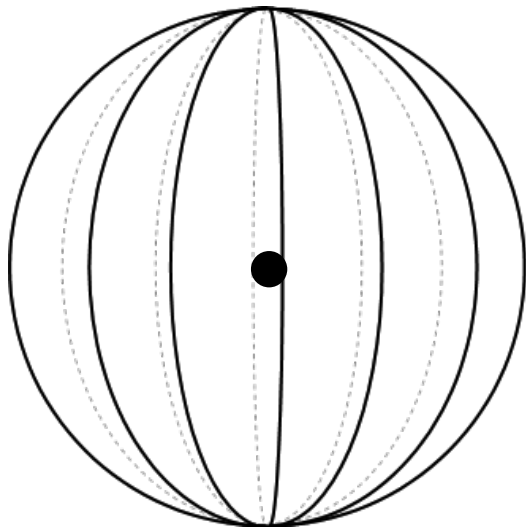A SPHERE is the set of all points in <u>space</u> that are equidistant from a given point, called the center

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

*It takes 4 Great Circles to cover a Sphere! *

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

Find the Surface Area and Volume of a sphere whose <u>diameter is 12 inches</u>

$$r = 6$$

$$SA = 4\pi r^2$$
$$= 4\pi 6^2$$
$$= 4\pi 36$$
$$= 144\pi \ in^2$$

$$V = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3}\pi (6)^3$$
$$= \frac{4}{3}\pi (216)$$
$$= 288\pi \ in^3$$

A sphere has a Surface Area of 3631.68 cm^2.
Find its radius.

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

$$\frac{3631.68}{4\pi} = \frac{4\pi r^2}{4\pi}$$

$$r^2 = \frac{3631.68}{4\pi}$$

$$r = \sqrt{\frac{3631.68}{4\pi}}$$

$$= 17 \text{ cm}$$

A sphere has a Volume of 8457 cm^3.
Find its Surface Area.

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

$$\frac{3}{4} \cdot 8457 = \frac{4}{3}\pi r^3 \cdot \frac{3}{4}$$

$$\frac{25371}{4} = \pi r^3$$

$$r^3 = \frac{25371}{4\pi}$$

$$r = \sqrt[3]{\frac{25371}{4\pi}}$$

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

$$= 4\pi \left(\sqrt[3]{\frac{25371}{4\pi}}\right)^2$$

$$\approx 2007.374 \text{ cm}^2$$

A sphere has a Volume of 72π ft³.
If the length of the radius of this sphere is tripled,
then find the volume of the new sphere.

• Radius is tripled

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

$(\text{triple})^3 =$
$3^3 = 27$

Volume is 27 times bigger

$72\pi \cdot 27 = \boxed{1944\pi \text{ ft}^3}$

A sphere has a Surface Area of 284π in².
Its radius is tripled to form a new sphere. If the
GREAT CIRCLE is defined as the circle that passes
through the center of the sphere, then find the
circumference of this great circle for the newly
formed sphere.

$SA = 4\pi r^2$
$284\pi = 4\pi r^2$

$\frac{284\pi}{4\pi} = r^2$

$71 = r^2$
$r = \sqrt{71}$

✱ tripled: $r = 3\sqrt{71}$

$C = 2\pi r$
$= 2\pi(3\sqrt{71})$
$\boxed{= 6\pi\sqrt{71}}$

Cavalieri 2D

Cavalieri 3D

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