

all bases are regular polygons

LESSON 12.3

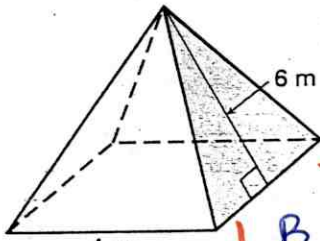
Practice

For use with pages 810-817

$$S = B + \frac{Pl}{2}$$

Find the area of each lateral face of the regular pyramid. Round your answer to two decimal places.

1.

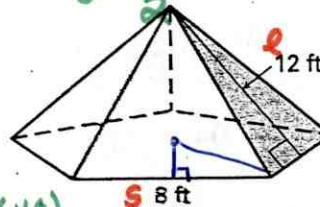


$B = 4^2 = 16$
 $P = 4(4) = 16$
 $l = 6$
 $S = 16 + \frac{16(6)}{2}$
 $S = 64 \text{ m}^2$

Lateral Face

$\frac{4(6)}{2} = 12 \text{ m}^2$

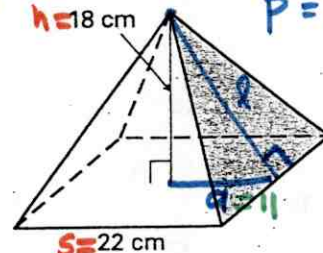
2.



$B = \frac{5.5(40)}{2} = 110$
 $P = 5(8) = 40$
 $l = 12$
 $S = 110 + \frac{40(12)}{2} = 350 \text{ ft}^2$



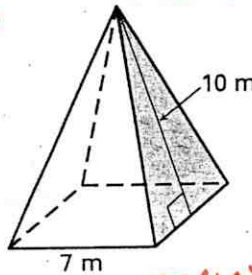
3.



$B = 22^2 = 484$
 $P = 4(22) = 88$
 $l = 21.1$
 $l^2 = 18^2 + 11^2$
 $S = 484 + \frac{88(21.1)}{2}$
 $S = 1412.4 \text{ cm}^2$
 $L = 932.8$
 $\text{each} = 233.2$

Find the surface area of the regular pyramid. Round your answer to two decimal places.

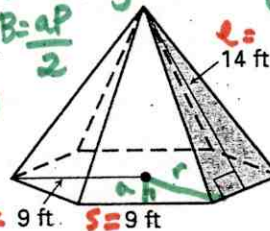
4.



$B = 7^2 = 49$
 $P = 4(7) = 28$
 $l = 10$

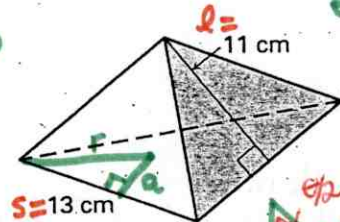
$S = 49 + \frac{28(10)}{2}$
 $S = 189 \text{ m}^2$

5.



$B = \text{Hexagon}$
 $B = \frac{aP}{2}$
 $P = 6(9) = 54$
 $a = 4.5\sqrt{3}$
 $B = 4.5\sqrt{3}(54)$
 $B = 210.44$
 $S = 210.44 + \frac{54(14)}{2}$
 $S = 588.44 \text{ ft}^2$

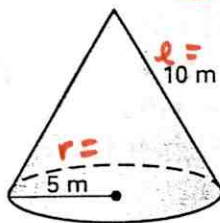
6.



$\theta = \frac{360}{6} = 60^\circ$
 $\theta = \frac{360}{3} = 120^\circ$
 $B = \frac{aP}{2}$
 $P = 3(13) = 39$
 $a = 3.75$
 $B = 3.75(39)$
 $B = 73.13$
 $S = 73.13 + \frac{39(11)}{2}$
 $S = 287.63 \text{ m}^2$

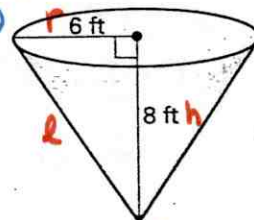
Find the lateral area of the right cone. Round your answer to two decimal places.

7.



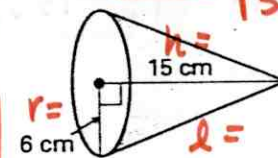
$S = \pi(5)(10) + \pi(5)^2$
 $= 50\pi + 25\pi$
 $S = 75\pi \text{ m}^2$
 Lateral = $50\pi \text{ m}^2$

8.



$l^2 = 6^2 + 8^2$
 $l^2 = 100$
 $l = 10$
 $S = \pi(6)^2 + \pi(6)(10)$
 $36\pi + 60\pi$
 $S = 96\pi \text{ ft}^2$

9.



$l^2 = 6^2 + 15^2$
 $l^2 = 36 + 225$
 $l^2 = 261$
 $l = \sqrt{261} \approx 16.16$
 $S = \pi(6)(16.16) + \pi(6)^2$
 $= 99.6\pi + 36\pi$
 $S = 135.6\pi \text{ cm}^2$
 Lateral = $99.6\pi \text{ cm}^2$

LESSON 12.3

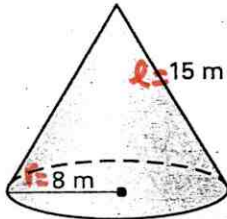
Practice *continued*

For use with pages 810-817

$$S = \pi r l + \pi r^2$$

Find the surface area of the right cone. Round your answer to two decimal places. *leave in terms of π*

10.

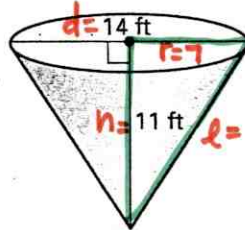


$$S = \pi(8)(15) + \pi(8)^2$$

$$= 120\pi + 64\pi$$

$$S = 184\pi \text{ m}^2$$

11.



$$l^2 = 7^2 + 11^2$$

$$l^2 = 49 + 121$$

$$l^2 = 170$$

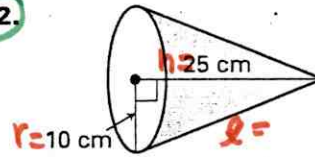
$$l = \sqrt{170} \approx 13.03$$

$$S = \pi(7)(13.03) + \pi(7)^2$$

$$= \pi(91.21) + 49\pi$$

$$S = 140.21\pi \text{ ft}^2$$

12.



$$l^2 = 10^2 + 25^2$$

$$l^2 = 100 + 625$$

$$l^2 = 725$$

$$l = \sqrt{725} \approx 26.93$$

$$S = \pi(10)(26.93) + \pi(10)^2$$

$$= 269.3\pi + 100\pi$$

$$S = 369.3\pi \text{ cm}^2$$

13. **Multiple Choice** The surface area of a regular pyramid with a square base is 1536 square meters. The base edge length is 24 meters and the slant height is 20 meters. What is the height of the pyramid?

A. 8 meters

B. 12 meters

C. 16 meters

D. 20 meters

$$S = 1536 \text{ m}^2$$

$$\text{side length} = 24$$

$$l = 20$$

$$h = ?$$

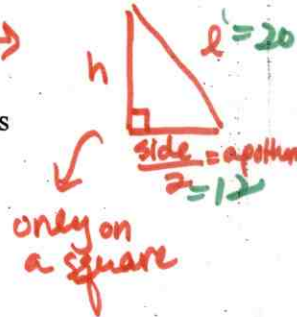


$$20^2 = h^2 + 12^2$$

$$400 = h^2 + 144$$

$$h^2 = 256$$

$$h = 16$$



Sketch the described solid and find its surface area. Round your answer to two decimal places.

$$S = B + \frac{Pl}{2} \quad \text{cone} \quad S = \pi r l + \pi r^2$$

14. A regular pyramid has a slant height of 12 inches. Its base is a square with a base edge length of 18 inches.

$$l = 12$$

$$P = 4(18) = 72$$

$$B = 18^2 = 324$$

$$S = 324 + \frac{72(12)}{2}$$

$$S = 756 \text{ in}^2$$



15. A regular pyramid has a height of 10 inches. Its base is an equilateral triangle with a base edge length of 12 inches.

$$h = 10$$

$$P = 3(12) = 36$$

$$B = \frac{12(6\sqrt{3})}{2} = 36\sqrt{3}$$

$$l^2 = 10^2 + (2\sqrt{3})^2$$

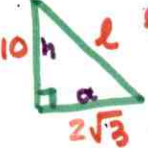
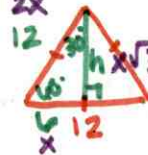
$$l^2 = 100 + 12$$

$$l^2 = 112$$

$$l = \sqrt{112} \approx 10.58$$

$$S = 36\sqrt{3} + \frac{36(10.58)}{2}$$

$$S = 252.79 \text{ in}^2$$



16. A right cone has a radius of 3 feet and a height of 9 feet.

17. A right cone has a diameter of 12 meters and a slant height of 9 meters.

$$r = 3$$

$$h = 9$$

$$l^2 = 3^2 + 9^2$$

$$l^2 = 9 + 81$$

$$l^2 = 90$$

$$l = \sqrt{90} \approx 9.49$$

$$S = \pi(3)(9.49) + \pi(3)^2$$

$$S = 37.47\pi \text{ ft}^2$$



$$d = 12$$

$$l = 9$$

$$r = 6$$

$$S = \pi(6)(9) + \pi(6)^2$$

$$= 54\pi + 36\pi$$

$$S = 90\pi \text{ m}^2$$

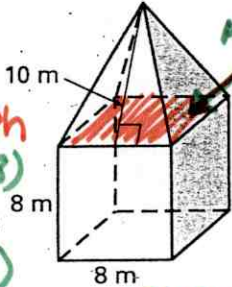
LESSON 12.3

Practice *continued*
For use with pages 810-817

* you must subtract the area of the shared base in red twice b/c it's a base twice
OR calculate it w/out the base

Find the surface area of the solid. The pyramids are regular and the cones are right. Round your answer to two decimal places.

18.



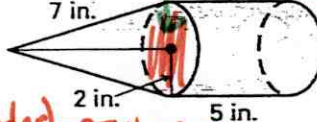
$A = 8^2 = 64$

$S(\text{prism}) = 2B + Ph$
 $B = 8^2 = 64$
 $P = 4(8) = 32$
 $h = 8$
 $S = 2(64) + 32(8) = 384$

$S(\text{Pyramid}) = B + \frac{Pl}{2}$
 $B = 8^2 = 64$
 $P = 4(8) = 32$
 $l = 10$
 $S = 64 + \frac{32(10)}{2} = 224$

Total SA = $384 + 224 - 64 = 480 \text{ m}^2$

19.



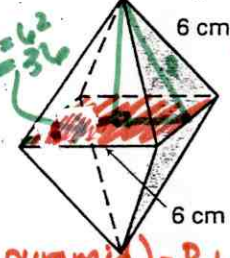
$A = \pi(2)^2 = 4\pi$

$S(\text{cylinder}) = 2\pi rh + 2\pi r^2$
 $= 2\pi(2)(5) + 2\pi(2)^2 = 28\pi$

$S(\text{cone}) = \pi rl + \pi r^2$
 $= \pi(2)(7) + \pi(2)^2 = 18\pi$

Total SA = $28\pi + 18\pi - 4\pi - 4\pi = 38\pi \text{ in}^2$

20.



$A = 6^2 = 36$

$S(\text{pyramid}) = B + \frac{Pl}{2}$
 $B = 6^2 = 36$
 $P = 4(6) = 24$
 $l = \sqrt{27} \approx 5.2$
 $S = 36 + \frac{24(5.2)}{2} = 98.4$

Total SA = $98.4 + 98.4 - 36 - 36 = 124.8 \text{ cm}^2$

In Exercises 21-23, use the following information.

Great Pyramid of Khufu The Great Pyramid of Khufu is located in El Giza, Egypt. Pyramids were built to serve as tombs for the pharaohs of ancient Egypt. The Great Pyramid is 481 feet high and has a square base with a base edge length of 756 feet. Round your answers to two decimal places.

- Approximate the slant height of the Great Pyramid.
- Approximate the area of each lateral face of the Great Pyramid.
- Approximate the surface area of the Great Pyramid.