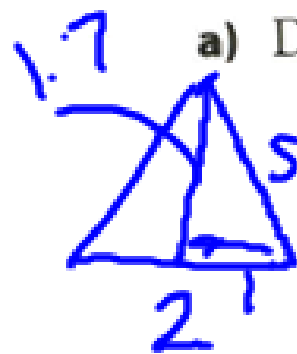
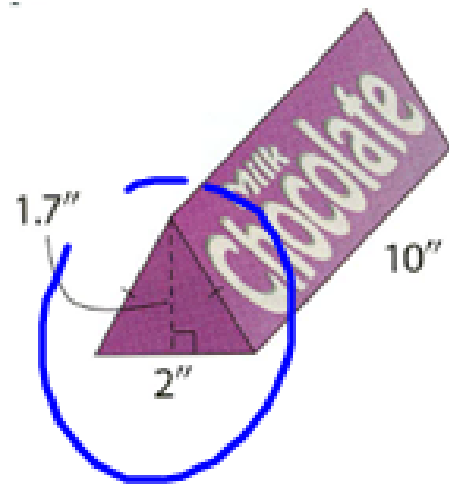
$$S.A. = (25)(6) + 2(25)(5) + (6)(4)$$

$$S.A. = 150ft^2 + 250ft^2 + 24ft^2$$

$$S.A. = 424ft^2$$

Case 2: We first need to find the slant height.

4. A chocolate bar comes packaged in the shape of a triangular prism.



- a) Determine the slant height of the package.

$$a^2 + b^2 = c^2$$

$$1.7^2 + 1^2 = c^2$$

$$2.89 + 1 = c^2$$

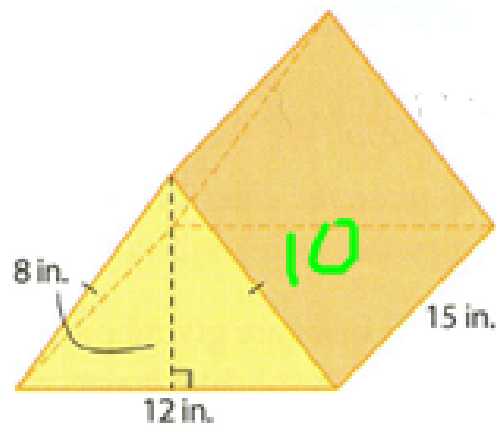
$$\sqrt{3.89} = \sqrt{c^2} \quad c = 1.9723$$

- b) Calculate the exterior surface area of the package.

$$S.A. = lw + 2(l \times s) + wh$$

$$= (10)(2) + 2(10)(1.9723) + (2)(1.7)$$

$$= 20 \text{ in}^2 + 39.45 \text{ in}^2 + 3.4 \text{ in}^2 = 62.84 \text{ in}^2$$



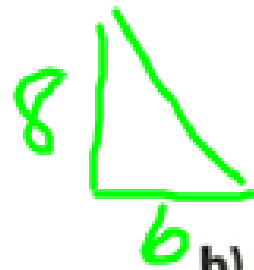
a) Determine the slant height of the package.

$$a^2 + b^2 = c^2$$

$$8^2 + 6^2 = c^2$$

$$64 + 36 = c^2$$

$$\sqrt{100} = \sqrt{c^2} \quad 10 = c$$



b) Calculate the exterior surface area of the package.

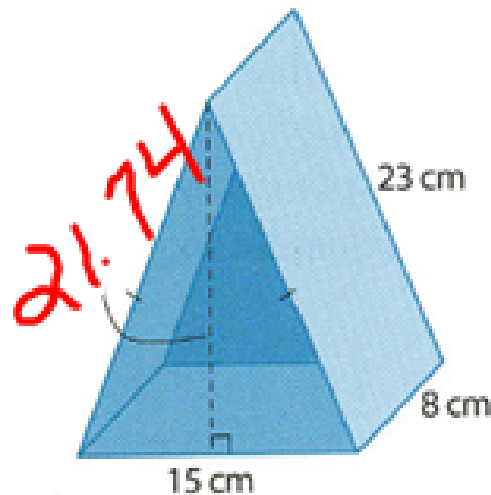
$$\begin{aligned} S.A. &= lw + 2(l)(s) + wh \\ &= (15)(12) + 2(15)(10) + (12)(8) \\ &= \end{aligned}$$



### Case 3: We need to find the height first.

Page 31 - 32  
# 1b, 3

5. Bruno and Lena are giving pieces of their wedding cake as gifts. Each piece of cake is packaged in the shape of an open triangular prism with the approximate dimensions shown. Calculate the exterior surface area of the box.

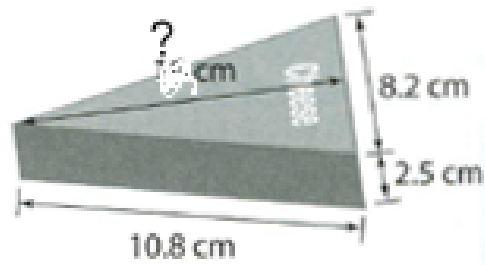


- a) Calculate the height of the prism:

$$\begin{aligned} a^2 + b^2 &= c^2 \\ a^2 + 7.5^2 &= 23^2 \\ -7.5^2 &\quad -7.5^2 \\ a^2 &= 23^2 - 7.5^2 \\ a^2 &= 529 - 56.25 \\ \sqrt{a^2} &= \sqrt{472.75} \\ a &= 21.74 \text{ cm} \end{aligned}$$

- b) Calculate the surface area:

a) Calculate the height of the prism:



b) Calculate the surface area:

