

Challenge Problems

13.4

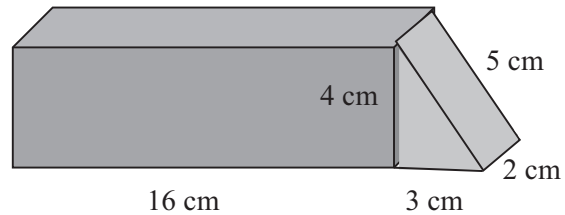
NAME _____

Module 13 Perimeter, Area, and Volume
Lesson 4 Surface Area: Prisms, Cylinders, and Spheres

Set 1

1

Find the surface area of the shape.



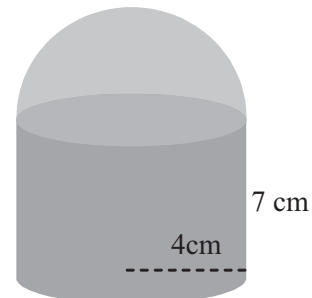
2

Explain how the formula for the surface area of a prism can be written as $S = 2B + ph$, where B is the area of one base of the prism, p is the perimeter of one base, and h is the height of the prism.

Set 2

1

Find the surface area of the shape.
Assume that the curved solid is a half-sphere.



Possible Answers

Set 1

1. Partial Rectangular Prism:

$$\begin{aligned} SA &= 4 \times 2 + 2(16 \times 4) + 2(16 \times 2) \\ &= 200 \text{ cm}^2 \end{aligned}$$

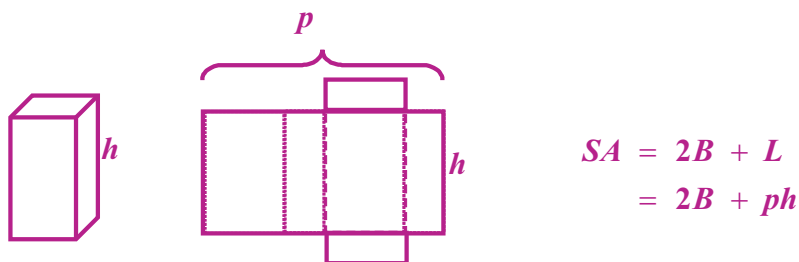
Partial Triangular Prism:

$$\begin{aligned} SA &= 2 \left(\frac{1}{2} \times 3 \times 4 \right) + 2 \times 5 + 2 \times 3 \\ &= 28 \text{ cm}^2 \end{aligned}$$

Total surface area:

$$\begin{aligned} SA &= 200 \text{ cm}^2 + 28 \text{ cm}^2 \\ &= 228 \text{ cm}^2 \end{aligned}$$

2. Use a net to visualize the faces of a prism.



$$\begin{aligned} SA &= 2B + L \\ &= 2B + ph \end{aligned}$$

The lateral surface is made up of four rectangles. Think of the lateral area as the area of one big rectangle, the rectangle's length is the same as the perimeter of the base of the prism, and the rectangle's width is the same as the height of the prism. So, the lateral area is the perimeter of the base times the height of the prism or ph .

Set 2

$$\begin{aligned} 1. \quad SA &= \pi 4^2 + 2\pi 4 \times 7 + \frac{1}{2} \times 4\pi 4^2 \\ &= 50.24 + 175.84 + 100.48 \\ &\approx 326.56 \text{ cm}^2 \end{aligned}$$