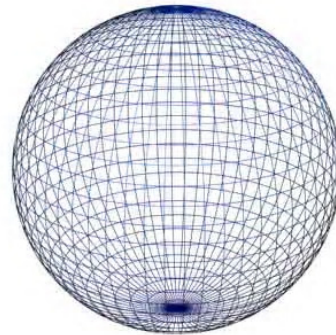
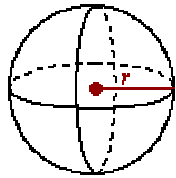


MATH 10 – UNIT 1 – LESSON 9 – SURFACE AREA & VOLUME OF A SPHERE
MEASUREMENT UNIT

Name: Key

Formula for the Surface area of a Sphere

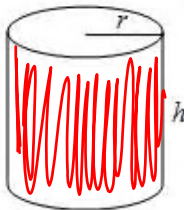
$$SA = 4\pi r^2$$



The surface area of a sphere is 4 times the area of a circle with the same radius

The surface area of a sphere is also related to the surface area of the curved surface of a cylinder!

Surface Area of a Cylinder = $2\pi r^2 + 2\pi rh$

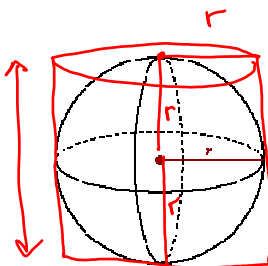


bases (2 circles)
 ↓
 curved surface area

$$SA = 2\pi rh$$

$$SA = 2\pi r(2r)$$

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



The surface area of a sphere is = to the curved surface area of a cylinder with the same radius & height (2r)

Example #1: The diameter of a ball is 4 in. Find the surface area of the ball to the nearest square inch.

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

$$SA = 4\pi(2^2)$$

$$SA = 16\pi$$

$$SA = 50 \text{ in.}^2$$

\therefore the ball has a surface area of 50 in.^2

Example #2: Find the surface area of the smallest cylinder that encloses the ball described in example 1.

$$r = 2 \quad h = 2r = 4$$

$$SA = 2\pi r^2 + 2\pi rh$$

$$SA = 2\pi(2^2) + 50$$

$$SA = 8\pi + 50$$

$$SA = 75$$

\therefore the cylinder has a SA of 75 in.^2

Example #3: 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?

$$SA = 20$$

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

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

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

$$r = \sqrt{\frac{5}{\pi}}$$

$$r = 1.3$$

$$\text{diameter} = 1.3 \times 2 = 2.6$$

$$2.6 = \frac{26}{10} = 2\frac{6}{10} = 2\frac{3}{5}$$

\therefore the diameter of the ball is approximately $2\frac{3}{5}$ inches

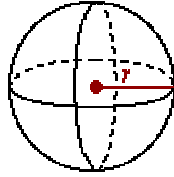
MATH 10 – UNIT 1 – LESSON 9 – SURFACE AREA & VOLUME OF A SPHERE

MEASUREMENT UNIT

Name: Key

Formula for the Volume of a Sphere

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



Example #4: The diameter of a softball is approximately 4 in. Find the volume of a softball to the nearest square inch. $r = 2$

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

$$V = \frac{4}{3}\pi(2^3)$$

$$V = \frac{4}{3}\pi(8)$$

$$V = 34 \text{ in.}^2$$

\therefore the volume of the softball is approx. 34 in.²

** you will NOT be given these formulae on a test*

Hemisphere: half of a sphere

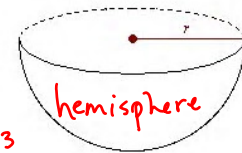
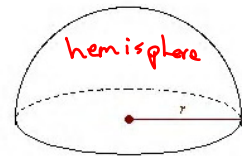
SA of a hemisphere = SA of sphere + area of circle

$$SA = \frac{4\pi r^2}{2} + \pi r^2$$

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

$$SA = 3\pi r^2$$

Volume of a hemisphere = $\frac{V \text{ of sphere}}{2} = \frac{\frac{4}{3}\pi r^3 \times 1}{2} = \frac{2\pi r^3}{3}$



$$V = \frac{2}{3}\pi r^3$$

Example #5: A hemisphere has radius 4.0 cm.

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

$$SA = 3\pi r^2$$

$$SA = 3\pi(4^2)$$

$$SA = 48\pi$$

$$SA = 150.8 \text{ cm}^2$$

2. What is the volume of the hemisphere to the nearest tenth of a cubic centimetre?

$$V = \frac{2}{3}\pi r^3$$

$$V = \frac{2}{3}\pi(4^3)$$

$$V = 134.0 \text{ cm}^3$$

Lesson 9 Homework: WS 10-1-9 "Surface Area & Volume of a Sphere"