



The National
Orthodox School
Shmaisani

Key answer

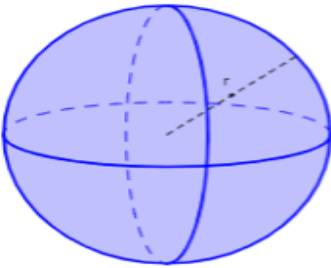
Name: _____ Worksheet(6)) volume and surface area of a sphere
Grade:8(A, B)

Subject : Math (Unit (7):Mensuration of planes and solids)

Date : _____

Objective: Find the volume and surface area of spheres.

Surface Area and Volume of Sphere

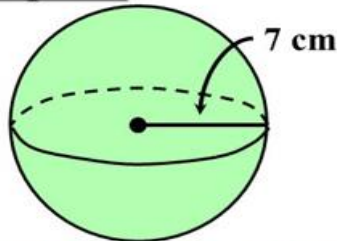


$$\text{Surface Area} = 4\pi r^2$$

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

Example 1 Find the surface area of a sphere

Find the surface area of the sphere.



Solution

$$\begin{aligned} S &= 4\pi r^2 \\ &= 4\pi (7)^2 \\ &= 196\pi \\ &\approx 615.75 \end{aligned}$$

Formula for surface area of a sphere

Substitute 7 for r .

Simplify.

Use a calculator.

The surface area of the sphere is about 615.75 square centimeters.

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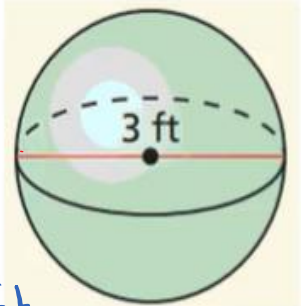
Exercise 1:

$$\sqrt{4\pi r^2}$$

~~150~~
Circumference

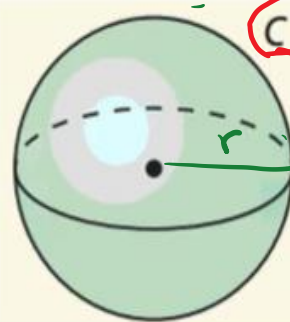
Find the surface area of each sphere. (in terms of π)

$$\begin{aligned} r &= \frac{d}{2} \\ &= \frac{3}{2} \\ &= 1.5 \text{ ft} \end{aligned}$$



7.5
7.5

$$\begin{aligned} S.A. &= 4\pi r^2 \\ &= 4 * \pi * (1.5)^2 \\ &= 4 * \pi * 2.25 \\ &= (9\pi) \text{ ft}^2 \end{aligned}$$



$$\begin{aligned} C &= 15\pi \text{ m} = 2\pi r \\ \frac{15\pi}{2} &= \frac{2\pi r}{2} \\ \boxed{r = 7.5 \text{ m}} \end{aligned}$$

$$\begin{aligned} S.A. &= 4\pi r^2 \\ &= 4 * \pi * (7.5)^2 \\ &= 4 * \pi * 56.25 \\ &= (225\pi) \text{ m}^2 \end{aligned}$$

Exercise (2): If the surface area of a sphere is $784\pi \text{ cm}^2$, find its radius?

$$\begin{aligned} S.A. &= 4 * \pi * r^2 \\ \frac{784\pi}{4} &= \frac{4 * \pi * r^2}{4} \end{aligned}$$

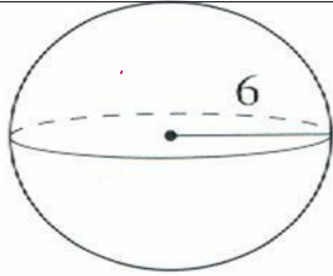
$$\sqrt{r^2} = \sqrt{196}$$

$$\boxed{r = 14 \text{ cm}}$$

$$\begin{array}{r} * 196 \quad S.A. = \checkmark \\ 4 \overline{) 784} \quad r = ? \\ \underline{4} \\ 38 \\ \underline{36} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Example 2:

Volume of Spheres



To find the volume of a sphere use the formula in the blue box.

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

$$= \frac{4}{3} \pi \times 6 \times 6 \times 6$$

$$= 4 \times 72 \pi = (288\pi) \text{ unit}^3$$

$$\begin{array}{r} \textcircled{1} \\ 36 \\ \underline{72} \end{array}$$

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

$$= \frac{4}{3} (3.14)(6)^3$$

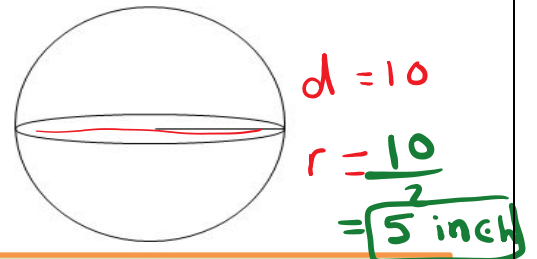
$$= \frac{4}{3} (678.24)$$

$$= \underline{\underline{904.32 \text{ units}^3}}$$

Exercise 3:

Find the volume of the sphere, given that the diameter is 10 inches. (in terms of π)

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



$$V = \frac{4}{3} \times \pi \times (5)^3$$

$$= \frac{4}{3} \times \pi \times 125$$

$$= \left(\frac{500\pi}{3} \right) \text{ in}^3$$

$$\begin{array}{r} \textcircled{1} \textcircled{2} \\ 125 \\ \underline{500} \end{array}$$

Exercise 4: Find the diameter of a sphere

if its volume is $\frac{500}{3}\pi \text{ cm}^3$?

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

$$\frac{\cancel{4}}{4} \times \frac{500}{\cancel{3}} \pi = \frac{\cancel{4}}{3} \pi r^3 \times \frac{\cancel{3}}{4}$$

$$\sqrt[3]{125} = \sqrt[3]{r^3}$$

$$r = 5 \text{ cm} \Rightarrow d = 5 \times 2 = \boxed{10 \text{ cm}}$$

$d = ?$
 S
 $V = \checkmark$

Exercise 5: Find the surface area

(in terms of π) of a sphere

if its volume is $\frac{256}{3}\pi \text{ cm}^3$?

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

$$\downarrow$$

$$\frac{\cancel{4}}{4} * \frac{256}{\cancel{3}} \pi = \frac{\cancel{4}}{3} \pi r^3 * \frac{\cancel{3}}{4}$$

$$\sqrt[3]{r^3} = \sqrt[3]{64} \Rightarrow \boxed{r = 4 \text{ cm}}$$

$$S.A = 4\pi r^2$$

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

$$= 4 * \pi * 16$$

$$= (64\pi) \text{ cm}^2$$



Exercise 6:

If the surface area of a sphere is 1256 m²,

find : a) its radius? b) its volume?

a) $S.A = 4\pi r^2$ (use $\pi \approx 3.14$)

S.A = ✓
- ?

$$1256 = 4 \times 3.14 \times r^2$$

$$1256 = 12.56 r^2$$

$$\frac{1256}{12.56} = \frac{12.56 r^2}{12.56}$$

$$r^2 = \frac{1256 \times 100}{12.56 \times 100} = \frac{125600}{1256} = 100$$

$$\sqrt{r^2} = \sqrt{100} \Rightarrow r = 10 \text{ m}$$

b)

$$V = \frac{4}{3} \pi r^3$$
$$= \frac{4}{3} \pi (10)^3$$
$$= \frac{4}{3} \pi (1000)$$
$$= \frac{4000\pi}{3} \text{ m}^3$$

Use $\pi \approx 3.14 \rightarrow V = \frac{4000 \times 3.14}{3}$

$$= (4186.6) \text{ m}^3$$

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