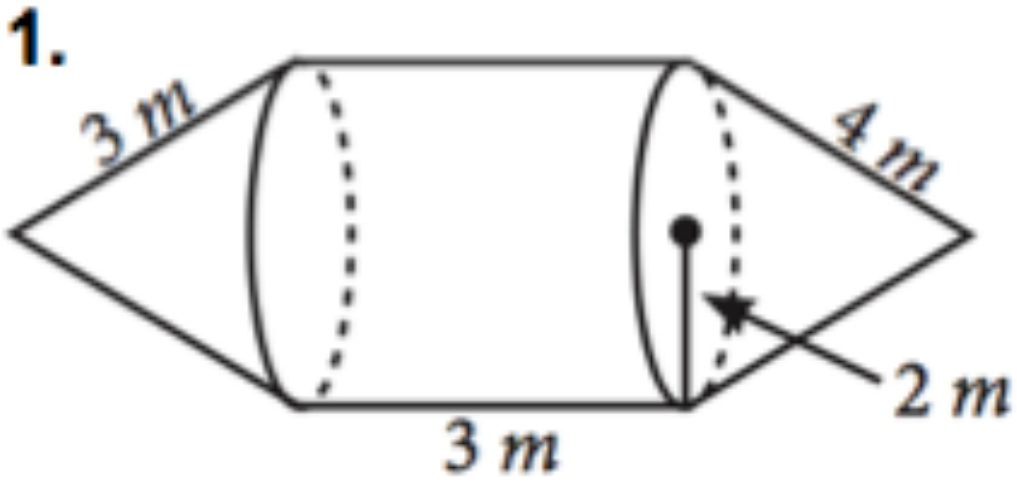
SURFACE AREA OF COMPOSITE FIGURES

FIND THE SURFACE AREA

1.



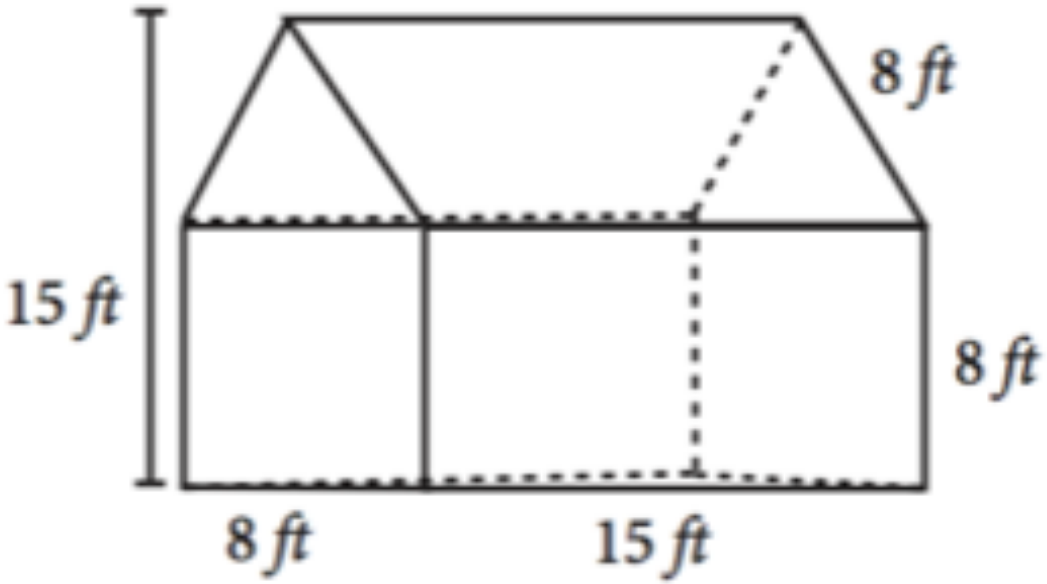
Lateral area of cone at the left + lateral area of cylinder + Lateral area of the cone at the right

$$\pi rl + 2\pi rh + \pi rl$$

$$\pi(2)(3) + 2\pi(2)(3) + \pi(2)(4)$$

$$26\pi = 81.68m^2$$

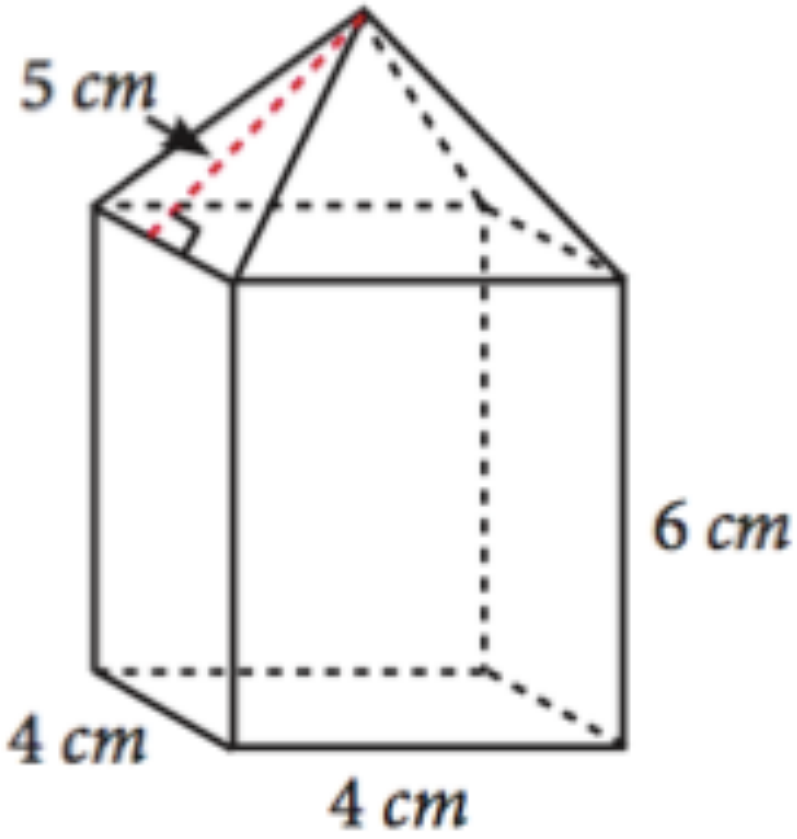
2.



Area of 2 triangles + Area of 5 congruent rectangles + Area of 2 congruent sides

$$2\left(\frac{1}{2}(8)(7)\right)+5(8)(15)+2(8)(8)$$
$$=56+600+128$$
$$=784\,ft^2$$

3.



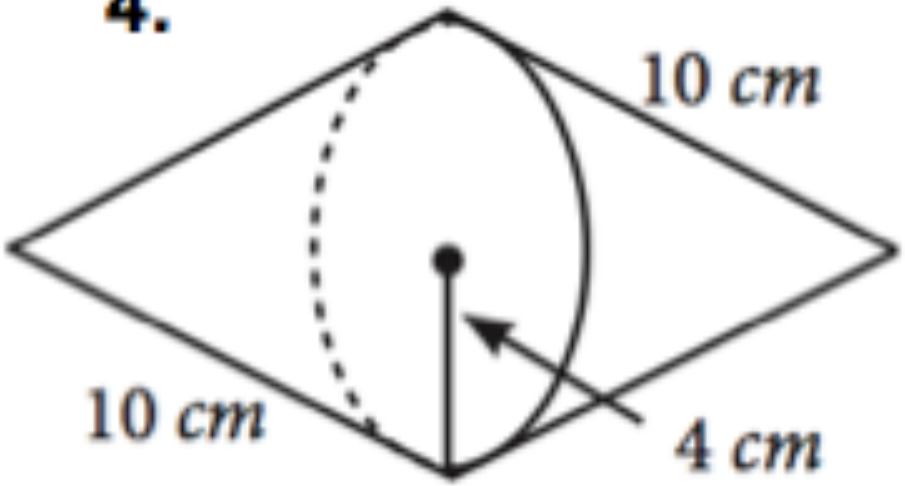
$$4\left(\frac{1}{2}(4)(5)\right)+4(4)(6)+(4)(4)$$

$$=40+96+16$$

$$=152cm^2$$

Area of 4 congruent triangles + Area of 4 congruent sides + Area of Base

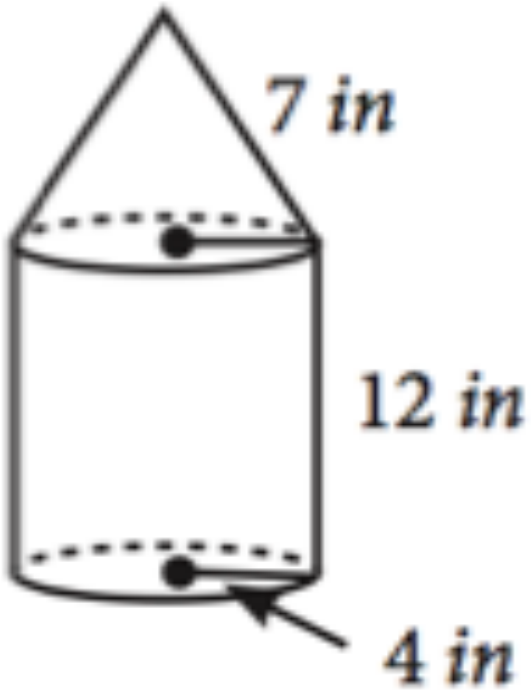
4.



Lateral area of the 2 cones x 2

$$2(\pi rl) = 2(\pi)(4)(10)$$
$$= 80\pi$$
$$= 251.3cm^2$$

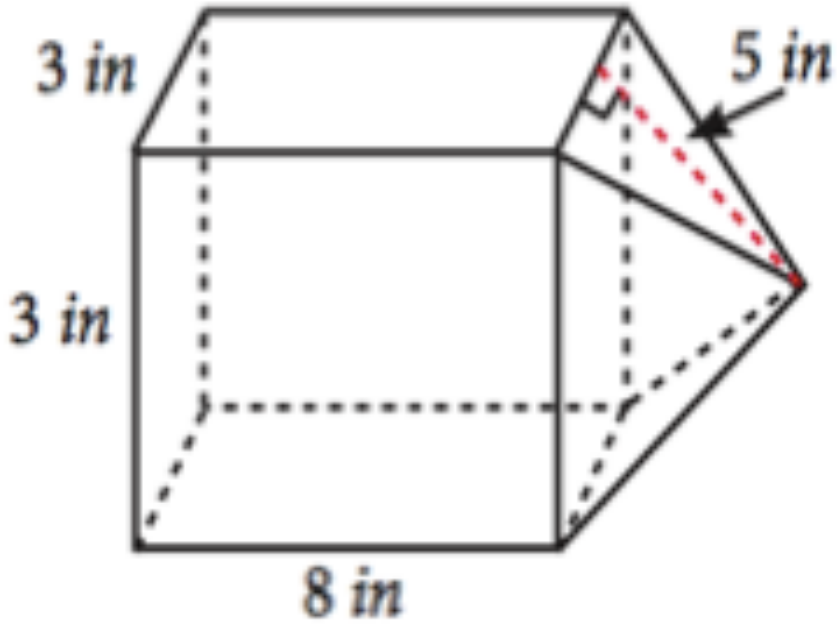
5.



Lateral area of cone + Lateral area of cylinder + Area of base of cylinder

$$= \pi(4)(7) + 2\pi(4)(12) + \pi(4)^2$$
$$= 28\pi + 96\pi + 16\pi$$
$$= 140\pi$$
$$= 439.8in^2$$

6.



Area of 4 congruent triangles + Area of 4 congruent sides + Area of Square Base

$$4\left(\frac{1}{2}(3)(5)\right)+4(3)(8)+3^2$$

$$=30+96+9$$

$$=135in^2$$

APPLICATIONS

1) Yanna celebrated her fifth birthday. She ate at her favorite restaurant. She ordered a soda pop. The soda pop came in a cup shaped like a cylinder with a cone top. The cylinder part of the cup was 6 inches tall and the height of the top was 2 inches. The radius of the cup was 2 inches. What was the surface area of the cup?

Lateral Area of Cone + Lateral Area of Cylinder + Area of Base of Cylinder

Find slant height of the cone.

$$l = \sqrt{2^2 + 2^2}$$

$$l = 2.8$$

$$\pi rl + 2\pi rh + \pi r^2$$

$$\pi(2)(2.8) + 2\pi(2)(6) + \pi(4)$$

$$33.6\pi$$

$$105.56in^2$$

2) James wants to paint his grain silo. The diameter of the silo is 8 meters. The height of the cylindrical part is 12 meters. The slant height of the cone top is 4.5 meters.

a. Calculate the surface area of the grain silo.

b. A five-gallon bucket of paint covers 20 square meters. How many buckets of paint will James need?

$$\pi rl + 2\pi rh + \pi r^2$$

$$\pi(4)(4.5) + 2\pi(4)(12) + \pi(4)^2$$

$$18\pi + 96\pi + 16\pi$$

$$130\pi = 408.4m^2$$

We need to subtract the area of the base if we decide not to paint it. So, 130π - 16π = 114π or 358.14 m^2 must be painted.

$$358.14 \div 20 = 17.907$$

$$18 buckets$$

3) Shynna designed her perfect wedding cake. She wants to have 3 layers with smooth white frosting on the cake. The first layer will have a 24-inch diameter, the second layer will have an 18-inch diameter and the top layer will have a 10-inch diameter. Each layer will be 6-inches tall. How many square inches of frosting will show on the surface of the cake?

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Step 1. Solve for the surface area of each cake (cylinder).
Step 2. Subtract the area of the biggest base (base of the 1st layer), since we won't be placing icing on it.
Step 3. Subtract twice the area of the base of the 2nd layer (the area of the base of the 2nd layer plus the part it covers on the 1st layer).
Step 4. Do Step 3 for the 3rd layer.

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$SA_{1st} = 2\pi r(r+h)$
$= 2\pi(12)(18)$
$= 432\pi$

$SA_{2nd} = 2\pi(9)(15)$
$= 270\pi$

$SA_{3rd} = 2\pi(5)(11)$
$= 110\pi$

$SA_{total} = (432\pi + 270\pi + 110\pi) - (\pi r^2) - (2\pi r^2) - (2\pi r^2)$
$= 812\pi - (144\pi) - (2\pi)(81) - (2\pi)(25)$
$= 812\pi - 356\pi$
$= 456\pi = 1432.56 in^2$