Geometry Practice: G.G.16
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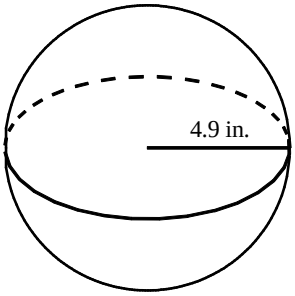
P.I. G.G.16: Apply the properties of a sphere, including: the intersection of a plane and a sphere is a circle, a great circle is the largest circle that can be drawn on a sphere, two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles, surface area is 4 x pi x r2, volume is 4/3 x pi x r3

1. Find the volume of the sphere. (Use 3.14 for π.)



[A] 277.063 $in.^3$ [B] 100.522 $in.^3$ [C] 492.557 $in.^3$ [D] 369.418 $in.^3$

2. Spaceship Earth at Epcot Center in Florida is a 180 ft geosphere. Estimate its volume by assuming it is a sphere with diameter 180 ft.

3. A semicircle has a diameter with endpoints (0, 0) and (0, 6). Compare the volume of the solid created by rotating the semicircle 360° about the line $y = 3$ to that of the solid created by rotating the semicircle 360° about the y – axis.

4. Give the dimensions of a cylinder and sphere such that the volume of the sphere is twice that of the cylinder.

5. The inside of an ice cream cone has radius 5 cm and height 6 cm. Assuming that a half scoop of ice cream is in the shape of a hemisphere, and that it fits perfectly on top of the cone (same radius), find the total volume of ice cream. Use 3.14 for π and round your answer to the nearest tenth.

[A] 418.7 cm^3 [B] 680.3 cm^3 [C] 442.0 cm^3 [D] 732.7 cm^3

6. A satellite is in the shape of a cylinder with two hemispheres fitted snugly on either end. If the diameter of the cylinder is 2 m and its length is 12 m, find the volume of the satellite. Express the answer in terms of π.

7. Compare the quantity in Column A with the quantity in Column B.

Column A	Column B
the volume of a cylinder with radius 2 and height 2	the volume of a sphere with radius 2

[A] The quantity in Column A is greater. [B] The quantity in Column B is greater.

[C] The two quantities are equal.

[D] The relationship cannot be determined on the basis of the information supplied.

8. Find the surface area of a sphere that has a diameter of 10 centimeters. Express your answer in terms of π.

9. A sphere has a radius of 9 centimeters. Find the volume and surface area of the sphere.

10. A sphere has a volume of 7776π cubic inches. Find the surface area of the sphere.

11. Find a shortcut for determining the surface area of a sphere if you know its volume.

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[1] C

[2] about 3 million ft^3

[3] The solid created by rotating about the line $y = 3$ is a hemisphere and has half the volume of the sphere created by rotating about the y-axis.

[4] Check students' work. Sample: cylinder - $r = 3$, $h = 2$ and sphere - $r = 3$

[5] A

[6] 13.3π m^3

[7] B

[8] 100π cm^2

[9] 972π cm^3, 324π cm^2

[10] 1296π square inches

[11] Because the ratio of the volume to the surface area of a sphere is $\frac{4}{3}\pi r^2 : 4\pi r^2$, or $\frac{r}{3}$, you can divide the volume by the quantity $\frac{r}{3}$ to find the surface area.