G.GMD.A.3: Volume 6

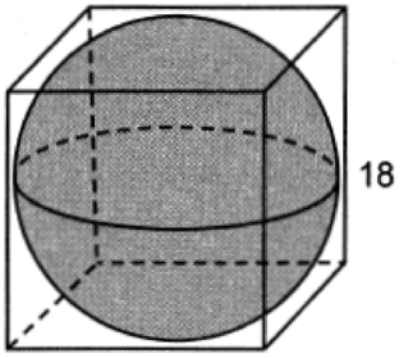
1 The volume, in cubic centimeters, of a sphere whose diameter is 6 centimeters is
1) 12π
2) 36π
3) 48π
4) 288π

2 The diameter of a sphere is 12 inches. What is the volume of the sphere to the *nearest cubic inch*?
1) 288
2) 452
3) 905
4) 7,238

3 The diameter of a sphere is 15 inches. What is the volume of the sphere, to the *nearest tenth of a cubic inch*?
1) 706.9
2) 1767.1
3) 2827.4
4) 14,137.2

4 What is the volume of a hemisphere that has a diameter of 12.6 cm, to the *nearest tenth of a cubic centimeter*?
1) 523.7
2) 1047.4
3) 4189.6
4) 8379.2

5 In the diagram below, a sphere is inscribed inside a cube. The cube has edge lengths of 18.



What is the volume of the sphere, in terms of π?
1) 108π
2) 432π
3) 972π
4) 7776π

6 A sphere is inscribed inside a cube with edges of 6 cm. In cubic centimeters, what is the volume of the sphere, in terms of π?
1) 12π
2) 36π
3) 48π
4) 288π

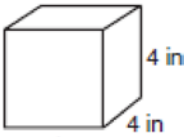
7 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?
1) 3591
2) 65
3) 55
4) 4

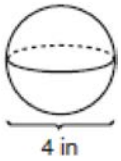
Name: _____

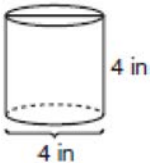
8 If the circumference of a standard lacrosse ball is 19.9 cm, what is the volume of this ball, to the *nearest cubic centimeter*?
1) 42
2) 133
3) 415
4) 1065

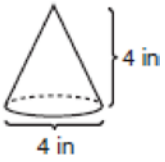
9 The volume of a sphere is approximately 44.6022 cubic centimeters. What is the radius of the sphere, to the *nearest tenth of a centimeter*?
1) 2.2
2) 3.3
3) 4.4
4) 4.7

10 If the surface area of a sphere is represented by 144π, what is the volume in terms of π?
1) 36π
2) 48π
3) 216π
4) 288π

11 Which diagram represents the figure with the greatest volume?
1) 

2) 

3) 

4) 

12 A sphere has a diameter of 18 meters. Find the volume of the sphere, in cubic meters, in terms of π.

13 Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the *nearest cubic inch*.

14 A large snowman is made of three spherical snowballs with radii of 1 foot, 2 feet, and 3 feet, respectively. Determine and state the amount of snow, in cubic feet, that is used to make the snowman. [Leave your answer in terms of π.]

15 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

16 Tamika has a hard rubber ball whose circumference measures 13 inches. She wants to box it for a gift but can only find cube shaped boxes of sides 3 inches, 4 inches, 5 inches, or 6 inches. What is the *smallest* box that the ball will fit into with the top on?

17 Izzy is making homemade clay pendants in the shape of a solid hemisphere, as modeled below. Each pendant has a radius of 2.8 cm.

How much clay, to the *nearest cubic centimeter*, does Izzy need to make 100 pendants?

G.GMD.A.3: Volume 6
Answer Section

1 ANS: 2

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 3^3 = 36\pi$

REF: 061112ge

2 ANS: 3

$V = \frac{2}{3}\pi\left(\frac{12}{2}\right)^3 \approx 905$

REF: 061502ge

3 ANS: 2

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \left(\frac{15}{2}\right)^3 \approx 1767.1$

REF: 061207ge

4 ANS: 1

$V = \frac{1}{2} \times \frac{4}{3}\pi r^3 = \frac{1}{2} \times \frac{4}{3}\pi \cdot \left(\frac{12.6}{2}\right)^3 \approx 523.7$

REF: 061910geo

5 ANS: 3

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \left(\frac{18}{2}\right)^3 = 972\pi$

REF: 062404geo

6 ANS: 2

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot \left(\frac{6}{2}\right)^3 \approx 36\pi$

REF: 081215ge

7 ANS: 3

$\frac{\frac{4}{3}\pi\left(\frac{9.5}{2}\right)^3}{\frac{4}{3}\pi\left(\frac{2.5}{2}\right)^3} \approx 55$

REF: 011614geo

8 ANS: 2

$19.9 = \pi d \quad \frac{4}{3}\pi\left(\frac{19.9}{2\pi}\right)^3 \approx 133$

$\frac{19.9}{\pi} = d$

REF: 012310geo

9 ANS: 1

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

$44.6022 = \frac{4}{3}\pi r^3$

$10.648 \approx r^3$

$2.2 \approx r$

REF: 061317ge

10 ANS: 4

$\text{SA} = 4\pi r^2 \quad V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \cdot 6^3 = 288\pi$

$144\pi = 4\pi r^2$

$36 = r^2$

$6 = r$

REF: 081020ge

11 ANS: 1

(1) cube: $V = s^3 = 4^3 = 64$

(2) sphere: $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi 2^3 \approx 33.5$

(3) cylinder: $V = \pi r^2 h = \pi 2^2 \bullet 4 \approx 50.3$

(4) cone: $V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi 2^2 \bullet 4 \approx 16.8$

REF: 080403a

12 ANS:

$V = \frac{4}{3}\pi \cdot 9^3 = 972\pi$

REF: 081131ge

13 ANS:

$29.5 = 2\pi r \quad V = \frac{4}{3}\pi \cdot \left(\frac{29.5}{2\pi}\right)^3 \approx 434$

$r = \frac{29.5}{2\pi}$

REF: 061831geo

14 ANS:

$\frac{4}{3}\pi \cdot (1)^3 + \frac{4}{3}\pi \cdot (2)^3 \; \frac{4}{3}\pi \cdot (3)^3 = \frac{4}{3}\pi + \frac{32}{3}\pi + \frac{108}{3}\pi = 48\pi$

REF: 062329geo

15 ANS:

$\sqrt[3]{\frac{3V_f}{4\pi}} - \sqrt[3]{\frac{3V_p}{4\pi}} = \sqrt[3]{\frac{3(294)}{4\pi}} - \sqrt[3]{\frac{3(180)}{4\pi}} \approx 0.6$

REF: 061728geo

16 ANS:

$C = \pi d$

5-inch. The great circle of a sphere has the same circumference as the sphere. $13 = \pi d$

$d \approx 4.1$

REF: 060028a

17 ANS:

$100 \times \frac{1}{2} \times \frac{4}{3} \times \pi \times 2.8^3 \approx 4598$

REF: 062229geo