

Name: Key

Date: \_\_\_\_\_

## Lesson 2-6: Surface Area and Volume Practice

Learning Goal: (#12) How do I find the volume of a sphere?

From your video last night...

Volume of Spheres

The volume of a sphere can be found using the following formula:

$$V = \frac{4}{3} \pi r^3 \quad \text{where } r = \text{radius}$$

Watch Me! *Error Analysis!*Example 1: What is the volume in terms of  $\pi$ ,

of a sphere with a radius of 5 inches?

$$\begin{aligned} V &= \left(\frac{4}{3}\right) \pi (5)^3 \\ &= 523.5987756 \\ &= \boxed{523.60 \text{ in}^3} \end{aligned}$$

\* Mistake: Answer not in terms of  $\pi$ !!

$$V = \frac{500}{3} \pi \text{ in}^3$$



You Try!

Example 2: If a sphere has a radius of 12 centimeters, what is the volume, to the nearest tenth of a cubic inch?

$$\begin{aligned} V &= \frac{4}{3} \pi (12)^3 \\ &= 7238.229474 \\ &= \boxed{7,238.2 \text{ in}^3} \end{aligned}$$

Example 3: The diameter of the sphere is 4.6cm. Find volume of a sphere to the nearest cubic centimeter.

$$\begin{aligned} d &= 4.6 \text{ cm} \\ \rightarrow r &= 2.3 \text{ cm} \end{aligned}$$

$$\begin{aligned} V &= \frac{4}{3} \pi (2.3)^3 \\ &= 50.96501042 \\ &= \boxed{51 \text{ cm}^3} \end{aligned}$$

Whole # rounding!

Geometry/Trig

Example 4: Sketch a sphere with a diameter of 3 ft.

a) Find the volume of the sphere in terms of  $\pi$ .

$$d = 3$$

$$r = 1.5$$

$$V = \frac{4}{3} \pi (1.5)^3$$

$$= \boxed{4.5\pi \text{ ft}^3}$$

b) Find the surface area in terms of  $\pi$ .

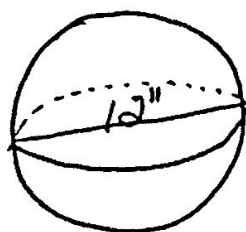
$$SA = 4\pi r^2$$

$$= 4\pi (1.5)^2$$

$$= \boxed{9\pi \text{ ft}^2}$$

Example 5: When you blow up a balloon it forms a sphere because it is trying to hold as much air as possible with as small a surface as possible. How much air, to the nearest tenth of a cubic inch, is being held by a spherical balloon with a diameter of 12 inches?

inside = volume!



$$V = \frac{4}{3} \pi (6)^3$$

$$= 904.7786842 \text{ in}^3$$

$$\boxed{904.8 \text{ in}^3}$$

Example 6: If the surface area of a sphere is represented by  $144\pi$ , what is the volume in terms of  $\pi$ ?

$$\textcircled{1} SA = 4\pi r^2$$

$$\frac{144\pi}{4\pi} = \frac{4\pi(r^2)}{4\pi}$$

$$\sqrt{36} = \sqrt{r^2}$$

$$r = 6 \text{ units.}$$

$$\textcircled{2} V = \frac{4}{3} \pi (6)^3$$

$$= \boxed{288\pi \text{ units}^3}$$

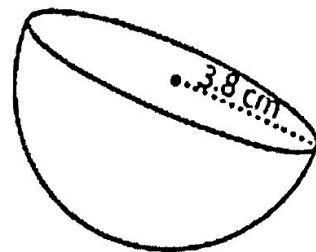
$$V = \frac{4}{3} \pi r^3$$

need radius!!

Geometry/Trig

$\frac{1}{2}$  Sphere!

Example 8: Use the hemisphere to the right to answer these questions.



- a) Calculate the volume:

$$\begin{aligned} V &= \left(\frac{1}{2}\right) \left(\frac{4}{3}\right) \pi r^3 \\ &= \left(\frac{1}{2}\right) \left(\frac{4}{3}\right) \pi (3.8)^3 \\ &= 114.9236481 \end{aligned}$$

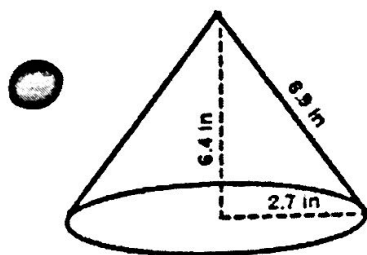
$$115 \text{ cm}^3$$

- b) Calculate the surface area:

$$\begin{aligned} SA &= \left(\frac{1}{2}\right) 4 \pi r^2 \\ &= \left(\frac{1}{2}\right) (4) \pi (3.8)^2 = 90.72919584 \\ &= 91 \text{ cm}^2 \end{aligned}$$

Example 9:

- a) Calculate the volume of the solid below:



$$\begin{aligned} V &= \frac{1}{3} \pi r^2 h \\ &= \frac{1}{3} \pi (2.7)^2 (6.4) \\ &= 48.85804895 \\ &= 48.86 \text{ in}^3 \end{aligned}$$

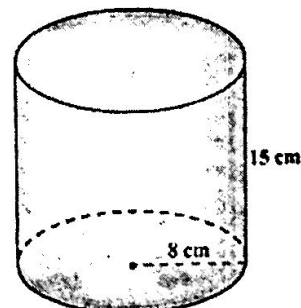
Example 7:

- a) Find the surface area. Leave your answer in terms of Pi.

$$\begin{aligned} SA &= 2\pi r^2 + \pi dh \\ &= 2\pi (8)^2 + \pi (16)(15) \\ &= 128\pi + 240\pi = 368\pi \text{ cm}^2 \end{aligned}$$

- b) Calculate the volume:

$$\begin{aligned} V &= \pi r^2 h \\ &= \pi (8)^2 (15) \\ &= 960\pi \text{ cm}^3 \end{aligned}$$



Name: Kay  
Date: \_\_\_\_\_

Lesson 2-6: Homework

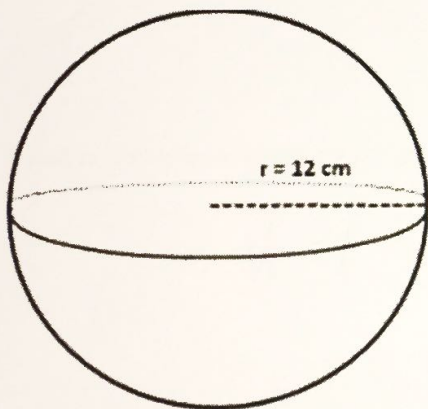
1. What is the difference between Surface Area and Volume?

\* SA = • space around the outside of a 3D figure  
• the sum of the areas of each surface

\* Volume = space inside a 3D figure.

2. Calculate the volume of the following figure to the nearest cubic centimeter.

→ nearest whole #!



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

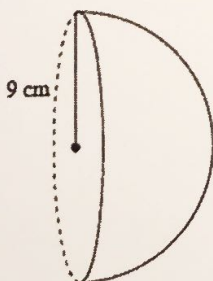
$$= \frac{4}{3} \pi (12)^3$$

$$= 7238.229474$$

$$= \boxed{7,238 \text{ cm}^3}$$

3. Calculate the volume of the following figure in terms of Pi:

→ don't put  $\pi$  in calc!

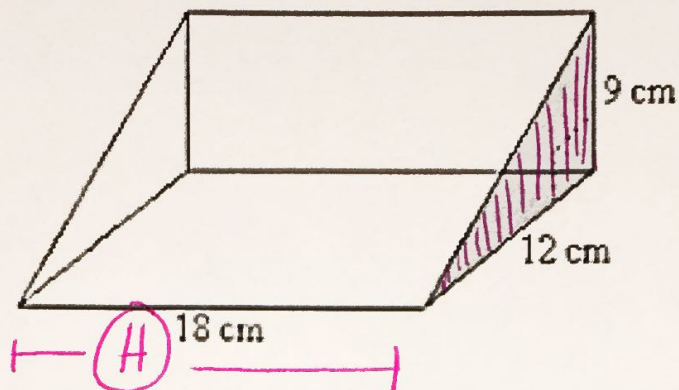


$$V = \frac{4}{3} \pi (9)^3$$

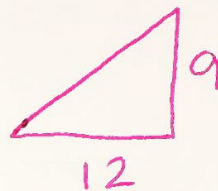
$$= \boxed{972 \pi \text{ cm}^3}$$



a) What is the name of the following figure? Triangular Prism



b) What *shape* is the "base" of this figure? Triangle.



c) What is the volume of the figure above?

$$\begin{aligned}
 V &= \left( \frac{1}{2} b \cdot h \right) H \\
 &= \frac{1}{2} (12)(9)(18) \\
 &= \boxed{972 \text{ cm}^3}
 \end{aligned}$$