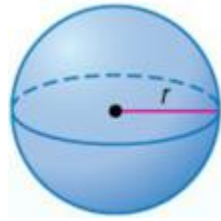


12.6 Surface Areas and Volumes of Spheres

- **Sphere:**

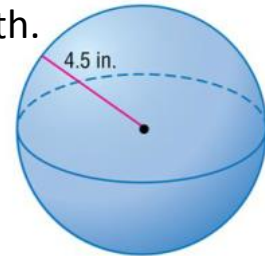
- Surface Area: $S = 4\pi r^2$
↑
radius



Find the surface area of the sphere to the nearest tenth.

$$S = 4\pi \cdot 4.5^2$$

$$\boxed{254.5 \text{ in}^2}$$



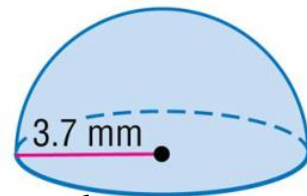
Find the surface area of the hemisphere to the nearest tenth.

$$\frac{1}{2} \text{ Sphere} + \text{circle top}$$

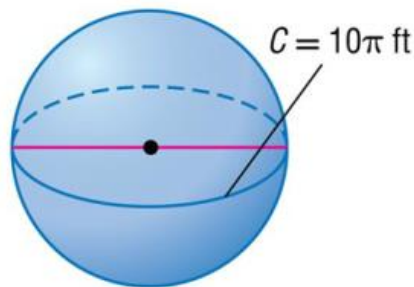
$$\frac{1}{2} 4\pi r^2 + \pi r^2$$

$$2\pi r^2 + \pi r^2 = 3\pi r^2 = 3\pi \cdot 3.7^2$$

$$\boxed{129.0 \text{ mm}^2}$$



B. Find the surface area of a sphere if the circumference of the great circle is 10π feet.



$$4\pi \cdot 5^2$$

$$\boxed{314.2 \text{ ft}^2}$$

$$C = 10\pi$$

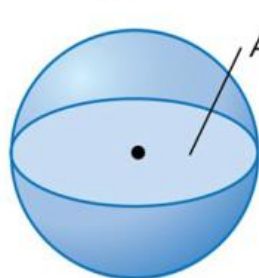
$$C = \pi d$$

$$\frac{\pi d}{\pi} = \frac{10\pi}{\pi}$$

$$d = 10$$

$$r = 5$$

C. Find the surface area of a sphere if the area of the great circle is approximately 220 square meters.



$$A \approx 220 \text{ m}^2$$

$$A = \pi r^2$$

$$4\pi r^2$$

$$4 \cdot 220 = \boxed{880 \text{ m}^2}$$

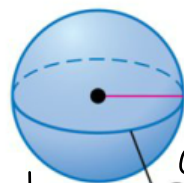
• **Sphere:**

○ Volume: $V = \frac{4}{3}\pi r^3$

A. Find the volume a sphere with a great circle circumference of 30π centimeters. Round to the nearest tenth.

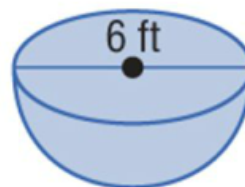
$$\frac{4}{3}\pi \cdot 15^3$$

$$4500\pi \text{ or } \boxed{14137.2 \text{ cm}^3}$$



$$\begin{aligned} C &= d\pi \\ C &= 30\pi \text{ cm} \\ d &= 30 \\ r &= 15 \end{aligned}$$

B. Find the volume of the hemisphere with a diameter of 6 feet. Round to the nearest tenth.



$$\frac{4}{3}\pi r^3 \cdot \frac{1}{2} = \frac{2}{3}\pi r^3$$

$$\frac{2}{3} \cdot \pi \cdot 3^3$$

$$18\pi \text{ or } \boxed{56.5 \text{ ft}^3}$$

ARCHEOLOGY The stone spheres of Costa Rica were made by forming granodiorite boulders into spheres. One of the stone spheres has a volume of about $36,000\pi$ cubic inches. What is the diameter of the stone sphere?

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

$$\frac{36,000\pi}{\pi} = \frac{4}{3}\pi r^3$$

$$\frac{3}{4} \cdot 36,000 = \frac{4}{3} r^3 \cdot \frac{3}{4}$$

$$\sqrt[3]{27000} = \sqrt[3]{r^3}$$

$$30\text{in} = r$$