Question ID f67e4efc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: f67e4efc

A right circular cylinder has a volume of 45π. If the height of the cylinder is 5, what is the radius of the cylinder?

A. 3

B. 4.5

C. 9

D. 40

ID: f67e4efc Answer

Correct Answer: A

Rationale

Choice A is correct. The volume of a right circular cylinder with a radius of r is the product of the area of the base, πr^2, and the height, h. The volume of the right circular cylinder described is 45π and its height is 5. If the radius is r, it follows that $45\pi = \pi(r)^2(5)$. Dividing both sides of this equation by 5π yields $9 = r^2$. Taking the square root of both sides yields $r = 3$ or $r = -3$. Since r represents the radius, the value must be positive. Therefore, the radius is 3.

Choice B is incorrect and may result from finding that the square of the radius is 9, but then from dividing 9 by 2, rather than taking the square root of 9. Choice C is incorrect. This represents the square of the radius. Choice D is incorrect and may result from solving the equation $45\pi = \pi(r)^2(5)$ for r^2, not r, by dividing by π on both sides and then by subtracting, not dividing, 5 from both sides.

Question Difficulty: Medium

Question ID 5afbdc8e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: 5afbdc8e

What is the length of one side of a square that has the same area as a circle with radius 2 ?

A. 2

B. $\sqrt{2\pi}$

C. $2\sqrt{\pi}$

D. 2π

ID: 5afbdc8e Answer

Correct Answer: C

Rationale

Choice C is correct. The area A of a circle with radius r is given by the formula $A = \pi r^2$. Thus, a circle with radius 2 has area $\pi(2^2)$, which can be rewritten as 4π. The area of a square with side length s is given by the formula $A = s^2$. Thus, if a square has the same area as a circle with radius 2, then $s^2 = 4\pi$. Since the side length of a square must be a positive number, taking the square root of both sides of $s^2 = 4\pi$ gives $s = \sqrt{4\pi}$. Using the properties of square roots, $\sqrt{4\pi}$ can be rewritten as $(\sqrt{4})(\sqrt{\pi})$, which is equivalent to $2\sqrt{\pi}$. Therefore, $s = 2\sqrt{\pi}$.

Choice A is incorrect. The side length of the square isn't equal to the radius of the circle. Choices B and D are incorrect and may result from incorrectly simplifying the expression $\sqrt{4\pi}$.

Question Difficulty: Medium

Question ID ec5d4823

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: ec5d4823

What is the volume, in cubic centimeters, of a right rectangular prism that has a length of 4 centimeters, a width of 9 centimeters, and a height of 10 centimeters?

ID: ec5d4823 Answer

Rationale

The correct answer is 360. The volume of a right rectangular prism is calculated by multiplying its dimensions: length, width, and height. Multiplying the values given for these dimensions yields a volume of $(4)(9)(10) = 360$ cubic centimeters.

Question Difficulty: Medium

Question ID 151eda3c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: 151eda3c

A manufacturing company produces two sizes of cylindrical containers that each have a height of 50 centimeters. The radius of container A is 16 centimeters, and the radius of container B is 25% longer than the radius of container A. What is the volume, in cubic centimeters, of container B?

A. $16{,}000\pi$

B. $20{,}000\pi$

C. $25{,}000\pi$

D. $31{,}250\pi$

ID: 151eda3c Answer

Correct Answer: B

Rationale

Choice B is correct. If the radius of container A is 16 centimeters and the radius of container B is 25% longer than the radius of container A, then the radius of container B is $16+(0.25)(16)=20$ centimeters. The volume of a cylinder is $\pi r^2 h$, where r is the radius of the cylinder and h is its height. Substituting $r=20$ and $h=50$ into $\pi r^2 h$ yields that the volume of cylinder B is $\pi(20)^2(50)=20{,}000\pi$ cubic centimeters.

Choice A is incorrect and may result from multiplying the radius of cylinder B by the radius of cylinder A rather than squaring the radius of cylinder B. Choice C is incorrect and may result from multiplying the radius of cylinder B by 25 rather than squaring it. Choice D is incorrect and may result from taking the radius of cylinder B to be 25 centimeters rather than 20 centimeters.

Question Difficulty: Medium

Question ID 38517165

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: 38517165

A circle has a circumference of 31π centimeters. What is the diameter, in centimeters, of the circle?

ID: 38517165 Answer

Correct Answer: 31

Rationale

The correct answer is 31. The circumference of a circle is equal to $2\pi r$ centimeters, where r represents the radius, in centimeters, of the circle, and the diameter of the circle is equal to $2r$ centimeters. It's given that a circle has a circumference of 31π centimeters. Therefore, $31\pi = 2\pi r$. Dividing both sides of this equation by π yields $31 = 2r$. Since the diameter of the circle is equal to $2r$ centimeters, it follows that the diameter, in centimeters, of the circle is 31.

Question Difficulty: Medium

Question ID 08b7a3f5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: 08b7a3f5

A triangular prism has a height of 8 centimeters (cm) and a volume of $216\ \text{cm}^3$. What is the area, in cm^2, of the base of the prism? (The volume of a triangular prism is equal to Bh, where B is the area of the base and h is the height of the prism.)

ID: 08b7a3f5 Answer

Correct Answer: 27

Rationale

The correct answer is 27. It's given that a triangular prism has a volume of 216 cubic centimeters cm^3 and the volume of a triangular prism is equal to Bh, where B is the area of the base and h is the height of the prism. Therefore, $216 = Bh$. It's also given that the triangular prism has a height of 8 cm. Therefore, $h = 8$. Substituting 8 for h in the equation $216 = Bh$ yields $216 = B8$. Dividing both sides of this equation by 8 yields $27 = B$. Therefore, the area, in cm^2, of the base of the prism is 27.

Question Difficulty: Medium

Question ID a2e76b60

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: a2e76b60

A cylindrical can containing pieces of fruit is filled to the top with syrup before being sealed. The base of the can has an area of $75\ cm^2$, and the height of the can is 10 cm. If $110\ cm^3$ of syrup is needed to fill the can to the top, which of the following is closest to the total volume of the pieces of fruit in the can?

A. $7.5\ cm^3$

B. $185\ cm^3$

C. $640\ cm^3$

D. $750\ cm^3$

ID: a2e76b60 Answer

Correct Answer: C

Rationale

Choice C is correct. The total volume of the cylindrical can is found by multiplying the area of the base of the can, $75\ cm^2$, by the height of the can, 10 cm, which yields $750\ cm^3$. If the syrup needed to fill the can has a volume of $110\ cm^3$, then the remaining volume for the pieces of fruit is $750-110=640\ cm^3$.

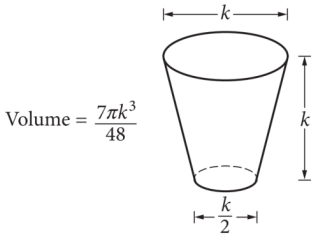
Choice A is incorrect because if the fruit had a volume of $7.5\ cm^3$, there would be $750-7.5=742.5\ cm^3$ of syrup needed to fill the can to the top. Choice B is incorrect because if the fruit had a volume of $185\ cm^3$, there would be $750-185=565\ cm^3$ of syrup needed to fill the can to the top. Choice D is incorrect because it is the total volume of the can, not just of the pieces of fruit.

Question Difficulty: Medium

Question ID 37dde49f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: 37dde49f



The glass pictured above can hold a maximum volume of 473 cubic centimeters, which is approximately 16 fluid ounces. What is the value of *k*, in centimeters?

A. 2.52

B. 7.67

C. 7.79

D. 10.11

ID: 37dde49f Answer

Correct Answer: D

Rationale

Choice D is correct. Using the volume formula $V = \frac{7\pi k^3}{48}$ and the given information that the volume of the glass is 473 cubic centimeters, the value of k can be found as follows:

$$473 = \frac{7\pi k^3}{48}$$

$$k^3 = \frac{473(48)}{7\pi}$$

$$k = \sqrt[3]{\frac{473(48)}{7\pi}} \approx 10.10690$$

Therefore, the value of k is approximately 10.11 centimeters.

Choices A, B, and C are incorrect. Substituting the values of k from these choices in the formula results in volumes of approximately 7 cubic centimeters, 207 cubic centimeters, and 217 cubic centimeters, respectively, all of which contradict

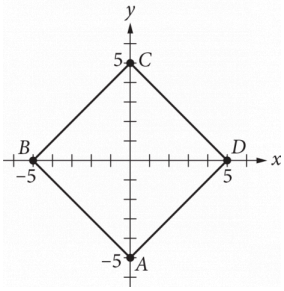
the given information that the volume of the glass is 473 cubic centimeters.

Question Difficulty: Medium

Question ID cf53cb56

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Area and volume	■■□

ID: cf53cb56



In the *xy*-plane shown, square *ABCD* has its diagonals on the *x*- and *y*-axes. What is the area, in square units, of the square?

A. 20

B. 25

C. 50

D. 100

ID: cf53cb56 Answer

Correct Answer: C

Rationale

Choice C is correct. The two diagonals of square ABCD divide the square into 4 congruent right triangles, where each triangle has a vertex at the origin of the graph shown. The formula for the area of a triangle is $A = \frac{1}{2}bh$, where b is the base length of the triangle and h is the height of the triangle. Each of the 4 congruent right triangles has a height of 5 units and a base length of 5 units. Therefore, the area of each triangle is $A = \frac{1}{2}(5)(5)$, or 12.5 square units. Since the 4 right triangles are congruent, the area of each is $\frac{1}{4}$ of the area of square ABCD. It follows that the area of the square ABCD is equal to 4×12.5, or 50 square units.

Choices A and D are incorrect and may result from using 5 or 25, respectively, as the area of one of the 4 congruent right triangles formed by diagonals of square ABCD. However, the area of these triangles is 12.5. Choice B is incorrect and may result from using 5 as the length of one side of square ABCD. However, the length of a side of square ABCD is $5\sqrt{2}$.

Question Difficulty: Medium