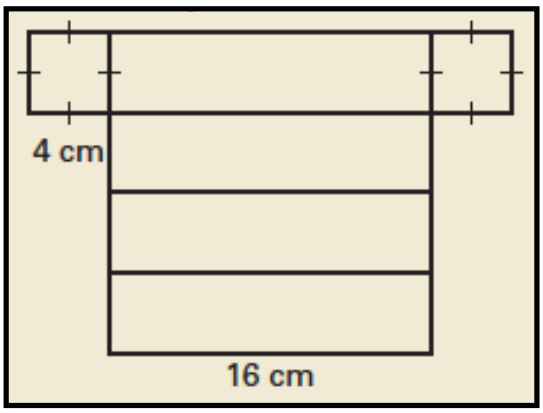
Bellwork
05/08/12

Find the surface area of the solid formed by the net.

1.



$SA = 2(B) + h(P)$

$B = 4^2 = 16$

$P = 4(4) = 16$

$h = 16$

$SA = 2(16) + 16(16)$

$= 32 + 256$

$SA = 288\ cm^2$

Geometry
12.3 Surface Area of Pyramids and Cones
Standard(s): 4

Vocabulary:

Pyramid: A polyhedron in which the base is a polygon and the lateral faces are triangles with a common vertex.

Lateral Edge: Intersection of two lateral faces.

Base Edge: The intersection of the base and a lateral face.

Regular Pyramid: A pyramid with a regular polygon for a base, and the segment joining the vertex and the center of the base is perpendicular to the base.

Slant Height: The height of a lateral face of the regular pyramid.

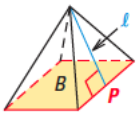
THEOREM *For Your Notebook*

THEOREM 12.4 Surface Area of a Regular Pyramid

The surface area S of a regular pyramid is the sum of the base area and the lateral area:

$$S = B + \frac{1}{2}P\ell,$$

where B is the area of the base, P is the perimeter of the base, and ℓ is the slant height.



$S = B + \frac{1}{2}P\ell$

Cone: A solid with a circular base and a vertex that is not in the same plane as the base.

Right Cone: A cone with a segment, joining the vertex and the center of the base, perpendicular to the base and the slant height is the distance between the vertex and a point on the base edge.

Lateral Surface: The surface of a cone that consists of all segments that connect the vertex with points on the base edge.

THEOREM *For Your Notebook*

THEOREM 12.5 Surface Area of a Right Cone

The surface area S of a right cone is the sum of the base area and the lateral area:

$$S = B + \frac{1}{2}C\ell = \pi r^2 + \pi r\ell,$$

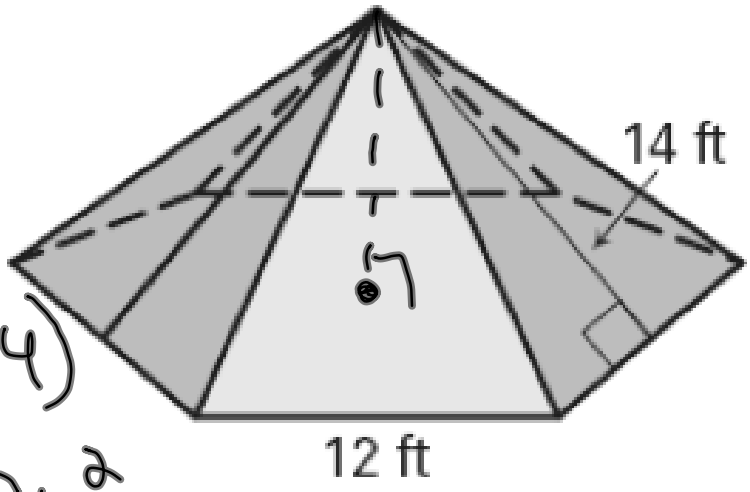
where B is the area of the base, C is the circumference of the base, r is the radius of the base, and ℓ is the slant height.

$S = B + \frac{1}{2}C\ell = \pi r^2 + \pi r\ell$

Lateral Area of Regular Pyramids

Find the area of each lateral face of the regular pyramid.

$$\text{Lateral Area} = \frac{1}{2}Pl$$



$P = 6 \cdot 12 = 72$

$l = 14$

$LA = \frac{1}{2}(72)(14)$

$LA = 504 \text{ ft}^2$

$\frac{504}{6} = 84 \text{ ft}^2$

Surface Area of a Regular Pyramid

Find the surface area of the regular pyramid. Round your answer to the nearest hundredth.

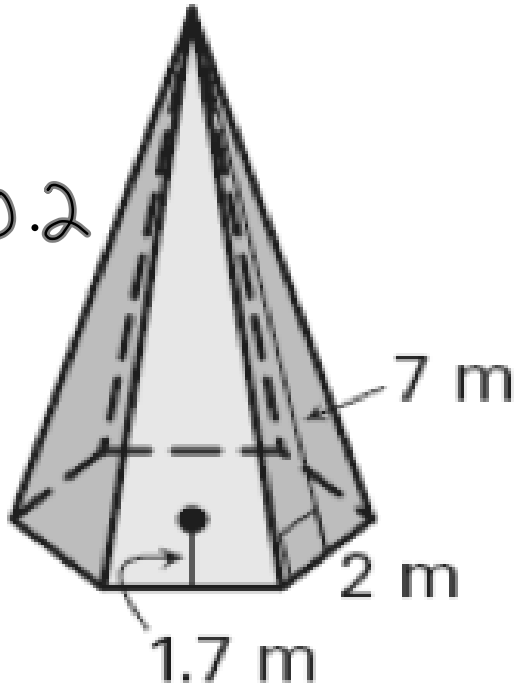
$$SA = B + \frac{1}{2}Pl$$

$B = \frac{1}{2}aP$

$\frac{1}{2}(1.7)(12) = 10.2$

$P = 2 \cdot 6 = 12$

$l = 7$



$SA = 10.2 + \frac{1}{2}(12)(7)$

$= 10.2 + 42$

$SA = 52.2\ m^2$

Lateral and Surface Area of a Right Cone

Find the lateral area of the right cone. Round your answer to the nearest hundredth.

$$\text{Lateral Area} = \frac{1}{2}Cl$$

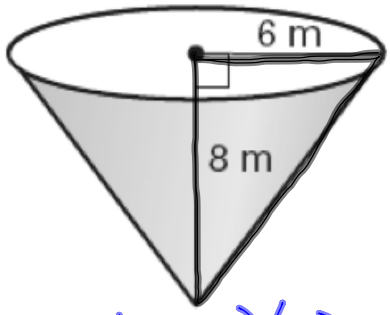
$C = 2r\pi$

$= 2(6)\pi = 12\pi$

$6^2 + 8^2 = l^2$

$l^2 = 100$

$l = 10$



$LA = \frac{1}{2}(12\pi)(10)$

$= 60\pi$

$LA = 188.5\ m^2$

Find the surface area of the right cone. Round your answer to the nearest hundredth.

$$SA = B + \frac{1}{2}Cl$$

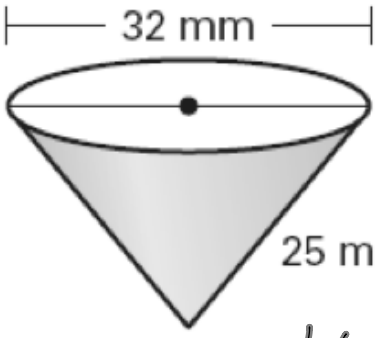
$B = r^2\pi$

$= 16^2\pi$

$= 256\pi$

$C = 32\pi$

$l = 25$



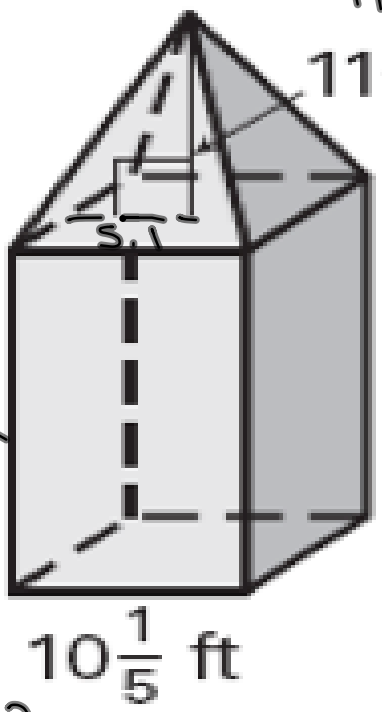
$SA = 256\pi + \frac{1}{2}(32\pi)(25)$

$= 656\pi$

$= 2060.88\ mm^2$

Multiple Solids

Find the surface area of the solid.



$LA = \frac{1}{2}Pl$

$P = 40.8$

$l = 12.81$

$l^2 = (11.75)^2 + (5.1)^2$

$l = 12.81$

$LA = 261.31 \text{ ft}^2$

$SA = B + Ph$

$B = 10.2^2 = 104.04$

$P = 4(10.2) = 40.8$

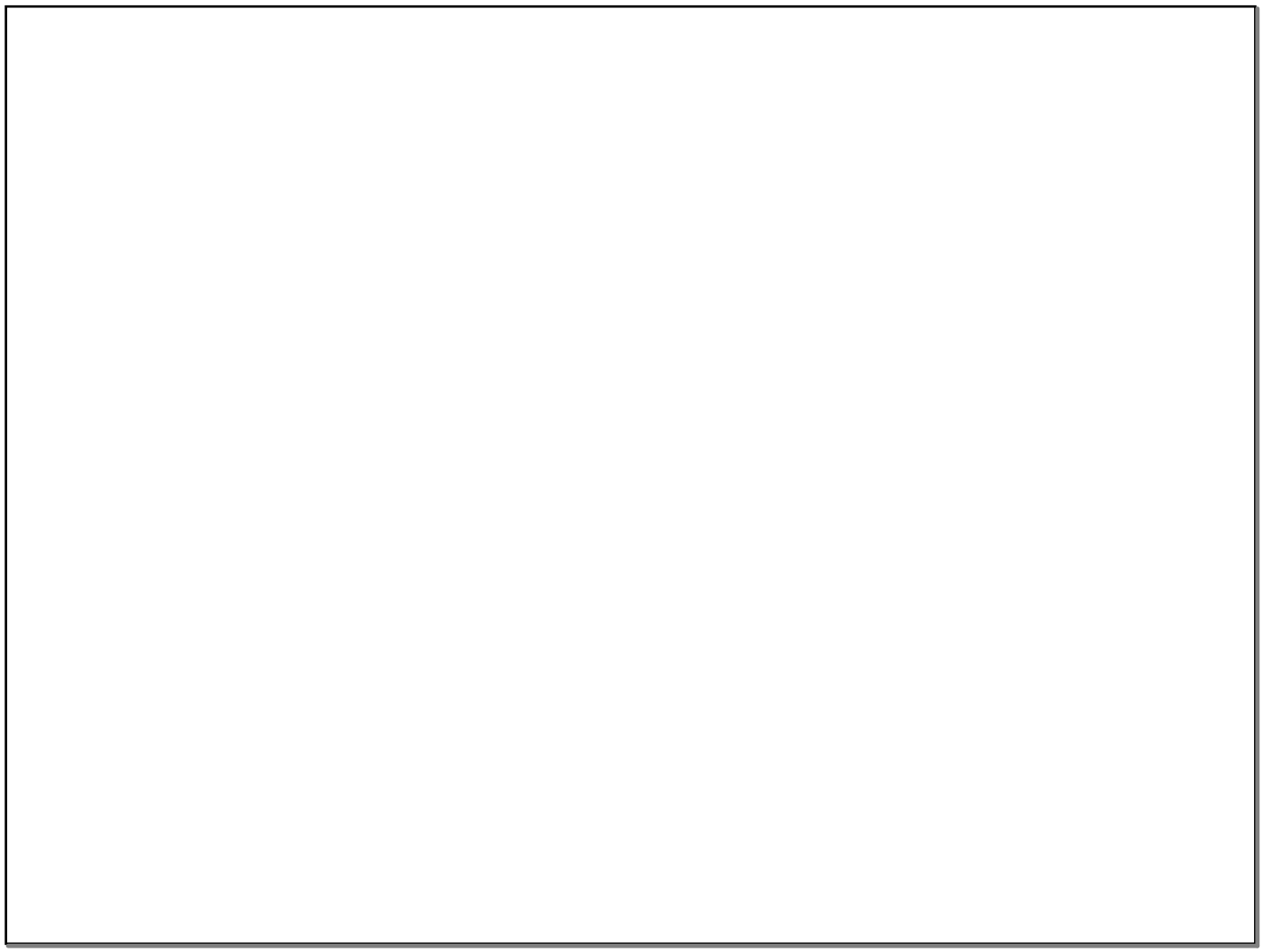
$h = 20$

$SA = 104.04 + 20(40.8)$

$= 920.04 \text{ ft}^2$

$$\begin{array}{r} 920.04 \\ +\ 261.31 \\ \hline \end{array}$$

$SA = 1181.35 \text{ ft}^2$

Homework Assignment

Worksheet 12.3B