# Basic Surface Area and Volume of Spheres Homework

Directions: Find the surface area and volume of each solid.
Round to the nearest tenth, if necessary.

1.

14.5 cm
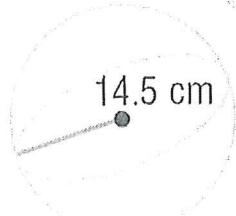
$SA = 4\pi (14.5)^2$

$= 841\pi$

$SA \approx 2642.1 \text{ cm}^2$

$V = \frac{4}{3}\pi (14.5)^3$

SA = 2642.1 cm^2

V = 12770.1 cm^3

2.

450 m

r = 225 m
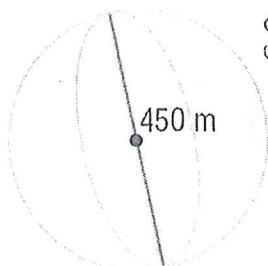
$SA = 4\pi (225)^2$

$V = \frac{4}{3}\pi (225)^3$

SA = 636172.5 m^2

V = 15187500 m^3

47712938m^3

3.

8.4 m
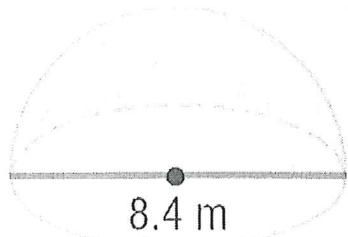
r = 4.2 m

$SA = \frac{1}{2}\left(4\pi (4.2)^2\right) + \pi (4.2)^2$

$= 35.28\pi + 17.64\pi$

$V = \frac{1}{2}\left(\frac{4}{3}\pi (4.2)^3\right)$

$= 49.4\pi$

SA = 166.3 m^2

V = 155.2 m^3

4.

32 m
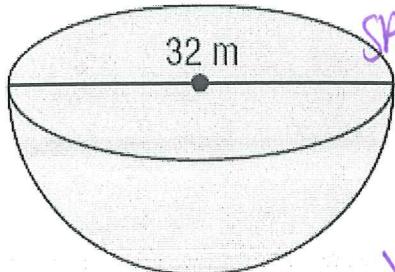
$SA = \frac{1}{2} 4\pi(16)^2 + \pi 16^2$

$SA = 2412.7 m^2$

$SA = \underline{2412.7 m^2}$

$V = \frac{1}{2}\left(\frac{4}{3}\pi 16^3\right)$

$V = \underline{8578.6 m^3}$

5.

14 cm   11 cm
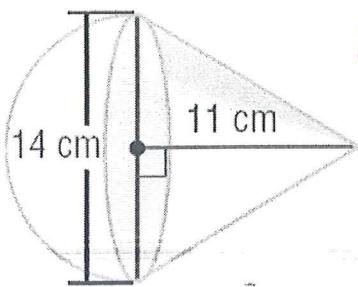
$SA = \frac{1}{2} 4\pi 7^2$
$\quad + \pi 7 \times 13$
$\overline{\quad 593.8 cm^2 \quad}$

$SA = \underline{593.8 cm^2}$

$V = \underline{1282.8 cm^3}$

$r = 7$
$l = 13.0 cm$
$h = 11$

6.

18 cm   10 cm
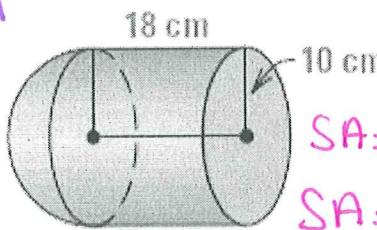
$SA = Cyl - \pi r^2 + \frac{1}{2} sph$ no circle

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

$SA = \pi 10^2 + 2\pi 10 \times 18 + \frac{1}{2} 4\pi 10^2$

$\boxed{SA = 2073.5 cm^2}$

$SA = \underline{2073.5 cm^2}$

$V = \frac{1}{2}\frac{4}{3}\pi r^3 + \pi r^2 \times h \qquad V =$

$V = \frac{1}{2}\left(\frac{4}{3}\pi 10^3\right) + \pi 10^2 \times 18$

$V = \underline{7749.3 cm^3}$

7.

9 in.

4.8 in.
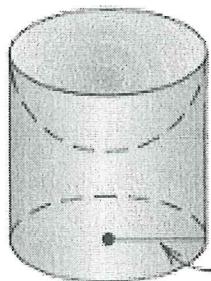
$SA = $ inside $\frac{1}{2}$ sphere
$\quad + $ cylinder $-$ circle

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

$SA = \frac{1}{2} 4\pi 4.8^2 + \pi 4.8^2 + 2\pi 4.8 \times 9$

$SA = 488.6$

$SA = \underline{488.6 in^2}$

$V = B \cdot h - \frac{1}{2}\frac{4}{3}\pi r^3$

$V = \pi 4.8^2 \cdot 9 - \frac{1}{2}\frac{4}{3}\pi \cdot 4.8^3$

$V = \underline{419.8 in^3}$

12-6 Study Guide and Intervention (continued)
Surface Areas of Spheres

Surface Areas of Spheres You can think of the surface area of a sphere as the total area of all of the nonoverlapping strips it would take to cover the sphere. If r is the radius of the sphere, then the area of a great circle of the sphere is πr^2. The total surface area of the sphere is four times the area of a great circle.
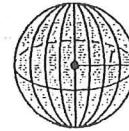
Surface Area of a Sphere	If a sphere has a surface area of T square units and a radius of r units, then $T = 4\pi r^2$.

Example Find the surface area of a sphere to the nearest tenth if the radius of the sphere is 6 centimeters.

$T = 4\pi r^2$ Surface area of a sphere
$= 4\pi \cdot 6^2$ $r = 6$
≈ 452.4 Simplify.
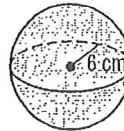
The surface area is 452.4 square centimeters.

Exercises

Find the surface area of each sphere with the given radius or diameter to the nearest tenth.

1. $r = 8$ cm $SA = 804.2 \text{ cm}^2$

2. $r = 2\sqrt{2}$ ft 100.5 ft^2

3. $r = \pi$ cm $SA = 124.0 \text{ cm}^2$

4. $d = 10$ in. $SA = 314.2 \text{ in}^2$

5. $d = 6\pi$ m $SA = 1116.2 \text{ m}^2$

6. $d = 16$ yd $SA = 804.2 \text{ yd}^2$

7. Find the surface area of a hemisphere with radius 12 centimeters.

$SA = 1357.2 \text{ cm}^2$

8. Find the surface area of a hemisphere with diameter π centimeters.

$SA = 23.3 \text{ cm}^2$

9. Find the radius of a sphere if the surface area of a hemisphere is 192π square centimeters.

$r = 8 \text{ cm}$

Practice

Surface Area ~~and Volume~~ of Spheres

Find the surface area ~~and volume~~ of each sphere described below. Round to the nearest tenth.

1. The diameter is 100 centimeters.

$r = 50$ $SA = 31415.9 \, cm^2$

$V = \frac{4}{3}\pi 50^2$

$V = 523598.8 \, cm^3$

2. A great circle has a circumference 83.92 meters.

$83.92 = 2\pi r$ $r = 13.4$ $SA = 4\pi(13.4)^2$

$SA = $ ~~volume~~ $V = \frac{4}{3}\pi(13.4)^3$

$V = 10078.7 \, m^3$

3. The radius is 12 inches long.

$SA = 1809.6 \, in^2$ $V = 7238.2 \, in^3$

4. A great circle has an area of 70.58 square feet.

$\frac{70.58}{\pi} = \frac{\pi r^2}{\pi}$ $r = 4.7$ $SA = 277.6 \, ft^2$

$\sqrt{22.4663} = r$ $V = 92.5 \, ft^3$

Find the surface area and volume of each solid. Round to the nearest tenth.

5.

$SA = 50.3 \, in^2$

$V = 33.5 \, in^3$

4 in.

6.

3 cm
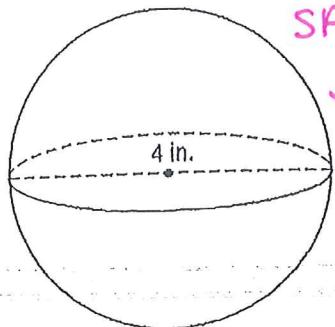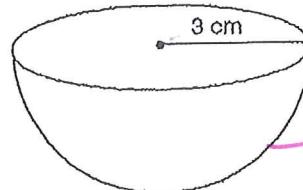
$SA = \pi 3^2$
$+ \frac{1}{2} 4\pi 3^2$

$SA = 84.8 \, cm^2$

$V = 56.5 \, cm^3$

7.

2 in.

5 in.
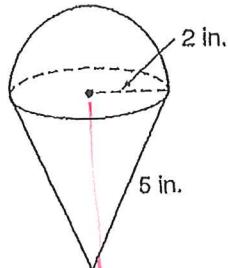
LA of cone

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

$SA = \frac{1}{2} 4\pi 2^2 + \pi 2 \times 5$

$SA = 56.5 \, in^2$

8.

10 in.
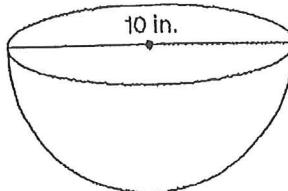
$SA = \pi 5^2$
$+ \frac{1}{2} 4\pi 5^2$

$SA = 235.6 \, in^2$

$V = 261.8 \, in^3$

$V = \frac{1}{2}\left(\frac{4}{3}\pi r^3\right) + \frac{1}{3}\pi r^2 \cdot h$