

MG-3a

Practice Assessment

1. Tennis balls are sold in cylindrical cans with the balls stacked on atop the other. A tennis ball has a diameter of 6.7cm. Find the approximate minimum volume, in cubic centimeters, of a can that can hold 4 such tennis balls.

height 6.7 x 4 = 26.8 cm

Diameter: 6.7 cm → r = 3.35 cm

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

$$= \pi (3.35)^2 \cdot 26.8$$

$$V = 300.763 \pi$$

$$V \approx 944.87 \text{ cm}^3$$

MG-2a

2. A spherical rock with diameter 2.02cm is brought to your lab for identification. Its mass is measured on a scale to be 12.6g. Based on the table below, find the most likely category for the rock.

MASS

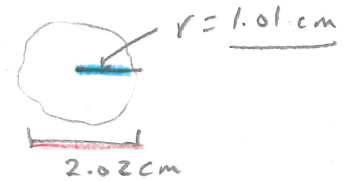
| Type     | Density (g/cm <sup>3</sup> ) |
|----------|------------------------------|
| Shale    | 0.34                         |
| Graphite | 2.23                         |
| Talc     | 2.92                         |
| Pyrite   | 5.02                         |

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

$$V = \frac{4}{3} \pi (1.01)^3$$

$$V \approx 4.32 \text{ cm}^3$$

VOLUME



$$D = \frac{m}{V}$$

$$D = \frac{12.6 \text{ g}}{4.32 \text{ cm}^3} \Rightarrow 2.92 \text{ g/cm}^3 \text{ — Talc}$$

3. Find the missing data values in the table. Round each to the nearest whole number.

| Country | Total Population | Area (km <sup>2</sup> ) | Density (people/km <sup>2</sup> ) |
|---------|------------------|-------------------------|-----------------------------------|
| Peru    | 29,555,000       | 1,285,000               | 23                                |
| Morocco | 34,000,000       | 450,000                 | 76                                |
| Laos    | 6,800,000        | 251,851                 | 27                                |

D =  $\frac{\text{stuff}}{\text{space}}$  → in this problem →  $\frac{\text{people}}{\text{area}}$

Peru:  $D = \frac{m}{V}$

$$23 = \frac{m}{1,285,000}$$

$$(23)(1,285,000) = m$$

$$29,555,000 \text{ people}$$

Morocco

$$D = \frac{m}{V}$$

$$D = \frac{34,000,000}{450,000}$$

$$D \approx 76 \text{ p/km}^2$$

Laos

$$D = \frac{m}{V}$$

$$27 = \frac{6,800,000}{V}$$

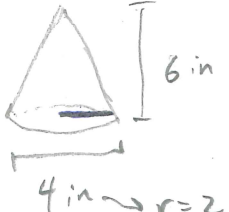
$$27 \cdot V = 6,800,000$$

$$V = \frac{6,800,000}{27} \approx 251,852 \text{ km}^2$$

GMD-3a

4. Find the approximate diameter of a sphere which has the same volume as an 8-inch tall cone with base diameter 4 in.

Cone



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

$$V_c = \frac{1}{3} \pi r^2 h$$

$$V_c = \frac{1}{3} \pi (2)^2 \cdot 6 = 8\pi \approx (25.13)$$

$$V_c = V_s$$

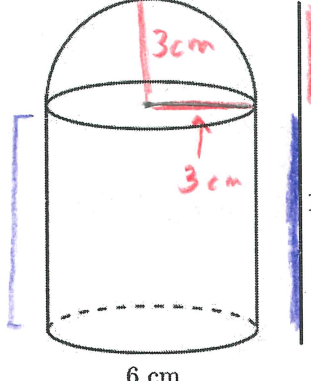
$$\frac{8\pi}{\pi} = \frac{\frac{4}{3} \pi r^3}{\pi}$$

$$8 = \frac{4}{3} r^3 \rightarrow 6 = r^3$$

$$\sqrt[3]{6} = r \approx 1.82 \text{ in}$$

$D = 2 \cdot r$   
 $D \approx 2(1.82)$   
 $D \approx 3.64 \text{ in}$

5. Find the volume of the object below, which consists of a cylinder capped by a hemisphere.



$$V_{\text{cyl}} = \pi r^2 h$$

$$V_{\text{cyl}} = \pi \cdot 3^2 \cdot 12$$

$$V_{\text{cyl}} = 108\pi \text{ cm}^3$$

$$V_{\text{sphere}} = \frac{4}{3} \pi r^3 \rightarrow V_{\frac{1}{2} \text{ sphere}} = \frac{\frac{4}{3} \pi r^3}{2}$$

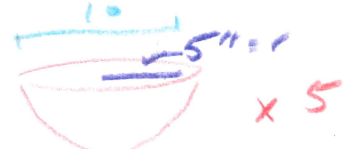
$$V_{\frac{1}{2} \text{ sphere}} = \frac{\frac{4}{3} \pi (3^3)}{2} = \frac{36\pi}{2} = 18\pi$$

$$= 108\pi + 18\pi = 126\pi \text{ cm}^3$$

$$\approx 395.8 \text{ cm}^3$$

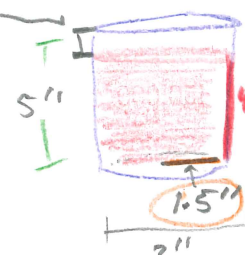
MG-1a

6. Drinks are being sold. Five hemispherical punch bowls with diameters 10" contain the delicious beverage. The cups being used to distribute the drinks are cylinders 3" wide and 5" tall but are only partially filled, with 1/2" left empty to keep from spilling. \$22 have already been spent on cups and supplies, and each drink is being sold for \$0.75. If all the punch is sold, approximately how much profit will the seller make?



$$V = \frac{4}{3} \pi r^3 = \frac{4}{3} \pi (5^3) = \frac{523.6 \text{ in}^3}{2}$$

1 bowl  $\rightarrow 261.8 \text{ cm}^3$   
5 bowls  $\rightarrow 1309 \text{ cm}^3$  (Amount of drink)



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

$$4.5 V = \pi (1.5)^2 \cdot 4.5$$

$$V = 31.81 \text{ in}^3$$

volume of 1 cup

How many cups to sell?

$$\frac{1309 \text{ cm}^3}{31.81 \text{ cm}^3/\text{cup}} = 41 \text{ cups}$$

$$\times 0.75 \text{ \$/cup}$$

$$\underline{\$ 30.75 \text{ revenue}}$$

$$\underline{\underline{- 22.00 \text{ costs}}}$$

$$\underline{\underline{\$ 8.75 \text{ profit}}}$$