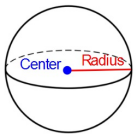
Wednesday, June 3, 2020

Section 11-6: SA and Vol of a Sphere.

A Sphere is a 3-Dimensional circle.

Definition: The set of all points in space equidistant from a given point.



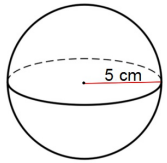
This point is the center.

This equal distance is the radius.

Surface Area of a Sphere:

$SA = 4\pi r^2$

Find the SA of this sphere. Leave your answer in terms of π.



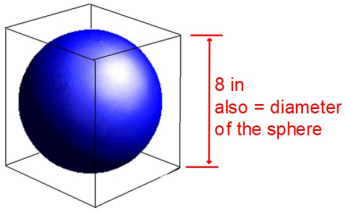
$SA = 4\pi r^2$

$r = 5$ cm

$SA = 4\pi(5)^2 = 4\pi(25)$

$SA = 100\pi \text{ cm}^2$

A sphere fits perfectly inside of a cube (inscribed). The edges of the cube are 8 in long. Find the surface area of the sphere to the nearest hundredth.



$SA = 4\pi r^2$

8 in = diameter

r = 8÷2 = 4 in

$SA = 4\pi(4)^2 = 4\pi(16)$

$SA = 201.06 \text{ in}^2$

The Surface Area of a Sphere is 600 in^2. Find the length of the radius to the nearest hundredth.

$SA = 4\pi r^2$

$SA = 600$

$600 = 4\pi r^2$

$\frac{600}{4\pi} = \frac{4\pi r^2}{4\pi}$

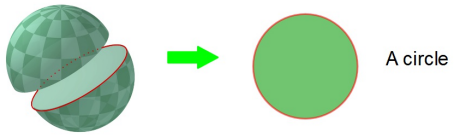
$\frac{600}{4\pi} = r^2$

$\sqrt{\frac{600}{4\pi}} = \sqrt{r^2}$

$r = 6.91$ in

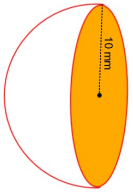
What is a hemisphere? Half of a sphere

What Cross Section is created when when cut a Sphere in half?



A circle

Find the Total Surface Area of a Hemisphere, including the area of the Cross Section. Round to the nearest hundredth.



SA = SA of 1/2 the Sphere + area of orange circle.

$SA = \frac{4\pi r^2}{2} + \pi r^2 = 2\pi r^2 + \pi r^2 = 3\pi r^2$

r = 10 mm

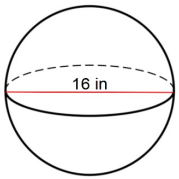
$SA = 3\pi(10)^2 = 3\pi(100)$

$SA = 942.48 \text{ mm}^2$

Volume of a Sphere

$$\text{Volume} = \frac{4}{3}\pi r^3$$

Find the volume of this sphere.
Leave your answer in terms of π.



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

16 = diameter

r = 16÷2 = 8

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

$$V = \frac{4}{3}\, 512\pi$$

$$V = \boxed{\frac{2048\pi}{3}\ \text{in}^3}$$

The volume of a sphere is 2000 cm^3.
Find its Surface Area to the nearest hundredth.

First we need to use the Volume to find the radius, then we can find the SA.

πr^3

$V = \frac{4}{3}\pi r^3$ $\quad V = 2000$

$2000 = \frac{4}{3}\pi r^3$

$\frac{3}{4} \cdot 2000 = \frac{4}{3}\pi r^3 \cdot \frac{3}{4}$

$1500 = \pi r^3$

$\frac{1500}{\pi} = \frac{\pi r^3}{\pi}$

$r^3 = \frac{1500}{\pi}$

$\sqrt[3]{r^3} = \sqrt[3]{\frac{1500}{\pi}}$

r = 7.82 cm

Now we can use this radius to find the SA:

r = 7.82 cm

$SA = 4\pi r^2 = 4\pi(7.82)^2 =$ 768.46 cm^2

You can now finish the next three problems on Practice #27.

Practice #27 is due on Sunday, June 7 by 10:00 pm