Geometry

Chapter 11

Section 11-6

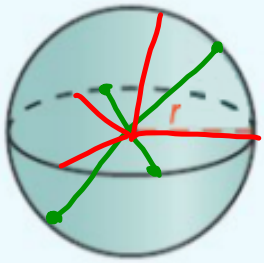
The three orange slices below were cut from three different oranges. Do you have sufficient information to tell which orange is the largest? If not, explain what information you would need.

A

B

C

A **sphere** is the set of all points in space equidistant from a given point called the **center**. A **radius** is a segment that has one endpoint at the center and the other endpoint on the sphere. A **diameter** is a segment passing through the center with endpoints on the sphere.

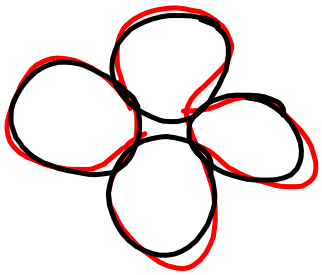


What is the cross section of a sphere?

circle

How do you make a baseball or softball?

- Two congruent panels make up the outside of the ball.
- What do they look like?

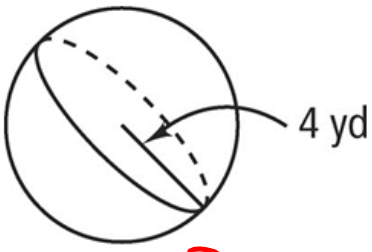


Theorem 11-10 Surface Area of a Sphere

The surface area of a sphere is four times the product of π and the square of the radius of the sphere.

$$\text{S.A.} = 4\pi r^2$$

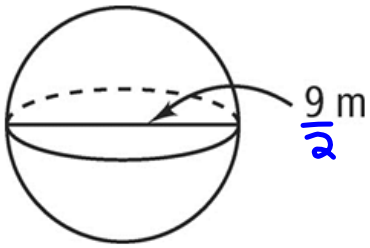
Find the surface area of the spheres.
Leave your answers in terms of pi.



$4\pi(4)^2$

$4\pi\ 16$

$64\pi\ yd^2$



$4\pi(4.5)^2$

$4\pi\left(\frac{9}{2}\right)^2$

$4\pi\ \frac{81}{4}$

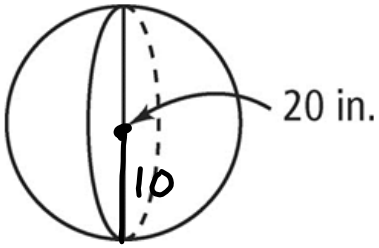
$81\pi\ m^2$

Theorem 11-11 Volume of a Sphere

The volume of a sphere is four thirds the product of π and the cube of the radius of the sphere.

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

Find the volume of the spheres to the nearest whole number.



$\frac{4}{3}\pi(10)^3$

4189 in^3

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

113 m^3

$\frac{4}{3} = \frac{4}{1} \cdot \frac{1}{3}$ $r^3 \rightarrow r \cdot (r \cdot r)$ $r \cdot r^2$

Write an equation relating surface area to volume for a sphere with radius r.

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

$V = \frac{1}{3} r (4\pi r^2)$

$V = \frac{1}{3} r SA$

Find the volume of a sphere with a surface area of 196π m^2.

$SA = 196\pi$

$\frac{196\pi}{4\pi} = \frac{4\pi r^2}{4\pi}$

$\sqrt{49} = \sqrt{r^2}$

$r = 7$

$V = \frac{4}{3}\pi(7)^3$

$V = \frac{4}{3}\pi \cdot \frac{343}{1}$

$V = \frac{1372}{3}\pi m^3$

Find the surface area of a sphere with a volume of 24 in^3 to the nearest tenth.

$\frac{3}{4\pi}24 = \frac{4}{3}\pi r^3 \frac{3}{4\pi}$

$\sqrt[3]{5.792} = \sqrt[3]{r^3}$

$1.8 = r$

$SA = 4\pi(1.8)^2$

$SA = 40.7\ in^2$

Homework

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