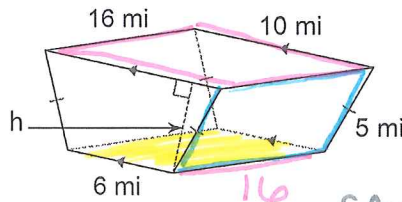# Surface Area and Working Backwards- ACC Warm Up

Directions: complete the following review questions.

1. The surface area of a cone is 261.9π km². The cone has a diameter of 18 km. Find the slant height of the cone.

$r=9$
$\ell=?$

$SA = \pi r^2 + \pi r \ell$
$261.9\pi = \pi(9)^2 + \pi 9 \cdot \ell$
$261.9\pi = 81\pi + 9\pi\ell$
$-81\pi \quad -81\pi$

$180.9\pi = 9\pi\ell$
$\dfrac{180.9\pi}{9\pi} = \dfrac{9\pi\ell}{9\pi}$

$\boxed{20\,km = \ell}$

2. The surface area of the trapezoidal prism is 489.6 mi². Find the missing length below.

768

16 mi
10 mi
h
5 mi
6 mi
16

$2\left(\frac{1}{2}h(6+10)\right)$
$+16\times10$
$+2(5\times16)$
$+6\times16$

$SA = 16h + 160 + 400 + 96$
$768 = 16h + 656$
$112 = 16h$

$\boxed{h=7\,mi}$

3. The bottomless tent illustrated below is in the shape of a right triangular prism and is made of nylon. How many square feet of nylon is required for the front, rear, and 2 sides of the tent? (Note: Please ignore the extra nylon for seams.)
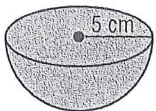
Not Bottom ☺

5
4 ft
6 ft
7 ft
5 ft
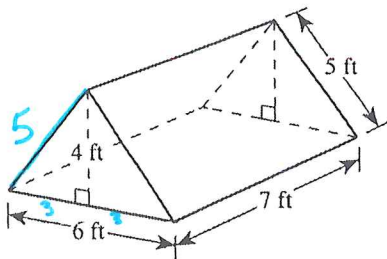
Front $\quad \frac{1}{2}6\times4$
rear $\Rightarrow$ same $\uparrow \quad \frac{1}{2}6\times4$
2 sides $\quad \boxed{} \quad 2(5\times7)$

A=needed for nylon
$94\,ft^2$

4. Find the radius of the base of a right cylinder if SA=528πft² and height is 10ft.
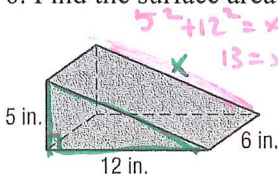
$SA = 2\pi r^2 + 2\pi r H$
$528\pi = 2\pi r^2 + 2\pi r \cdot 10$
$528\pi = 2\pi r^2 + 20\pi r$
-528π

$0 = 2\pi r^2 + 20\pi r - 528\pi$
$0 = 2\pi(r^2 + 10r - 264)$
$0 = 2\pi(r-12)(r+22)$
$0 = 2\pi(r-12)(r+22)$

$GCF = 2\pi!$
-264
$a \cdot c = -264$
$-12 \cdot 22 = -264$
$-12 + 22 = 10$

$r-12=0 \quad \boxed{r=12}$
$r+22=0 \quad r=-22$

5. Find the surface area of this hemisphere to the nearest tenth.

5 cm

$SA = \frac{1}{2}$ sphere + top circle
$= \frac{1}{2}4\pi r^2 + \pi r^2$
$SA = \frac{1}{2}4\pi 5^2 + \pi 5^2 = \boxed{75\pi = SA}$
$ 50\pi + 25\pi \quad cm^2$

$\boxed{SA \approx 235.6\,cm^2}$

6. Find the surface area of the solid.

$5^2 + 12^2 = x^2$
$13 = x$
5 in.
12 in.
6 in.
x

$A_B = 2\left(\frac{1}{2}12\times5\right)$
$LA \begin{cases} +12\times6 \\ +5\times6 \\ +13\times6 \end{cases}$

$\boxed{SA = 240\,in^2}$

7. The surface area of a sphere is 64π square centimeters. Find the radius.

$64\pi = 4\pi r^2$
$16 = r^2$
$\boxed{r=4\,cm}$

8. The surface area of a right cylinder is 200π square centimeters and the radius is 4 centimeters. Find the height of the cylinder.

$SA = 2\pi r^2 + 2\pi r H$
$200\pi = 2\pi 4^2 + 2\pi 4H$
$200\pi = 32\pi + 8\pi H$
$-32\pi \quad -32\pi$
$168\pi = 8\pi H \quad \div 8\pi$

$\boxed{H = 21\,cm}$

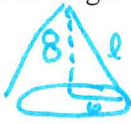9. The lateral area of a cube is 36 square inches. How long is each edge?

$4(x \cdot x) = 36$
$x^2 = 9$

each edge is 3 inches

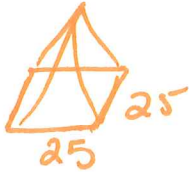10. The radius of a right circular cone is 6 inches and the height is 8 inches. Find the slant height of the cone.

$8^2 + 6^2 = \ell^2$
$10\, in = \ell$

11. The lateral area of a regular pyramid is 300 square units. The perimeter of its base is 100 units. Find the slant height of the pyramid.

$\cancel{25 \cdot 25}$
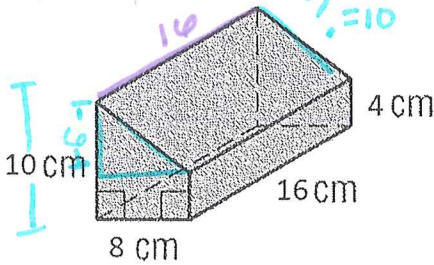$LA = 4(\frac{1}{2} 25 \cdot \ell)$
$300 = 50\ell$

$\ell = 6\ units$

12. The area of each face of a cube is 60 square centimeters. Find the surface area of the cube.

$60 \times 6 \Rightarrow$ $SA = 360\ cm^2$

13. Find the surface area.

? = 10

$8^2 + 6^2 = ?^2$
$10 = ?$

$2(\frac{1}{2} 8(10+4))$
$+\ 8 \times 16$
$+\ 4 \times 16$ } LA
$+\ 10 \times 16$
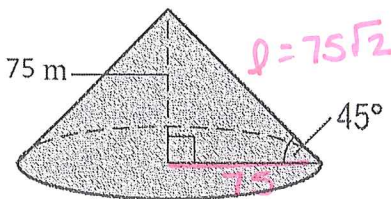$+\ 10 \times 16$

$SA = 624\ cm^2$

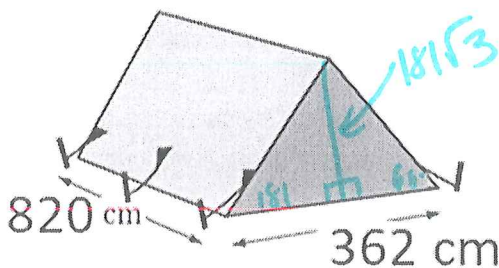14. Find the exact surface area.

75 m — $\ell = 75\sqrt{2}$ 45°

$SA = \pi r^2 + \pi r \ell$
$SA = \pi 75^2 + \pi 75 \cdot 75\sqrt{2}$
$SA = 5625\pi + 5625\sqrt{2}\,\pi\ m^2$

15. Find the exact amount of canvas required for the sides, floor, doors and window of the tent in the shape of a triangular prism as shown in the figure. The base of the prism is an equilateral triangle.

820 cm $181\sqrt{3}$ 362 cm

$3(\boxed{362}) = 3(820 \times 362)$
$\quad\quad 820$
$2(\triangle\ 181\sqrt{3}) \overset{+}{=} 2(\frac{1}{2} 362 \cdot 181\sqrt{3})$
$\quad\quad 362$

$SA = 890520 + 65522\sqrt{3}\,cm^2$