

Solutions

Surface Area of Pyramids & Cones

1.



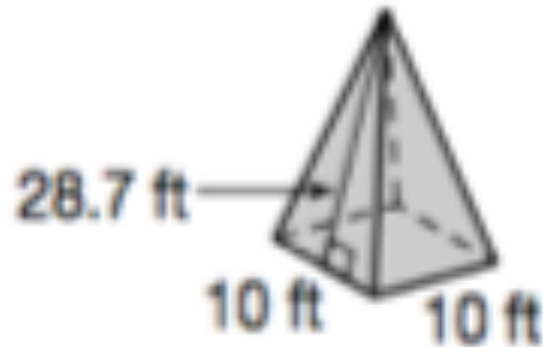
$$SA = \pi(10)(10 + 18.2)$$

$$SA = 10\pi(28.2)$$

$$SA = 282\pi m^2$$

$$SA \approx 885.93m^2$$

2.

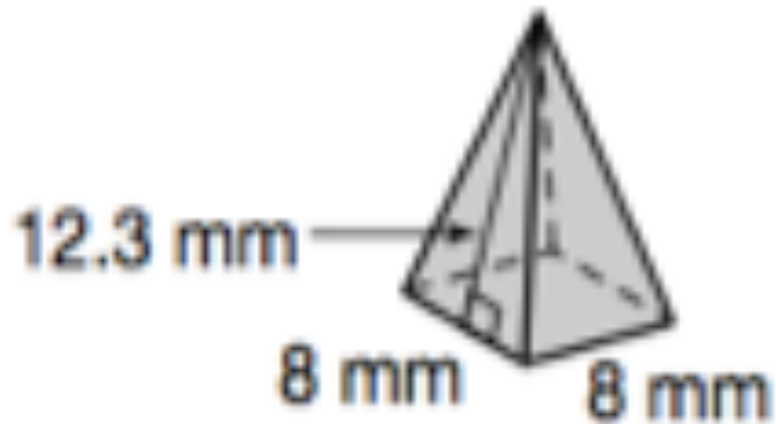


$$SA = \frac{1}{2}(40)(28.7) + (10)(10)$$

$$SA = 574 + 100$$

$$SA = 674 \text{ ft}^2$$

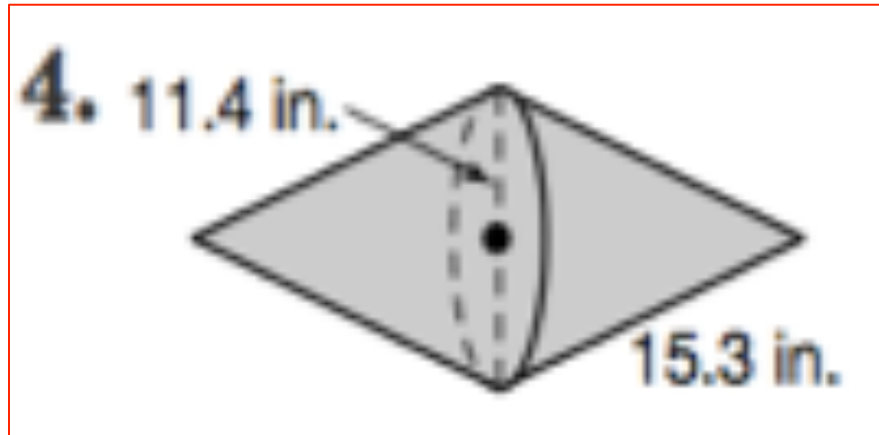
3.



$$SA = \frac{1}{2}(32)(12.3) + (8)(8)$$

$$SA = 196.8 + 64$$

$$SA = 260.8 \text{ mm}^2$$



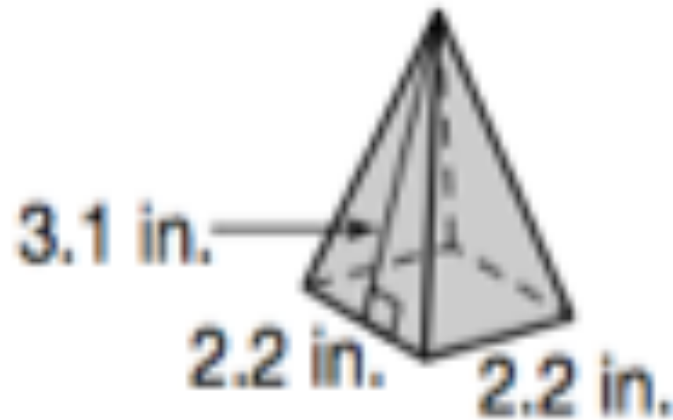
$$SA = 2\pi rl$$

$$SA = 2\pi(11.4)(15.3)$$

$$SA = 348.84\pi \text{ in}^2$$

$$SA \approx 1095.91^2$$

5.



$$SA = \frac{1}{2}(8.8)(3.1) + (2.2)^2$$

$$SA = 13.64 + 4.84$$

$$SA = 18.48in^2$$

6.

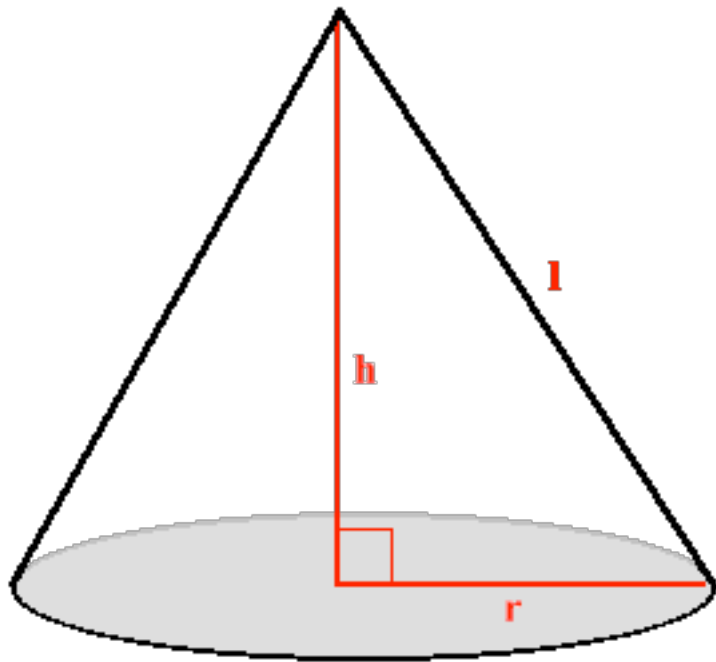


$$SA = 17\pi(17 + 21)$$

$$SA = 646\pi cm^2$$

$$SA \approx 2029.47 cm^2$$

- 1) A cone has a radius of 10 inches and a height of 14 inches. Find the surface area.



Find the slant height.

$$l = \sqrt{14^2 + 10^2}$$

$$l = \sqrt{296}$$

$$l = 17.2 \text{ in}$$

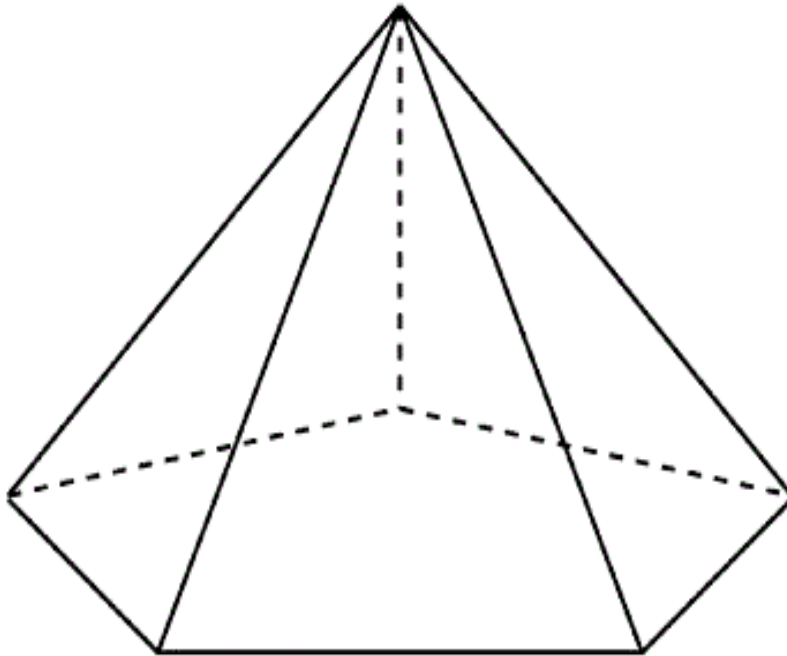
$$SA = 10\pi(17.2 + 10)$$

$$SA = 10\pi(27.2)$$

$$SA = 272\pi \text{ in}^2$$

$$SA \approx 854.51 \text{ in}^2$$

- 2) The base of a regular pentagonal pyramid has a perimeter of 60 feet. The slant height of the pyramid is 9 feet. Find the lateral area of the pyramid.



$$LA = \frac{1}{2}(60)(9)$$

$$LA = 270 \text{ ft}^2$$

A roof is shaped like a cone with a diameter of 12 feet and a slant height of 13 feet. One bundle of shingles covers 32 square feet. How many bundles should you buy to cover the roof?



$$LA = \pi(6)(13)$$

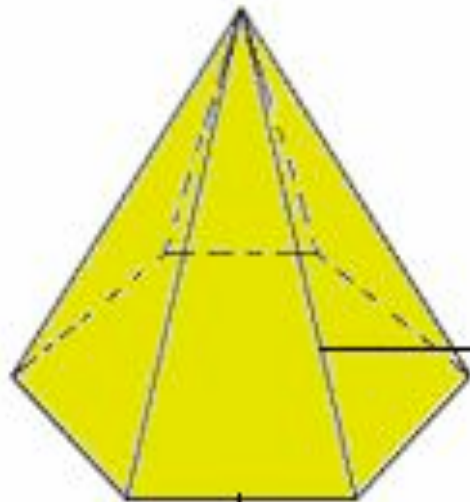
$$LA = 78\pi$$

$$LA \approx 245.04 \text{ ft}^2$$

$$245.04 \text{ ft}^2 \div 32 \text{ ft}^2 = 7.66$$

We need to buy 8 bundles of shingles.

- 4) A regular hexagonal pyramid has a base area of 392.9 square feet. The sides of the hexagon are 12.3 feet long. The slant height of the pyramid is 15.9 feet. What is the surface area of the pyramid?



hexagonal base

triangular face

$$P = (12.3)(6)$$

$$P = 73.8 \text{ ft}$$

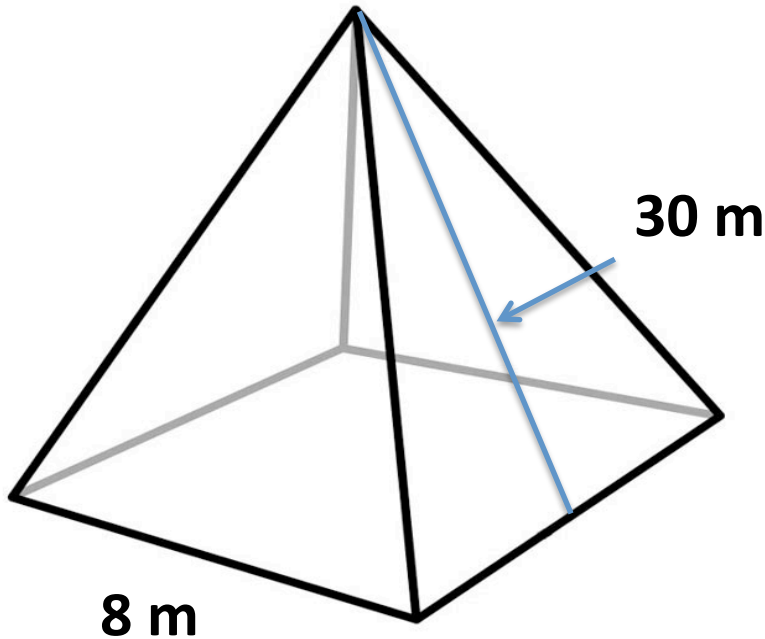
$$SA = \frac{1}{2}(73.8)(15.9) + 392.9$$

$$SA = 586.71 + 392.9$$

$$SA = 979.61 \text{ ft}^2$$

5) A square pyramid has a base edge that measures 8 meters and a slant height of 30 meters.

- Find the perimeter of the base.
- Find the lateral area.



$$P = (8)(4) = 32m$$

$$LA = \frac{1}{2} P_{base} l$$

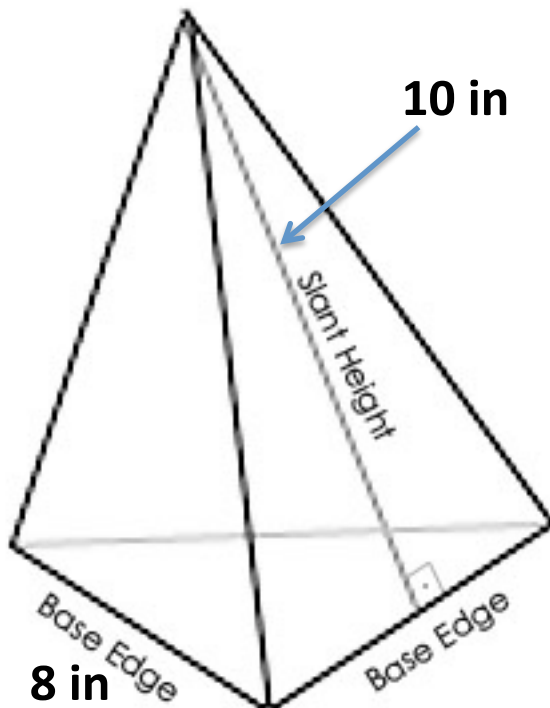
$$LA = \frac{1}{2} (32)(30)$$

$$LA = \frac{1}{2} (960)$$

$$LA = 480m^2$$

6) A regular triangular pyramid has a slant height of 10 inches. The perimeter of the base is 24 inches. The base of the pyramid has an area of 27.7 square inches.

- Find the lateral area of the pyramid.
- Find the surface area of the pyramid.



$$a) LA = \left(\frac{1}{2}\right)(24)(10)$$

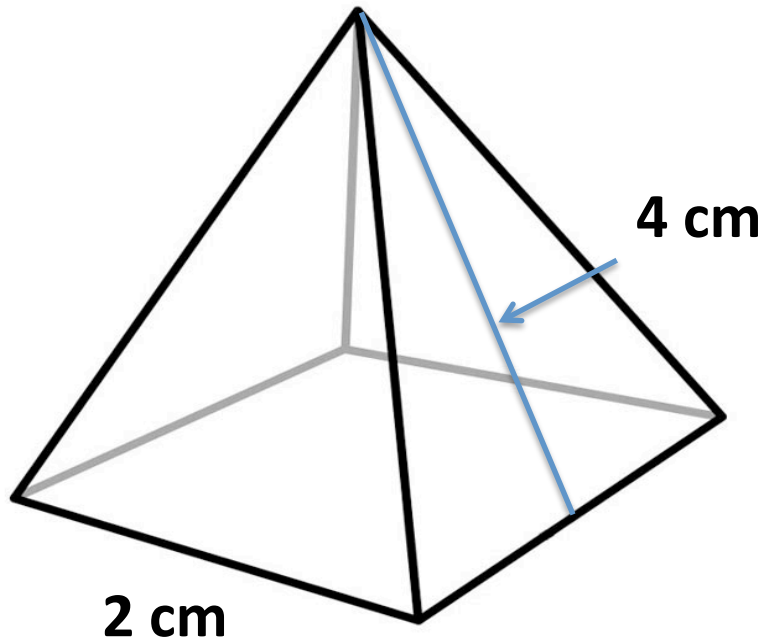
$$LA = 120in^2$$

$$b) SA = 120 + 27.7$$

$$SA = 147.7in^2$$

7) Maico made game pieces in the shape of square pyramids. Each piece has a base edge of 2 cm and a slant height of 4 cm. He will paint all of the pieces. He needs to know how much paint he needs.

a. Find the surface area of one game piece.



$$SA = \frac{1}{2} P_{base} l + A_{base}$$

$$SA = \frac{1}{2} (8)(4) + (2)^2$$

$$SA = 16 + 4$$

$$SA = 20 \text{ cm}^2$$

b. Each game has 24 game pieces. Find the total surface area of one set of game pieces.

$$\begin{aligned}\text{SA of one set} &= (20 \text{ cm}^2) (24 \text{ pieces}) \\ &= 480 \text{ cm}^2\end{aligned}$$

c. She wants to make 12 games. What is the total surface area for all 12 games?

$$\begin{aligned}\text{SA of all} &= (480 \text{ cm}^2) (12 \text{ games}) \\ &= 5760 \text{ cm}^2\end{aligned}$$

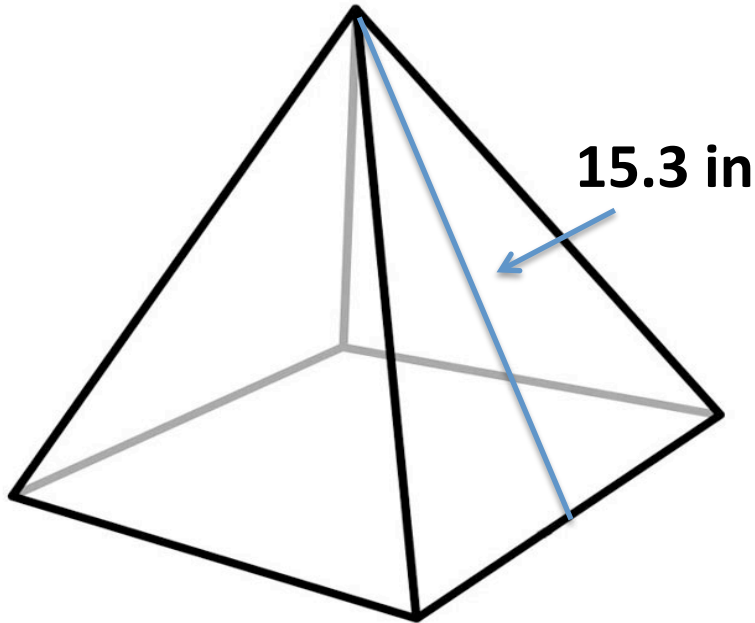
d. A can of paint covers 400 square centimeters. How many cans of paint will he need?

$$5760 / 400 = 14.4$$

He will need 15 cans of paint.

8) A square pyramid has a perimeter of 50 inches and a slant height of 15.3 inches.

- Find the lateral area of the pyramid.
- What is the length of one side of the base?
- Find the area of the base.
- Find the surface area of the pyramid.



$$a) LA = \frac{1}{2} P_{base} l$$

$$LA = \frac{1}{2} (50)(15.3)$$

$$LA = 382.5in^2$$

$$b) \frac{50}{4} = 12.5in$$

$$c) A_{base} = (12.5)^2 = 156.25in^2$$

$$d) SA = 382.5 + 156.25$$

$$SA = 538.75in^2$$