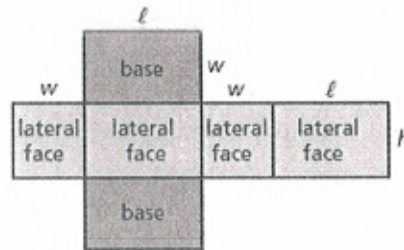
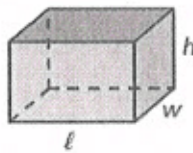


Words The surface area, SA , of a rectangular prism is the sum of the areas of the bases and the lateral faces.



Algebra

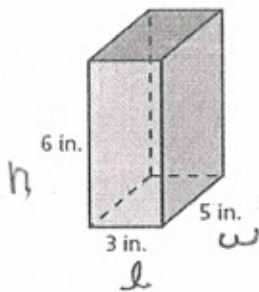
$$SA = 2lw + 2lh + 2wh$$

Area of
bases

Area of
lateral faces

Finding the Surface Area of a Prism:

Example 1: Find the surface area of the rectangular prism.



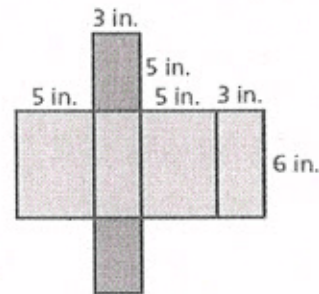
Draw a net.

$$SA = 2lw + 2lh + 2wh$$

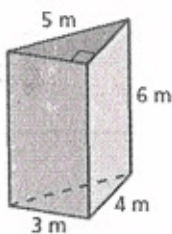
$$SA = 2(3)(5) + 2(3)(6) + 2(5)(6)$$

$$SA = 30 + 36 + 60$$

$$SA = 126 \text{ in}^2$$



Example 2: Find the surface area of the triangular prism.



Draw a net.

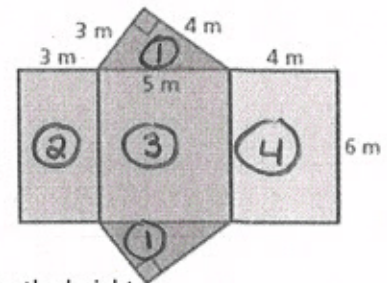
Area of the 2 triangular bases ①

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(3)(4)$$

Substitute 3 in for base and 4 for the height.

$$A = 6(2) = 12 \text{ m}^2 \quad \text{There are 2 bases. Multiply by 2.}$$



Area of left rectangle ②

$$A = lw$$

$$A = 6(3) = 18 \text{ m}^2$$

Area of middle rectangle ③

$$A = lw$$

$$A = 6(5) = 30 \text{ m}^2$$

Area of right rectangle ④

$$A = lw$$

$$A = 6(4) = 24 \text{ m}^2$$

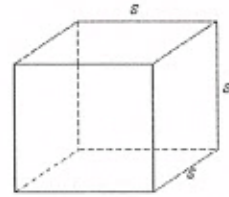
Add the areas of the bases and lateral faces (rectangles) together.

$$SA = 12 + 18 + 30 + 24$$

$$SA = 84 \text{ m}^2$$

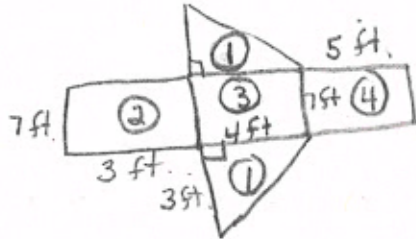
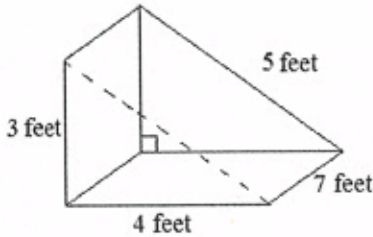
When all the edges of a rectangular prism have the same length s , the rectangular prism is a cube. The formula for the surface area of a cube is

$$SA = 6s^2$$



Try This: Find the surface area of the prism.

a.



Area ①

$$A = 2\left(\frac{1}{2}bh\right)$$

$$A = 2\left(\frac{1}{2} \cdot 4 \cdot 3\right)$$

$$A = 2(6)$$

$$A = 12 \text{ ft}^2$$

Area ④

$$A = l \cdot w$$

$$A = 5(7)$$

$$A = 35 \text{ ft}^2$$

Area ②

$$A = l \cdot w$$

$$A = 3(7)$$

$$A = 21 \text{ ft}^2$$

Area ③

$$A = l \cdot w$$

$$A = 4(7)$$

$$A = 28 \text{ ft}^2$$

Total SA

$$SA = 12 + 21 + 28 + 35$$

$$SA = 96 \text{ ft}^2$$

b. Which prism has the greater surface area?

SA Cube

$$SA = 6s^2$$

$$SA = 6(9)^2$$

$$SA = 6(81)$$

$$SA = 486 \text{ cm}^2$$

SA Rec Prism

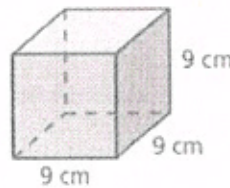
$$SA = 2lw + 2lh + 2wh$$

$$SA = (2 \cdot 15 \cdot 5) + (2 \cdot 15 \cdot 7) + (2 \cdot 5 \cdot 7)$$

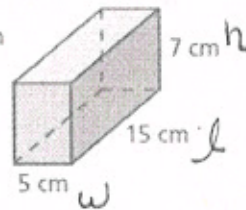
$$SA = 150 + 210 + 70$$

$$SA = 430 \text{ cm}^2$$

cube



Rec. Prism



$$l = 15$$

$$w = 5$$

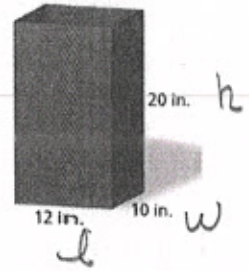
$$h = 7$$

The cube has a greater surface area than the rectangular prism because $486 \text{ cm}^2 > 430 \text{ cm}^2$.

The lateral surface area of a prism is the sum of the areas of the lateral faces.

* NOT including the bases *

Example 3: The outsides of fly trap are coated with glue to catch flies. You make your own trap in the shape of a rectangular prism with an open top and bottom. What is the surface area that you need to coat with glue?



Find the lateral surface area.

Do not include the areas of the bases in the formula.

$$SA = 2lh + 2wh$$

$$SA = 2(12)(20) + 2(10)(20)$$

$$SA = 480 + 400$$

$$SA = 880 \text{ in}^2$$

$$l = 12$$
$$w = 10$$
$$h = 20$$

Try This:

d. **WHAT IF?** In Example 3, both the length and the width of your trap are 12 inches. What is the surface area that you need to coat with glue?

$$l = 12$$
$$w = 12$$
$$h = 20$$

$$SA = 2lh + 2wh$$
$$SA = (2 \cdot 12 \cdot 20) + (2 \cdot 12 \cdot 20)$$
$$SA = 480 + 480$$
$$SA = 960 \text{ in}^2$$

You would need to coat
960 square inches with glue.

