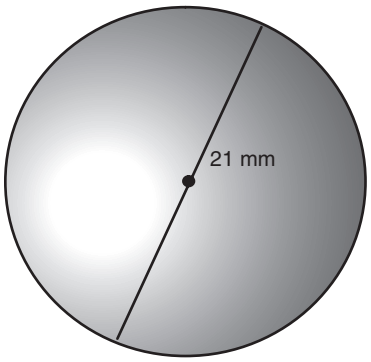
Name _____ Date _____

Spheres à la Archimedes

Volume of a Sphere

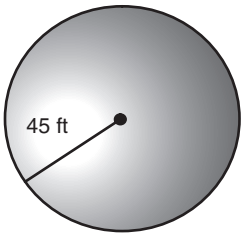
Calculate the volume of each sphere. Use 3.14 for π and round to the nearest tenth, if necessary.

1.



$$\text{Volume} = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3}\pi(10.5^3)$$
$$= 1543.5\pi$$
$$\approx 4846.6 \text{ square millimeters}$$

2.

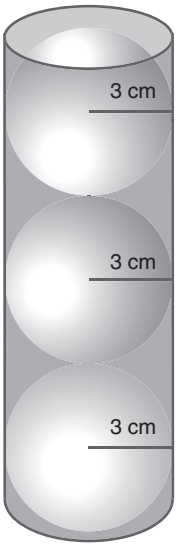


$$\text{Volume} = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3}\pi(45^3)$$
$$= 121{,}500\pi$$
$$\approx 381{,}510 \text{ square feet}$$

3. A can holds 3 tennis balls as shown in the figure. The radius of each tennis ball is 3 centimeters.

a. What is the volume of a single tennis ball?

$$\text{Volume} = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3}\pi(3^3)$$
$$\approx \frac{4}{3}(3.14)\ (27)$$
$$\approx 113.04 \text{ cubic centimeters}$$



b. What is the total volume all 3 tennis balls take up?

$$\text{Total volume} \approx 3(113.04)$$
$$\approx 339.12 \text{ cubic centimeters}$$

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c. Can you determine the height of the can? Explain your reasoning.

Yes. The height of the can is 18 centimeters. The height of the can is three times the diameter of one tennis ball.

height of can $= 3 \times$ diameter of one tennis ball

$= 3 \times 6$

$= 18$

d. What is the volume of the can? Use 3.14 for π.

Volume $= \pi r^2 h$

$\approx (3.14)(3^2)(18)$

≈ 508.68 cubic centimeters

4

e. What is the volume of the can not taken up by the tennis balls?

The volume of the can that is not taken up by the tennis balls is approximately 169.56 cubic centimeters.

$508.68 - 339.12 \approx 169.56$

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Name _____ Date _____

Surface Area

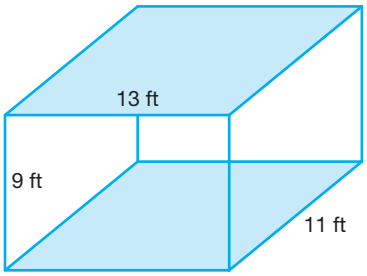
Total and Lateral Surface Area

1. Julie plans to redecorate her bedroom. A model of her bedroom is shown.

a. Determine the number of square feet of flooring she will need to purchase.

Floor area = 13 × 11

= 143 ft^2



b. How many square yards of carpet should Julie order?

9 ft^2 = 1 yd^2

143 ÷ 9 = 15.89 yd^2

Julie should order 16 square yards.

c. Julie would like to paint the walls in her bedroom. Determine the square footage of the walls.

Lateral surface area = 2(9 × 11) + 2(9 × 13)

= 2(99) + 2(117)

= 432 ft^2

d. If a can of paint will cover 300 square feet, how many cans of paint will Julie need to purchase?

Julie will need to purchase 2 cans of paint.

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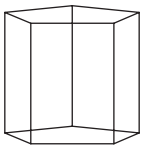
2. Determine the minimum amount of wrapping paper Juan will need to wrap a soccer ball that comes in a pentagonal prism box. The height of the box is 12 inches, each side of the regular pentagon is 8 inches and the apothem of the pentagon is 5 inches.



a. Determine the lateral surface area.

Lateral surface area: $5(8)(12) = 480 \text{ in}^2$

b. Determine the base area.

Base area: $2\left(\frac{1}{2}Pa\right)$

$= 2\left(\frac{1}{2}\cdot 40\cdot 5\right)$

$= 200 \text{ in}^2$

c. Determine the total surface area.

Total surface area: $480 + 200 = 680 \text{ in}^2$

Juan will need 680 square inches of wrapping paper.

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