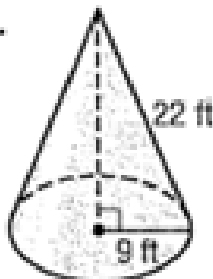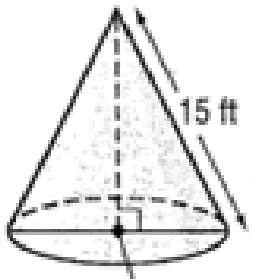Get out your homework and have it ready to check.

Classwork - Surface Area of Pyramids

Find the lateral and total surface areas of each cone. Round to the nearest tenth if necessary. SHOW WORK
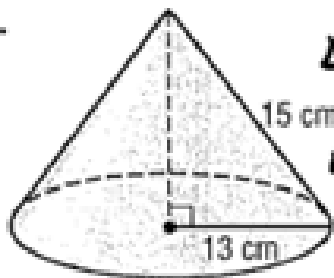
1.

$LA = 3.14(9)(22) = 621.72 ft^2$

$A \text{ of } O = 3.14(9^2) = 254.34 ft^2$

22 ft

9 ft

$SA = 254.34 + 621.72$

2.

$LA = 3.14(7.5)(15) = 353.25 ft^2$

$A \text{ of } O = 3.14(7.5^2) = 176.6 ft^2$

15 ft

$r = 7.5 ft$

$SA = 353.25 + 176.6$

$LA = \underline{621.7 ft^2}$

$SA = \underline{876.1 ft^2}$

$LA = \underline{353.3 ft^2}$

$SA = \underline{529.9 ft^2}$

3.

15 cm

13 cm

$LA. = 3.14(13)(15) = 612.3 cm^2$

$A of O = 3.14(13^2) = 530.7 cm^2$

$SA = 612.3 + 530.7$

$LA = \underline{612.3 cm^2}$

$SA = \underline{1143 cm^2}$

4.

$A = 28.3 in.^2$

6 in.
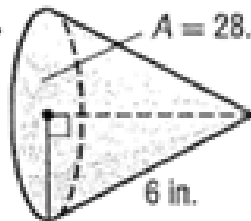
$LA. = 3.14(3)(6) = 56.52$

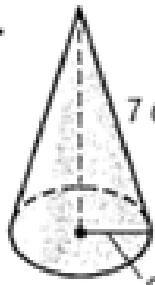$SA = 56.5 + 28.3$

$\dfrac{28.3}{3.14} = \dfrac{3.14 r^2}{3.14}$

$\sqrt{9} = \sqrt{r^2}$

$3 = r$

$LA = \underline{56.5 in^2}$

$SA = \underline{84.8 in^2}$

5.

7 cm

0.5 cm

$L.A. = 3.14(0.5)(7) = 10.99 cm^2$

$A of O = 3.14(0.5^2) = 0.785$

$SA = 11 + 0.8$

$LA = \underline{11 cm^2}$

$SA = \underline{11.8 cm^2}$

6.

c — 12 cm

5 cm
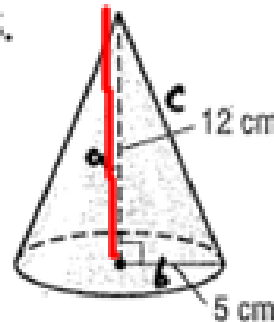
$12^2 + 5^2 = c^2$

$144 + 25 = c^2$

$\sqrt{169} = \sqrt{c^2}$

$13 cm = c \rightarrow \ell$

$LA. = 3.14(5)(13) = 204.1 cm^2$

$A of O = 3.14(5^2) = 78.5 cm^2$

$SA = 204.1 + 78.5$

$LA = \underline{204.1 cm^2}$

$SA = \underline{282.6 cm^2}$

7. **ALGEBRA** A cone has a lateral surface area of 62.8 square yards. If the slant height is 2 yards, what is the total surface area of the cone?
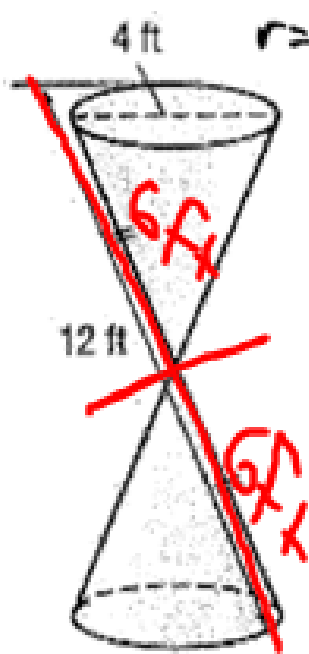
$$L.A. = \pi r \ell$$

$$62.8 = 3.14 \cdot r \cdot 2$$

$$\frac{62.8}{6.28} = \frac{6.28 \cdot r}{6.28}$$

$$10 \text{ yd} = r$$

$$A \text{ of } O = 3.14(10^2) = 314 \text{ yd}^2$$

$$SA = 62.8 + 314 = \boxed{376.8 \text{ yd}^2}$$

8. Find the total surface area of the figure below. SHOW WORK

4 ft   12 ft

$r = 2 ft$

$6 ft$ $6 ft$

$$L.A. = 3.14(2)(6) = 37.68 \text{ ft}^2$$

$$A \text{ of } O = 3.14(2^2) = 12.56 \text{ ft}^2$$

$$S.A. \text{ of } 1 \text{ cone} = 37.68 + 12.56 = 50.24$$
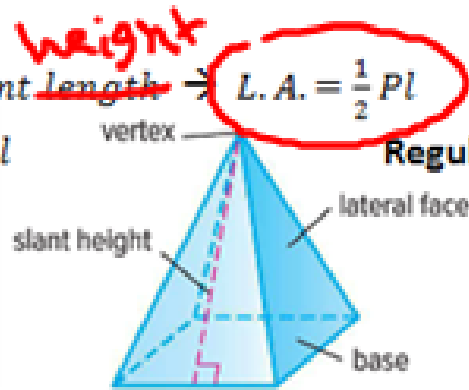
$$50.24(2) = 100.48 \text{ ft}^2$$

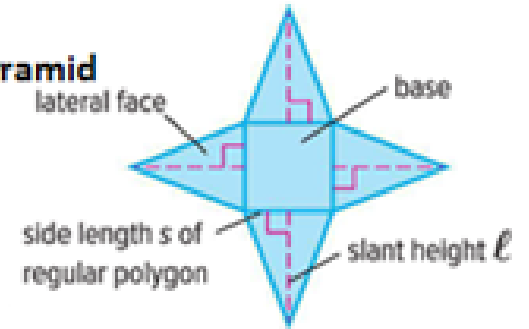$$SA = \underline{100.5 \text{ ft}^2}$$

Lateral Area and Surface Area

Lateral Area $= \frac{1}{2} \cdot Perimeter\ of\ base \cdot slant\ \cancel{length} \to$ **height** $\boxed{L.A. = \frac{1}{2}Pl}$

Surface Area $= B + L.A.$ OR $S.A. = B + \frac{1}{2}Pl$

**Regular Pyramid** – A pyramid with a base that is a regular polygon.

All sides and angles of a regular polygon are **congruent**.

vertex

slant height

lateral face

base

Regular Square Pyramid

lateral face

base

side length s of regular polygon

slant height ℓ

Examples

$$L.A. = \frac{1}{2}Pl$$

1) Find the lateral area and total surface area of the regular pyramids below. SHOW WORK AND LABEL

A)

6 ft

4 ft
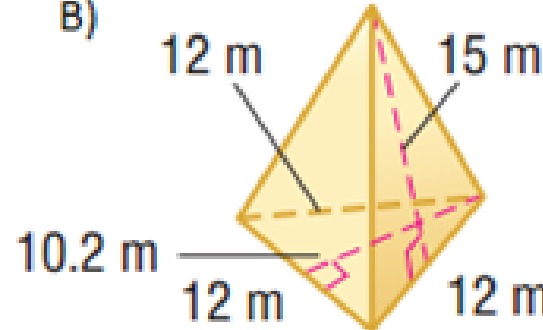
4 ft
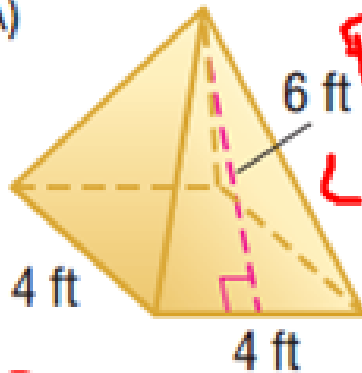
$$P = 4+4+4+4 = 16 ft$$

$$LA = \frac{1}{2}(16)(6)$$

$$L.A. = 48 ft^2$$

$$B = 4(4) = 16 ft^2$$

$LA =$ __$48 ft^2$__

$SA =$ __$64 ft^2$__

$$SA = 48 + 16$$

B)

12 m   15 m

10.2 m

12 m   12 m

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

$$LA = \frac{1}{2}(36)(15) = 270 m^2$$

$LA =$ __$270 m^2$__

$SA =$ __$331.2 m^2$__

$$B = \frac{1}{2}(10.2)(12) = 61.2 m^2$$

$$SA = 61.2 + 270$$

2) Find the lateral area and total surface area of the regular pyramids below. SHOW WORK AND LABEL

A)

7 in.

5 in.

5 in.
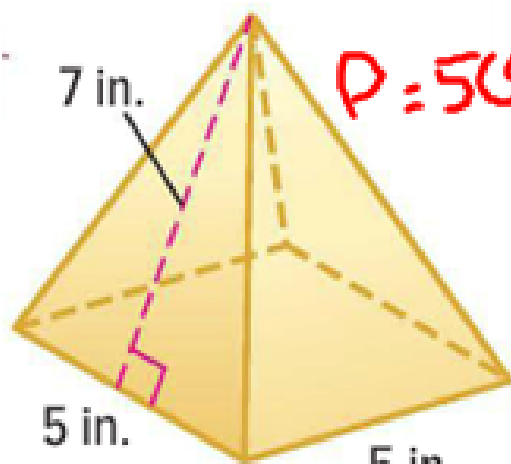
$P = 5(4) = 20 \text{ in}$

$LA = \frac{1}{2}(20)(7)$

$LA = 70 \text{ in}^2$
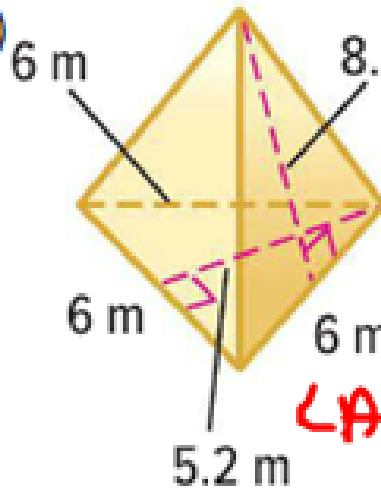
$LA = \underline{70 \text{ in}^2}$

$SA = \underline{95 \text{ in}^2}$

$B = 5 \cdot 5 = 25 \text{ in}^2$

$SA = 70 + 25$

B)

6 m   8.3 m

6 m   6 m

5.2 m

$P = 6(3) = 18 \text{ in}$
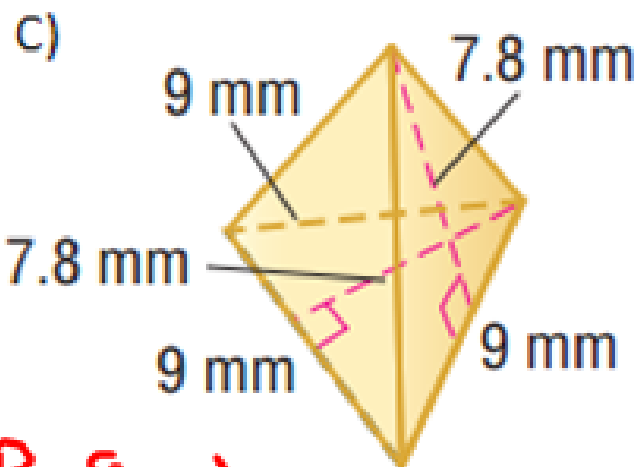
$LA = \frac{1}{2}(P)(8.3)$

$LA = 74.7 \text{ m}^2$

$LA = \underline{74.7 \text{ m}^2}$

$SA = \underline{90.3 \text{ m}^2}$

$SA = 74.7 + 15.6$

$B = \frac{1}{2}(6)(5.2)$

$B = 15.6 \text{ m}^2$

C)

9 mm 7.8 mm
7.8 mm
9 mm   9 mm

$P = 9(3) = 27$ mm

$LA = \frac{1}{2}(27)(7.8) = 105.3$ mm²

$B = \frac{1}{2}(9)(7.8) = 35.1$ mm²

$LA = \underline{105.3 mm^2}$

$SA = \underline{140.4 mm^2}$

$SA = 105.3 + 35.1$

D)

5 ft

$3\frac{1}{2}$ ft

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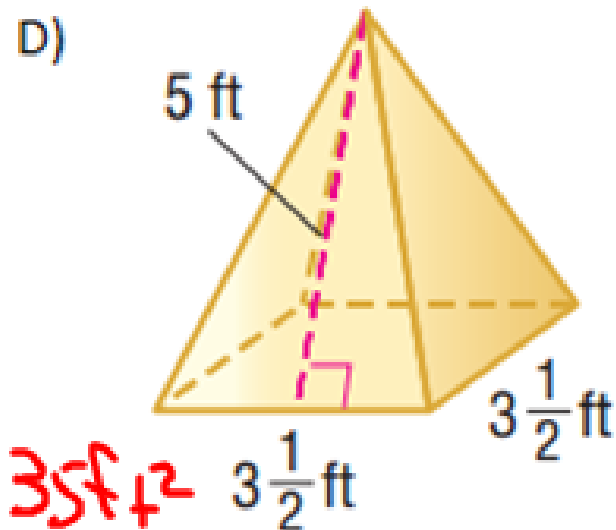
$P = 3\frac{1}{2}(4)$

$P = 14$ ft

$LA = \frac{1}{2}(14)(5) = 35$ ft²

$B = 3\frac{1}{2}(3\frac{1}{2}) = 12\frac{1}{4}$ ft²

$SA = 35 + 12\frac{1}{4}$

$LA = \underline{35 ft^2}$

$SA = \underline{47\frac{1}{4} ft^2}$

3) Use the figure to the right to answer the following questions. **The total height of the figure is 20 inches.**
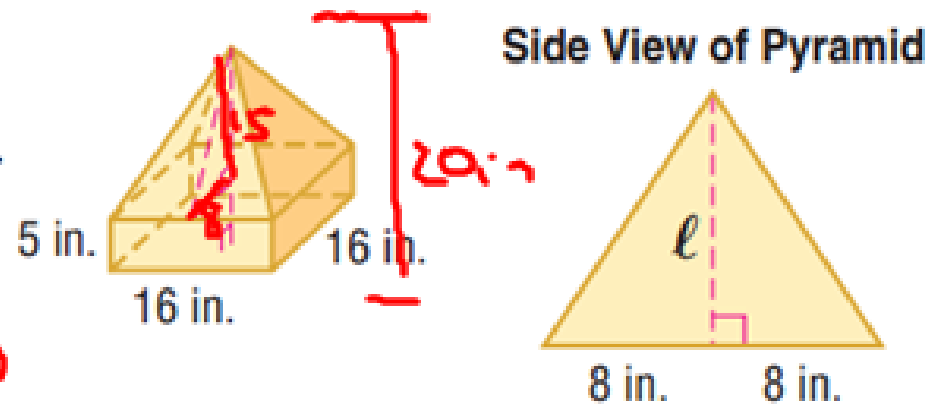A) Find the height of the pyramid.

$$20 - 5 = 15in$$

B) Use the height of the pyramid to find the slant height, l.

$$8^2 + 15^2 = l^2$$
$$64 + 225 = l^2$$
$$l = 17in$$

5 in.

16 in.

16 in.

20 in.

Side View of Pyramid

l

8 in.   8 in.

C) Which has a greater surface area, the prism or the pyramid? Explain your reasoning.

D) Find the total volume of the figure. SHOW WORK