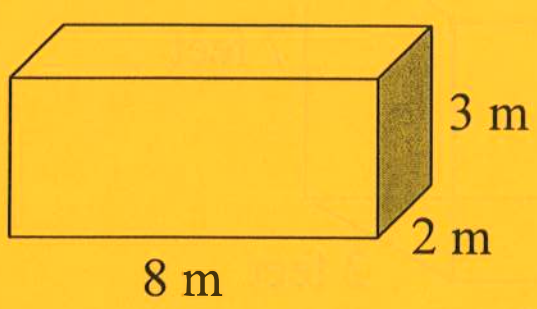
Review for Test on Surface Area and Volume

area = _____

volume = _____



radius = 5 height = 12

area = _____

volume = _____

1. A rock is dropped into a container that is in the shape of a circular cylinder with a radius of 3 inches. If the rock causes the water to rise 2 inches, what is the volume of the rock?

2. The play area around a swing set is 32 feet by 20 feet, and the landscaper wants to cover this area with 6 inches of bark. If the bark comes in bags that contain 2.5 cubic yards of bark, how many bags will he need? (Use your calculator and round your answer to 4 significant digits.)

3. How much material is wasted by carving the largest possible sphere from a cube that has an edge of 12 inches?

4. Find the volume and surface area of a container that is in the shape of a cube with edges of 6 inches.

   area = _____ volume = _____

5. Find the volume and surface area of a container that is in the shape of a circular cylinder with a diameter of 7 inches and a height of 6 inches.

   area = _____ volume = _____

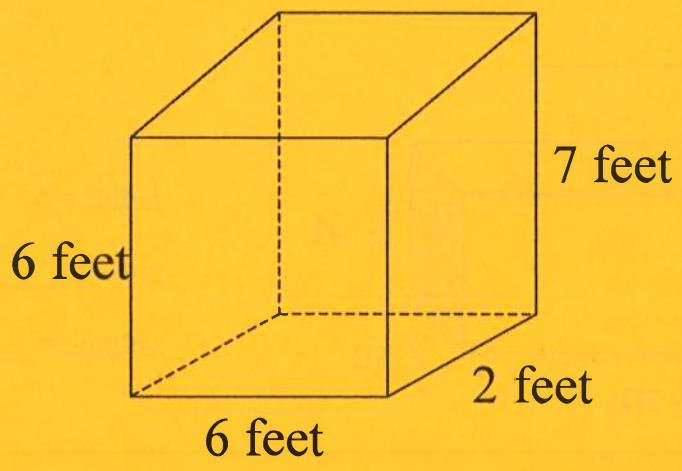
6. Use the above information to explain why many food items (for example soup and vegetables) come in cylindrical containers.

7. A hemispherical barbecue grill has two racks, one for the food and one for the charcoal. The food rack is a great circle of the grill and has a radius of 11 inches. The charcoal rack is 5 inches below the food rack. Find the area of the charcoal rack. (Use your calculator and round your answer to 4 significant digits.)

8. The World's Only Corn Palace is located in Mitchell, South Dakota. The sides of the building are covered with huge murals made from corn and other grains. Estimate the area of the Corn Palace to be covered if its base is approximately 100 yards by 62 yards, and it is 15 yards tall, not including it turrets.

9. Suppose a bushel of grain can cover 15 square feet. How many bushels of grain does it take to cover the Corn Palace? (Use your calculator and round your answer to 4 significant digits.)

10. This greenhouse is designed for a home gardener. It is attached to one wall of the house, and the frame is covered with tempered safety glass. Find the surface area of the glass covering the greenhouse. (Use your calculator and round your answer to 4 significant digits.)



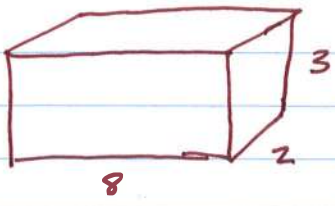
11. The main tank at an aquarium is a cylinder with a diameter of 203 feet and a height of 25 feet. If 1 gallon is 231 cubic inches, how many gallons will the aquarium hold? (Use your calculator and round your answer to 4 significant digits.)

12. The Luxor Hotel in Las Vegas is a black glass pyramid. The base is a square with edges 646 feet long. The hotel is 350 feet tall. Find the area of the glass. (Use your calculator and round your answer to 4 significant digits.)

13. Megan plans to make eight conical party hats for her niece's birthday party. She wants each hat 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? (Use your calculator and round your answer to 4 significant digits.)

area = $92\ m^2$

volume = $48\ m^3$



$SA = 2B + LSA$

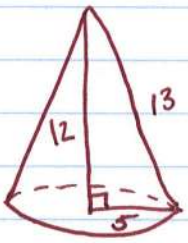
$B = 8(2) = 16$

$2B = 32$

$LSA = P \cdot h = 20(3) = 60$

$V = Bh$

$= 16(3) = 48$



$SA = B + LSA = \boxed{90\pi}$

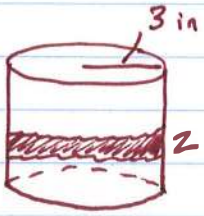
$B = \pi(5)^2 = 25\pi$

$LSA = \pi r l = \pi(5)(13) = 65\pi$

$V = \frac{1}{3}Bh$

$= \frac{1}{3}(25\pi)(12) = \boxed{100\pi}$

(1)



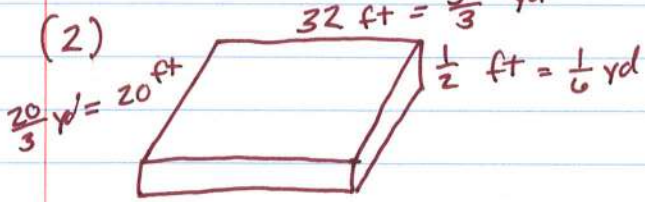
$V = Bh = 9\pi(2) = \boxed{18\pi\ in^3}$

$\approx 56.55\ in^3$

$B = \pi(3)^2 = 9\pi$

$h = 2$

(2)



$V = Bh = \frac{640}{9}\left(\frac{1}{6}\right) = \frac{320}{27}\ yd^3$

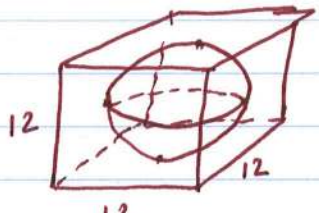
$B = \frac{32}{3}\left(\frac{20}{3}\right) = \frac{640}{9}$

$h = \frac{1}{6}$

$V = \frac{320}{27}\ yd^3$

$\div 2.5$

$4.7407 \approx \boxed{5 \text{ bags}}$

(3) 

$V = V_C - V_S$

$= Bh - \frac{4}{3}\pi r^3$

$= (144)(12) - \frac{4}{3}\pi(6)^3$

$= \boxed{1728 - 288\pi \text{ in}^3} \approx 823.22$

(4) $SA = 2B + LSA = \boxed{216 \text{ in}^2}$

$B = 6(6) = 36$

$2B = 72$

$LSA = Ph = 24(6) = 144$

$V = Bh$

$= (36)(6) = \boxed{216 \text{ in}^3}$

(5) $SA = 2B + LSA = \frac{49}{2}\pi + 42\pi = \boxed{\frac{133}{2}\pi \text{ in}^2} \approx 208.92$

$B = \pi(\frac{7}{2})^2 = \frac{49}{4}\pi$

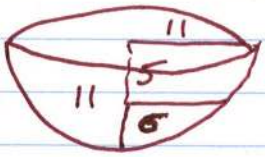
$2B = \frac{49}{2}\pi$

$LSA = Ph = 7\pi(6) = 42\pi$

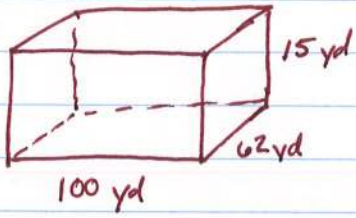
$V = Bh$

$= (\frac{49}{4}\pi)(6) = \boxed{\frac{147}{2}\pi \text{ in}^3} \approx 230.91$

(6) The volume of a cylinder is larger than its surface area, whereas the cube has a surface area equal to its volume. If you get more volume to sell for less cost in making the container, then profits will be higher.

(7) 

$A = \pi r^2$
$= \pi(6)^2 = 36\pi \approx$ **113.10 in²**

(8) 

$SA = 2B + LSA$
$B = 100(62) = 6200$
$LSA = P \cdot h = (324)(15) =$ **4860 yd²**

* Only covered sides, not top or bottom.

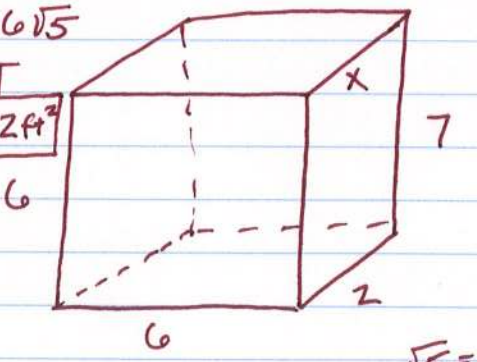
(9) 15 square feet $= \frac{5}{3}$ yd² = 1 bushel

$\frac{15 \text{ ft}^2}{1} \cdot \frac{1^2 \text{ yd}^2}{3^2 \text{ ft}^2}$

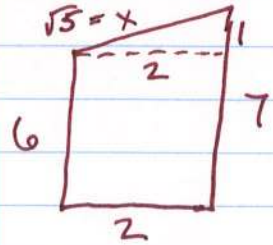
4860 yd²
$\div \frac{5}{3}$

2916 bushel

(10) $SA = 13 + 36 + 13 + 6\sqrt{5}$
$SA = L + F + R + T$
$= 62 + 6\sqrt{5} \approx$ **75.42 ft²**



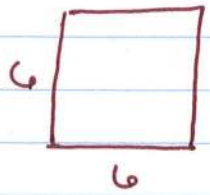
L = left side



$A = \frac{1}{2}(b_1 + b_2)h$
$= \frac{1}{2}(6+7)(2)$
$= 13$

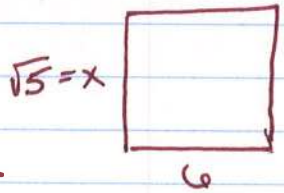
R = right side = L = 13

F = Front area



$F = 6(6) = 36$

T = Top



$T = 6(\sqrt{5})$
$= 6\sqrt{5}$

(11)

25 ft = 300 in

203 ft = 2436 in

$V = Bh$

$B = \pi(1218)^2 = 1483524\pi$

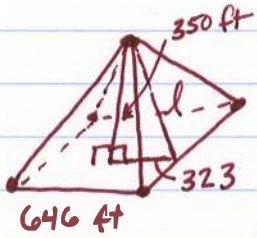
$h = 300$

$V = 445057200\pi \text{ in}^3$

$\div 231$

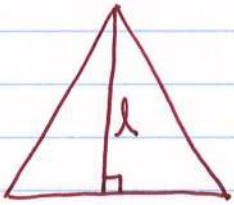
$= \boxed{6052763.77 \text{ gallons}}$

(12)



$323^2 + 350^2 = l^2$

$l = 476.27$



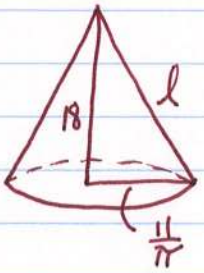
LSA = Area of $\triangle$ · # $\triangle$'s

$= \frac{1}{2}bh \cdot 4$

$= \frac{1}{2}(646)(476.27) \cdot 4$

$= \boxed{615335.26 \text{ ft}^2}$

(13)



Circumference = 22 in

$\pi \cdot d = 22$

$d = \frac{22}{\pi}$

$r = \frac{11}{\pi}$

$18^2 + \left(\frac{11}{\pi}\right)^2 = l^2$

$l = 18.33738$

$LSA = \pi \cdot r \cdot l = \pi\left(\frac{11}{\pi}\right) \cdot (18.34) = 201.71 \text{ in}^2$

$\times$ 8 hats

$\boxed{1613.69 \text{ in}^2}$