

Challenge Problems

13.6

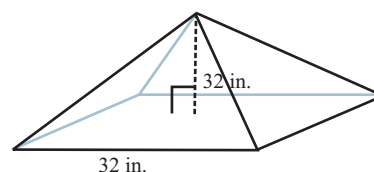
NAME _____

Module 13 Perimeter, Area, and Volume
Lesson 6 Surface Area: Pyramids and Cones

Set 1

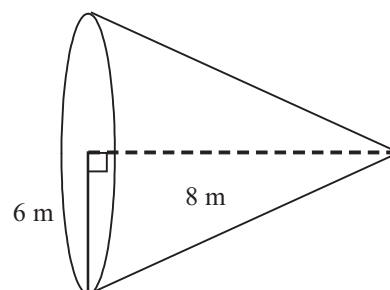
- 1 Explain why the slant height of a pyramid is always longer than the height of the pyramid. Then, explain why a pyramid's slant height is always shorter than the length of its lateral edge.

- 2 Find the surface area of the square pyramid.



Set 2

- 1 Find the surface area of the cone.



Possible Answers

Set 1

1. A right triangle is formed with the pyramid height as a leg and the slant height as the hypotenuse. In a right triangle, the hypotenuse is always the longest side, so the slant height is always greater than the pyramid height. On a lateral face, a right triangle is formed with the slant height as a leg and a lateral edge as the hypotenuse. So, the lateral edge is always greater than the slant height.

2. Find the slant height.
$$l^2 = (12 \text{ in.})^2 + \left(\frac{32 \text{ in.}}{2}\right)^2$$
$$= 144 \text{ in.}^2 + 256 \text{ in.}^2$$
$$= 400 \text{ in.}^2$$
$$l = 20 \text{ in.}$$

Find the surface area.
$$SA = B + \frac{1}{2}Pl$$
$$= (32 \text{ in.})^2 + \frac{1}{2} \times (4 \times 32 \text{ in.}) \times 20 \text{ in.}$$
$$= 1,024 \text{ in.}^2 + 1,280 \text{ in.}^2$$
$$= 2,304 \text{ in.}^2$$

The surface area is 2,304 square inches.

Set 2

1. Find the slant height.
$$l^2 = (6 \text{ m})^2 + (8 \text{ m})^2$$
$$= 36 \text{ m}^2 + 64 \text{ m}^2$$
$$= 100 \text{ m}^2$$
$$l = 10 \text{ m}$$

Find the surface area.

$$SA = \pi r^2 + \pi rl$$
$$= 3.14 \times (6 \text{ m})^2 + 3.14 \times 6 \text{ m} \times 10 \text{ m}$$
$$= 113.04 \text{ m}^2 + 188.4 \text{ m}^2$$
$$\approx 301.44 \text{ m}^2$$

The surface area is about 301.44 m².