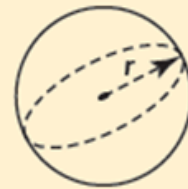


## 1.6 Surface Area and Volume of a Sphere

### Surface Area of a Sphere

The surface area, SA, of a sphere with radius  $r$  is:

$$SA = 4\pi r^2$$



Ex: The diameter of a baseball is approximately 3 in.  $\rightarrow r = 1.5 \text{ in}$   
 Determine the surface area of a baseball to the nearest square inch.



$$SA = 4\pi r^2$$

$$SA = 4(3.14)(1.5)^2$$

$$SA = 28.26 \text{ in}^2$$

$$SA = 28 \text{ in}^2$$

Ex 2: The surface area of a lacrosse ball is approximately 20 square inches.  
 What is the diameter of the lacrosse ball to the nearest tenth of an inch?

↳ get radius.

$$SA = 4\pi r^2$$

$$\frac{20}{4} = \frac{4\pi r^2}{4}$$

$$5 = \pi r^2$$

$$5 = (3.14)r^2$$

$$\frac{5}{3.14} = \frac{3.14r^2}{3.14}$$

$$1.59 = r^2$$

$$\sqrt{1.59} = r$$

$$1.26 = r$$

$$r = 1.3 \text{ in}$$

$$\therefore d = 2(1.3) = \underline{\underline{2.6 \text{ in}}}$$

Ex ③: If the surface area of a basketball is 350 cm<sup>2</sup>, what is the diameter?

what is radius?  
then double it!

$$SA = 4\pi r^2$$

$$\frac{350}{4} = \frac{4\pi r^2}{4}$$

$$87.5 = 3.14 r^2$$

$$\frac{87.5}{3.14} = \frac{3.14 r^2}{3.14}$$

$$27.866 = r^2$$

$$\sqrt{27.866} = r$$

$$5.2788 = r$$

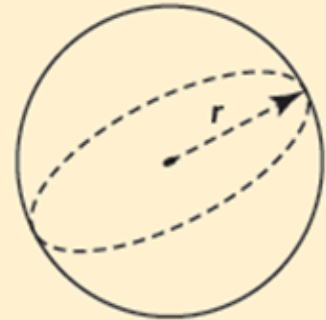
$$r = 5.3$$

$$\therefore d = 2(5.3) = 10.6 \text{ cm}$$

## Volume of a Sphere

The volume,  $V$ , of a sphere with radius  $r$  is:

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



Ex 1: The sun approximates a sphere with diameter 870 000 mi.

What is the approximate volume of the sun?  $r = 435\,000$

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

$$V = \frac{4}{3} (3.14) (435\,000)^3$$

$$V = 3.4 \times 10^{17} \text{ mi}^3$$

Ex 2: A hemisphere has radius 8.0 cm.

a) What is the surface area of the hemisphere to the nearest tenth of a square centimetre?

$$SA_{\text{sphere}} = 4\pi r^2$$

$$SA_{\text{sphere}} = 4(3.14)(8)^2$$

$$SA_{\text{sphere}} = 803.84$$

$$\frac{1}{2} \text{ sphere} = \frac{803.84}{2}$$

$$\frac{1}{2} \text{ sphere} = 401.92$$

But we need to add the circle area.

$$\begin{aligned} A_{\text{circle}} &= \pi r^2 \\ &= 3.14(8)^2 \\ &= 200.96 \end{aligned}$$

b) What is the volume of the hemisphere to the nearest tenth of a cubic centimetre?