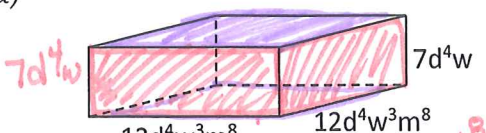
Key

Acc Geometry: Surface Area Applications

1. Find the expression for the surface area.

a)



$4(7d^4w)(12d^4w^3m^8) = 336d^8w^4m^8$

$2(12d^4w^3m^8)(12d^4w^3m^8) = 288d^8w^6m^{16}$

$SA = 336d^8w^4m^8 + 288d^8w^6m^{16}$

If you struggled w/ this you need to practice exponents - search youtube!

b) If the radius of a cylinder is $r = 4xy^6$ and the height is $h = 5x^2y^4$ what is the expression which represents the surface area of the cylinder in terms of x and y?

Cyl. $= 2\pi r^2 + 2\pi rh$

$SA = 2\pi(4xy^6)^2 + 2\pi(4xy^6)(5x^2y^4)$

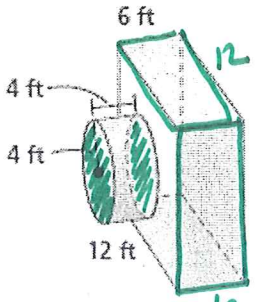
$SA = 32\pi x^2y^{12} + 40\pi x^3y^{10}$

$SA = 32\pi x^2y^{12} + 40\pi x^3y^{10}$

Composites

Directions: Find the surface area. If it does not specify, round to the nearest thousandth.

2.



Cyl. + prism

The green circle is on the surface of the prism.

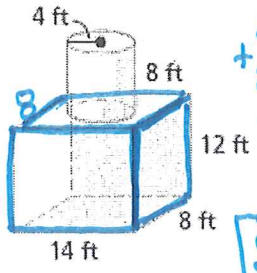
$2\pi r^2 + 2\pi rh + SA_{prism}$

$2\pi 4 \cdot 4 + 2(6 \cdot 12) + 2(6 \cdot 14) + 2(12 \cdot 14)$

$SA = 748.531 ft^2$

$7^2 + 11^2 = l^2 \quad l = \sqrt{170}$

3.



$2(12 \times 8)$

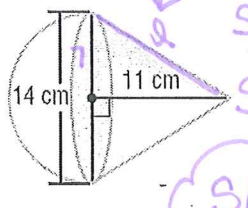
$+2(12 \times 14)$

$+2(8 \times 14)$

+ LA of $2\pi 4 \cdot 8$ cyl.

$SA \approx 953.062 ft^2$

4.

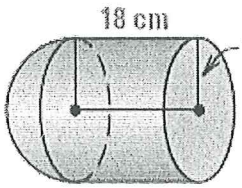


$SA = \frac{1}{2}$ Sphere + Cone no top

$SA = \frac{1}{2}4\pi 7^2 + \pi 7\sqrt{170}$

$SA \approx 594.606 cm^2$

5. Find SA in terms of pi.



One Base is NOT on surface

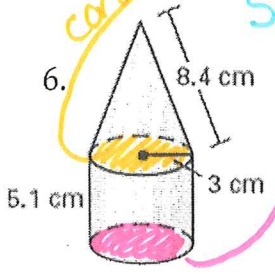
Cyl. + $\frac{1}{2}$ Sphere

$2\pi r^2 + 2\pi rh + \frac{1}{2}4\pi r^2$

$\pi 10^2 + 2\pi 10 \cdot 18 + \frac{1}{2}4\pi 10^2$

$SA = 660\pi \ cm^2$

6.



can't include not on surface

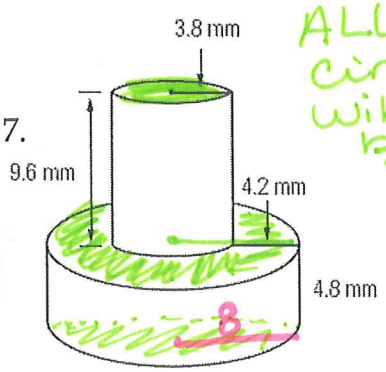
$SA = \pi 3^2 + \pi 3 \cdot 8.4 + 2\pi 3^2 + 2\pi 3 \cdot 5.1$

$SA = 64.8\pi \ cm^2$

$SA \approx 203.575 cm^2$

only one circle is on the surface.

7.



ALL green circles/parts will make 2 bases of the Bottom Cylinder the top cylinder will be used for Lateral area

$2\pi 8^2 + 2\pi 8 \cdot 4.8 + 2\pi(3.8)(9.6)$

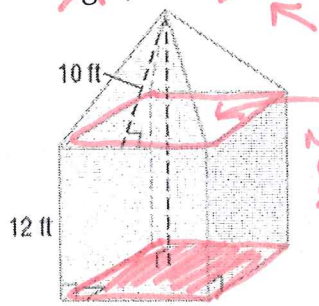
$SA = 277.76\pi$

$SA \approx 872.609 m^2$

Applications

Directions: If it does not specify, round to the nearest thousandth.

8. This solid is a composite of a cube and square pyramid. The base solid is the base of the cube. Find the height, lateral area and surface area of the entire solid.



not needed

not on surface

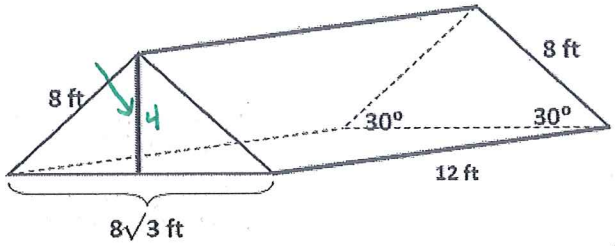
Cube all square faces.

Just find the SA:

$5(12 \times 12) + 4(\frac{1}{2} 12 \cdot 10)$

$SA = 960\ ft^2$

9. Suppose you are designing a tent in the design shown here. You want to use as little fabric as possible. Given the dimensions of the drawing, find the height of the triangular bases, the surface area of the tent including the floor, sides, windows and doors.



$SA = 2(8 \cdot 12) = 192$

$+ 1(8\sqrt{3} \cdot 12) = 96\sqrt{3}$

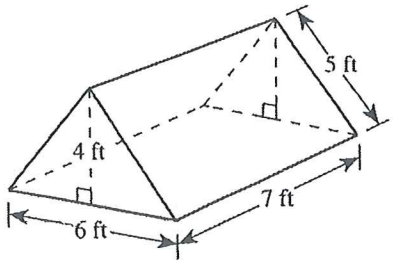
$+ 2(\frac{1}{2} 8\sqrt{3} \cdot 4) = 32\sqrt{3}$

$SA = 192 + 128\sqrt{3}\ ft^2$

OR

$SA \approx 413.703\ ft^2$

10. 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.)



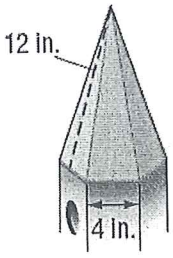
$2(\frac{1}{2} 6 \cdot 4)$

$+ 2(7 \times 5)$

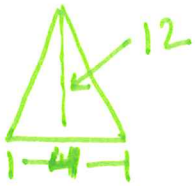
SA of Nylon needed

$= 94\ ft^2$

11. **BIRDHOUSES** The roof of a birdhouse is a regular hexagonal pyramid. The base of the pyramid has sides of 4 inches, and the slant height of the roof is 12 inches. If the roof is made of copper, find the amount of copper used for the roof.



Just the 6 △s

6 

$LA = 6 \cdot \frac{1}{2} 4 \cdot 12$

$LA = 144 \text{ in}^2$

12. The surface area of a cone is 261.9π km^2. The cone has a diameter of 18 km. Find the slant height of the cone.

$261.9\pi = \pi 9^2 + \pi 9 l$

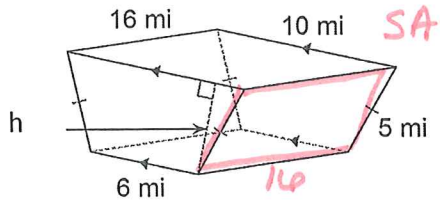
$261.9\pi = 81\pi + 9\pi l$

$180.9\pi = 9\pi l$

$20.1 = l$

$l = 20.1$ km

13. The surface area of the trapezoidal prism is 489.6 mi^2. Find the missing length below.



$SA = 2\left(\frac{1}{2} h(10+6)\right) + 2(5 \cdot 16) + 6 \cdot 16 + 10 \cdot 16$

$16h + 416 = 489.6$

$16h = 73.6$

$h = 4.6$ mi

14. **PARTY HATS** Shelley plans to make eight conical party hats for her niece's birthday. If each hat is to be 18 inches tall and the bases of each to be 22 inches in circumference, how much material will she use to make the hats?

$C = 22$ $\quad 22 = d\pi$

$r = 3.5$ $\quad d = 7.0028\ldots$

$18^2 + 3.5^2 = l^2$

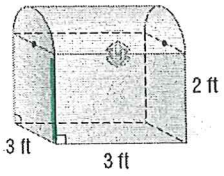
$\sqrt{336.25} = l$

$18.337 = l$

No Circle $= \pi r l \times 8$

$= 1613.008 \text{ in}^2$

15. Find the surface area of the treasure chest.



3×3

$4(3 \times 2)$

$+ \frac{1}{2}(2\pi 1.5^2 + 2\pi 1.5 \cdot 3)$

$SA \approx 54.206 \text{ ft}^2$