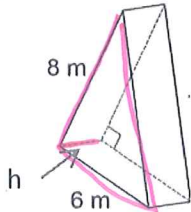


Key

# Practice Similar Solids & Volume- ACC Geometry

**Examples:** Find the missing dimension. Round to the nearest tenth.

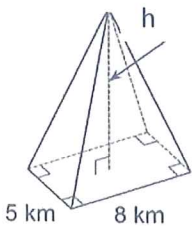
1. The volume of a triangular prism is  $96\text{m}^3$ . The prism has a right triangle base with legs of 8 meters and 6 meters. Find the height of the prism.



$$\begin{aligned} V &= B \cdot H \\ V &= \left(\frac{1}{2} 6 \cdot 8\right) h \\ 96 &= \frac{1}{2} 6 \cdot 8 \cdot h \\ 96 &= 24h \\ \boxed{4\text{m} = h} \end{aligned}$$

$$B = \frac{1}{2} b \cdot h \text{ of } \Delta$$

2. The volume of the rectangular pyramid has a volume of about  $146.67\text{ km}^3$ . The base of the pyramid is a rectangle that is 5 km by 8 km. Find the height of the pyramid.



$$\begin{aligned} V &= \frac{1}{3} B \cdot H \\ 146.67 &= \frac{1}{3} (5 \times 8) h \\ 146.67 &= 13.3h \\ \boxed{11.03\text{ km} = h} \end{aligned}$$

$$B = 5 \times 8$$

3. The volume of a cylinder is  $616\pi$  cubic meters and the height is 4 meters. Find the length of the diameter of the cylinder.

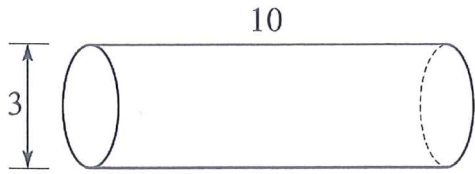
$$\begin{aligned} V &= \pi r^2 \cdot h \\ 616\pi &= \pi r^2 \cdot 4 \\ 154 &= r^2 \end{aligned}$$

$$\begin{aligned} r &= 12.41 \text{ or } r = \sqrt{154} \\ \boxed{d = 24.82 \text{ or } d = 2\sqrt{154}} \end{aligned}$$

4. The volume of a rectangular prism is 1152 cubic inches and the area of the base is 64 square inches. Find the height of the prism.

$$\begin{aligned} V &= B \cdot h \\ 1152 &= 64h \\ \boxed{h = 18\text{ in}} \end{aligned}$$

5. A formula for the volume,  $V$ , of a right cylinder is  $V = \pi r^2 h$ , where  $r$  is the radius and  $h$  is the height. If a tanker truck has a tank as shown below with a diameter of 3 meters and a length of 10 meters and is filled with water, then the weight, in pounds, of the water cargo is: (Note: 1 cubic meter of water weighs approximately 2,205 pounds.)



$$r = 1.5 \text{ m}$$

$$V = \pi (1.5)^2 \cdot 10$$

$$V = 70.7 \text{ m}^3$$

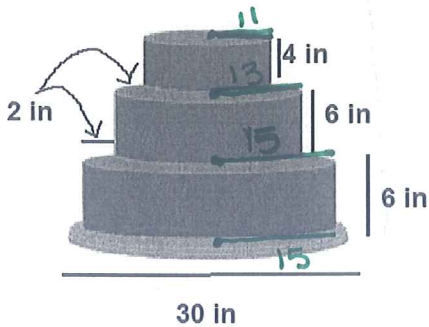
Weight

$$70.7 \times 2205$$

The Weight is Approx.

$$155,893.5 \text{ lbs}$$

6. Find the amount of cake needed for this structure. Round to nearest tenth.



$$V = \pi 11^2 \cdot 4 + \pi 13^2 \cdot 6 + \pi 15^2 \cdot 6$$

$$V = 2848\pi \text{ in}^3$$

$$V \approx 8947.3 \text{ in}^3$$

7. 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 volume of the cylinder in terms of  $x$  and  $y$ ?

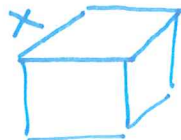
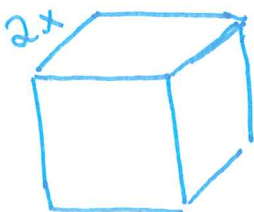
$$V = \pi r^2 \cdot h$$

$$V = \pi (4xy^6)^2 \cdot 5x^2y^4$$

$$\rightarrow \pi 4^2 x^2 y^{12} \cdot 5 x^2 y^4$$

$$V = 80\pi x^4 y^{16}$$

8. A large cube has edges that are twice as long as those of a small cube. The volume of the large cube is how many times the volume of the small cube?

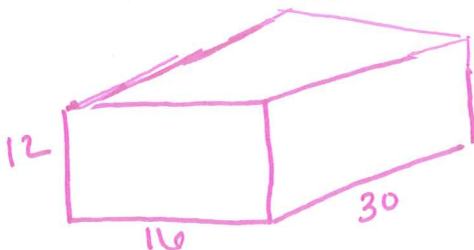


$$\frac{x}{2x} \Rightarrow \text{SLR}$$

$$\left(\frac{x^3}{(2x)^3}\right) = \text{VR}$$

8 times larger

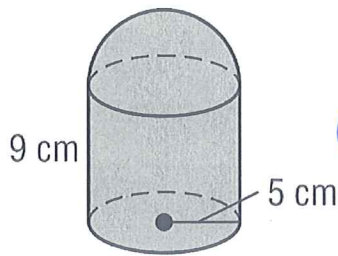
9. In order to clean her aquarium (rectangular prism), Stephanie must remove half of the water. The aquarium measures 30 inches long, 16 inches wide, and 12 inches deep. The aquarium is currently completely full. What volume of water, in cubic inches, must Stephanie remove?



$$V_{\frac{1}{2}} = \frac{1}{2} (16 \times 30) \cdot 12$$

$$V = 2880 \text{ in}^3$$

10. Find the volume of the composite solid below. Round to the nearest tenth.

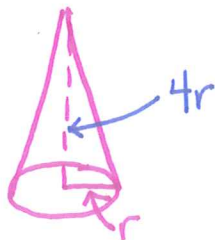
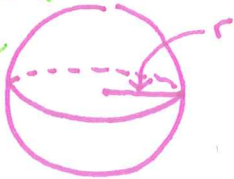


$$V = \frac{1}{2} \left( \frac{4}{3} \pi 5^3 \right) + \pi 5^2 \times 9$$

$$V = 968.7 \text{ cm}^3$$

11. A sphere and a cone have the same radius. The height of the cone is 4 times the length of the radius which is a whole number greater than 2. What had the greater volume and why?

Explain  
Relationship  
of volume



$$V_s = \frac{4}{3} \pi r^3 \quad V_c = \frac{1}{3} \pi r^2 \cdot 4r$$

$$V_s = \frac{4}{3} \pi r^3 \quad V_c = \frac{4}{3} \pi r^3$$

The volumes are the same.

12. An ice cream cone is 8 centimeters deep and has a diameter of 5 centimeters. A spherical scoop of ice cream that is 5 centimeters in diameter rests on the top of the cone. If all the ice cream melts into the cone, will the cone overflow? Explain. (Assume the liquid and solid state of the ice cream will stay the same per cubic centimeter).

Cone  
 $h = 8$   
 $d = 5$   
 $r = 2.5$

Sphere  
 $r = 2.5$

$$V_c = \frac{1}{3} \pi (2.5)^2 \cdot 8 \quad V_s = \frac{4}{3} \pi (2.5)^3$$

$$V_c = 52 \text{ cm}^3 \quad V_s = 65.4 \text{ cm}^3$$

Yes, the volume of the melted ice cream is more than the cone.

13. The ratio of the radii of two spheres is 7:3. Find the volume ratio of the two solids then, use it to find the volume of the smaller sphere if the volume of the larger sphere is  $343\pi$  cubic feet.

$$SR = \frac{7}{3}$$

$$VR = \left( \frac{7}{3} \right)^3$$

$$VR = \frac{343}{27}$$

$$VR = VR$$

$$\frac{343}{27} = \frac{4116\pi}{x}$$

$$343x = 111132\pi$$

$$x = 324\pi \text{ ft}^3$$

14. A sphere has a volume of  $4500\pi$  cubic inches. Find the diameter of the sphere.

$$V = \frac{4}{3} \pi r^3$$

$$4500\pi = \frac{4}{3} \pi r^3$$

$$\frac{3}{4} \cdot 4500 = \frac{4}{3} r^3 \cdot \frac{3}{4}$$

$$3375 = r^3$$

$$\sqrt[3]{3375} = r$$

$$3375^{(1/3)} = r$$

$$r = 15 \quad d = 30 \text{ in}$$

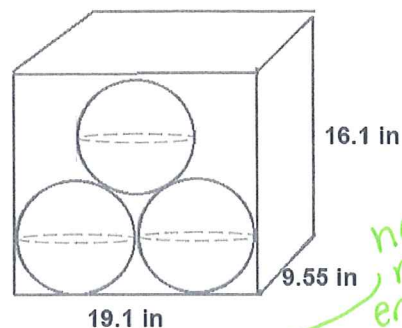
15. You are selling your game day basket balls signed by Andre Drummond on EBay. You have offered free shipping to the highest bidder. To keep the cost at a minimum, you need to ship the basket balls in the proper shipping container. For the amount of empty space within shipping containers. If you wanted to also send them <sup>Find</sup> a signed jersey, what packaging option would have the most empty space?



$$9.55 \times 9.55 \times 28.65 - 3 \left( \frac{4}{3} \pi (4.775)^3 \right)$$

Option 1

$$V \text{ of empty space: } 1244 \text{ in}^3$$



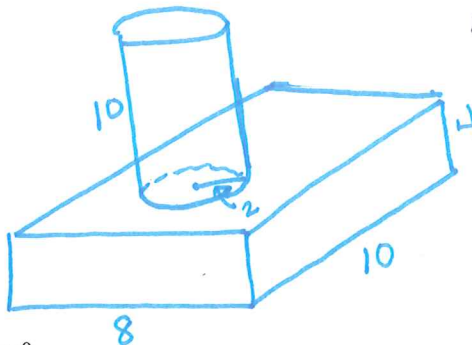
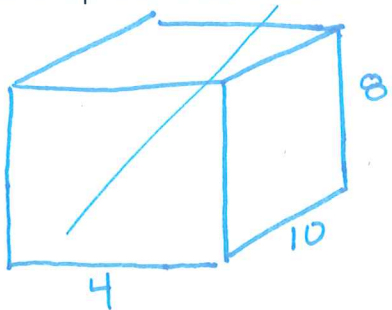
has the most empty space

Option 2

$$V = 19.1 \times 9.55 \times 16.1 - 3 \left( \frac{4}{3} \pi (4.775)^3 \right)$$

$$V \text{ of empty space: } 1568.6 \text{ in}^3$$

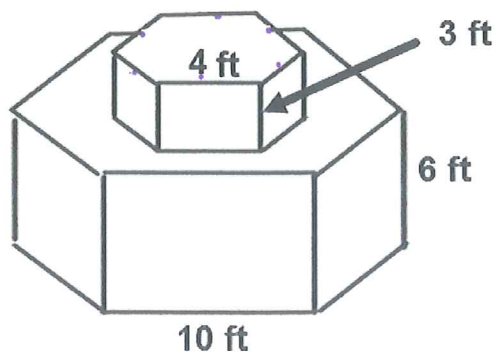
16. A cereal company decided to make an oddly shaped box for a promotion. Their new design is a rectangular prism with length 10 in., width 8 in., and height 4 in. They plan to attach a cylinder with a radius of 2 in and the height of 10 in. to the 8x10 face. How much will it take to fill up the odd box?



$$4 \times 10 \times 8 + \pi 2^2 \times 10$$

$$V = 445.7 \text{ in}^3$$

17. Find the volume, using  $A = n \cdot \frac{1}{2} \cdot ab \cdot \sin \theta$



$$r=4 \quad V_S = 6 \cdot \frac{1}{2} \cdot 4 \cdot 4 \cdot \sin(60) \times 3$$

$$V_B = 6 \cdot \frac{1}{2} \cdot 10 \cdot 10 \cdot \sin(60) \times 6$$

$$V_T = 1683.6 \text{ ft}^3$$