

Question ID 1aa2b038

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: 1aa2b038

A right circular cylinder has a volume of **432** cubic centimeters. The area of the base of the cylinder is **24** square centimeters. What is the height, in centimeters, of the cylinder?

- A. 18
- B. 24
- C. 216
- D. 10,368

ID: 1aa2b038 Answer

Correct Answer: A

Rationale

Choice A is correct. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where πr^2 is the area of the base of the cylinder and h is the height. It's given that a right circular cylinder has a volume of 432 cubic centimeters and the area of the base is 24 square centimeters. Substituting 432 for V and 24 for πr^2 in the formula $V = \pi r^2 h$ yields $432 = 24h$. Dividing both sides of this equation by 24 yields $18 = h$. Therefore, the height of the cylinder, in centimeters, is 18.

Choice B is incorrect. This is the area of the base, in square centimeters, not the height, in centimeters, of the cylinder.

Choice C is incorrect. This is the height, in centimeters, of a cylinder if its volume is 432 cubic centimeters and the area of its base is 2, not 24, cubic centimeters.

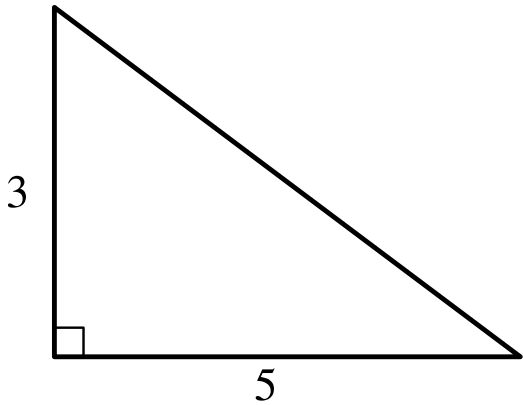
Choice D is incorrect. This is the height, in centimeters, of a cylinder if its volume is 432 cubic centimeters and the area of its base is $\frac{1}{24}$, not 24, cubic centimeters.

Question Difficulty: Medium

Question ID b458eea8

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: b458eea8



Note: Figure not drawn to scale.



The figure shows the lengths, in inches, of two sides of a right triangle. What is the area of the triangle, in square inches?

ID: b458eea8 Answer

Correct Answer: 7.5, 15/2

Rationale

The correct answer is $\frac{15}{2}$. The area, A , of a triangle is given by the formula $A = \frac{1}{2}bh$, where b is the length of the base of the triangle and h is the height of the triangle. In the right triangle shown, the length of the base of the triangle is 5 inches, and the height is 3 inches. It follows that $b = 5$ and $h = 3$. Substituting 5 for b and 3 for h in the formula $A = \frac{1}{2}bh$ yields $A = \frac{1}{2}53$, which is equivalent to $A = \frac{1}{2}15$, or $A = \frac{15}{2}$. Therefore, the area of the triangle, in square inches, is $\frac{15}{2}$. Note that 15/2 and 7.5 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID a298a9b6

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: a298a9b6

Square X has a side length of **12** centimeters. The perimeter of square Y is **2** times the perimeter of square X. What is the length, in centimeters, of one side of square Y?

- A. 6
- B. 10
- C. 14
- D. **24**

ID: a298a9b6 Answer

Correct Answer: D

Rationale

Choice D is correct. The perimeter, P , of a square can be found using the formula $P = 4s$, where s is the length of each side of the square. It's given that square X has a side length of 12 centimeters. Substituting 12 for s in the formula for the perimeter of a square yields $P = 4(12)$, or $P = 48$. Therefore, the perimeter of square X is 48 centimeters. It's also given that the perimeter of square Y is 2 times the perimeter of square X. Therefore, the perimeter of square Y is 248, or 96, centimeters. Substituting 96 for P in the formula $P = 4s$ gives $96 = 4s$. Dividing both sides of this equation by 4 gives $24 = s$. Therefore, the length of one side of square Y is 24 centimeters.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 15709a24

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: 15709a24

A triangle has a base length of **40** centimeters and a height of **90** centimeters. What is the area, in square centimeters, of the triangle?

ID: 15709a24 Answer

Correct Answer: 1800

Rationale

The correct answer is 1,800. The area, A , of a triangle can be found using the formula $A = \frac{1}{2}bh$, where b is the base length of the triangle and h is the height of the triangle. It's given that the triangle has a base length of 40 centimeters and a height of 90 centimeters. Substituting 40 for b and 90 for h in the formula $A = \frac{1}{2}bh$ yields $A = \frac{1}{2}4090$, or $A = 1,800$. Therefore, the area, in square centimeters, of the triangle is 1,800.

Question Difficulty: Medium

Question ID fd1a9b2e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: fd1a9b2e

A right circular cylinder has a base diameter of **22** centimeters and a height of **6** centimeters. What is the volume, in cubic centimeters, of the cylinder?

- A. **132** π
- B. **264** π
- C. **726** π
- D. **2,904** π

ID: fd1a9b2e Answer

Correct Answer: C

Rationale

Choice C is correct. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder. It's given that a right circular cylinder has a height of 6 centimeters. Therefore, $h = 6$. It's also given that the cylinder has a base diameter of 22 centimeters. The radius of a circle is half the diameter of the circle. Since the base of a right circular cylinder is a circle, it follows that the radius of the base of the right circular cylinder is $\frac{22}{2}$, or 11, centimeters. Therefore, $r = 11$. Substituting 11 for r and 6 for h in the formula $V = \pi r^2 h$ yields $V = \pi 11^2 6$, which is equivalent to $V = \pi 121 6$, or $V = 726\pi$. Therefore, the volume, in cubic centimeters, of the cylinder is 726π .

Choice A is incorrect. This is the volume of a right circular cylinder that has a base diameter of $2\sqrt{22}$, not 22, centimeters and a height of 6 centimeters.

Choice B is incorrect. This is the volume of a right circular cylinder that has a base diameter of $4\sqrt{11}$, not 22, centimeters and a height of 6 centimeters.

Choice D is incorrect. This is the volume of a right circular cylinder that has a base diameter of 44, not 22, centimeters and a height of 6 centimeters.

Question Difficulty: Medium

Question ID f3cfbc3e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: f3cfbc3e

A cylinder has a diameter of **8** inches and a height of **12** inches. What is the volume, in cubic inches, of the cylinder?

- A. **16π**
- B. **96π**
- C. **192π**
- D. **768π**

ID: f3cfbc3e Answer

Correct Answer: C

Rationale

Choice C is correct. The base of a cylinder is a circle with a diameter equal to the diameter of the cylinder. The volume, V , of a cylinder can be found by multiplying the area of the circular base, A , by the height of the cylinder, h , or $V = Ah$. The area of a circle can be found using the formula $A = \pi r^2$, where r is the radius of the circle. It's given that the diameter of the cylinder is 8 inches. Thus, the radius of this circle is 4 inches. Therefore, the area of the circular base of the cylinder is $A = \pi 4^2$, or 16π square inches. It's given that the height h of the cylinder is 12 inches. Substituting 16π for A and 12 for h in the formula $V = Ah$ gives $V = 16\pi 12$, or 192π cubic inches.

Choice A is incorrect. This is the area of the circular base of the cylinder.

Choice B is incorrect and may result from using 8, instead of 16, as the value of r^2 in the formula for the area of a circle.

Choice D is incorrect and may result from using 8, instead of 4, for the radius of the circular base.

Question Difficulty: Medium

Question ID 2f004f77

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: 2f004f77

A right circular cylinder has a volume of **377** cubic centimeters. The area of the base of the cylinder is **13** square centimeters. What is the height, in centimeters, of the cylinder?

ID: 2f004f77 Answer

Correct Answer: 29

Rationale

The correct answer is 29. The volume, V , of a right circular cylinder is given by the formula $V = \pi r^2 h$, where r is the radius of the base of the cylinder and h is the height of the cylinder. Since the base of the cylinder is a circle with radius r , the area of the base of the cylinder is πr^2 . It's given that a right circular cylinder has a volume of 377 cubic centimeters; therefore, $V = 377$. It's also given that the area of the base of the cylinder is 13 square centimeters; therefore, $\pi r^2 = 13$. Substituting 377 for V and 13 for πr^2 in the formula $V = \pi r^2 h$ yields $377 = 13h$. Dividing both sides of this equation by 13 yields $29 = h$. Therefore, the height of the cylinder, in centimeters, is 29.

Question Difficulty: Medium

Question ID 7f94a1a7

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: 7f94a1a7

A cube has an edge length of **41** inches. What is the volume, in cubic inches, of the cube?

- A. **164**
- B. **1,681**
- C. **10,086**
- D. **68,921**

ID: 7f94a1a7 Answer

Correct Answer: D

Rationale

Choice D is correct. The volume, V , of a cube can be found using the formula $V = s^3$, where s is the edge length of the cube. It's given that a cube has an edge length of 41 inches. Substituting 41 inches for s in this equation yields $V = 41^3$ cubic inches, or $V = 68,921$ cubic inches. Therefore, the volume of the cube is 68,921 cubic inches.

Choice A is incorrect. This is the perimeter, in inches, of the cube.

Choice B is incorrect. This is the area, in square inches, of a face of the cube.

Choice C is incorrect. This is the surface area, in square inches, of the cube.

Question Difficulty: Medium

Question ID 1a5eb1b1

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: 1a5eb1b1

The side length of a square is **55 centimeters (cm)**. What is the area, **in cm²**, of the square?

- A. **110**
- B. **220**
- C. **3,025**
- D. **12,100**

ID: 1a5eb1b1 Answer

Correct Answer: C

Rationale

Choice C is correct. The area A , in square centimeters (cm^2), of a square with side length s , in cm, is given by the formula $A = s^2$. It's given that the square has a side length of 55 cm. Substituting 55 for s in the formula $A = s^2$ yields $A = 55^2$, or $A = 3,025$. Therefore, the area, in cm^2 , of the square is 3,025.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the perimeter, in cm, of the square, not its area, in cm^2 .

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID c921127e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: c921127e

A circle has a radius of **43** meters. What is the area, in square meters, of the circle?

- A. $\frac{43\pi}{2}$
- B. **43 π**
- C. **86 π**
- D. **1,849 π**

ID: c921127e Answer

Correct Answer: D

Rationale

Choice D is correct. The area, A , of a circle is given by the formula $A = \pi r^2$, where r is the radius of the circle. It's given that the circle has a radius of 43 meters. Substituting 43 for r in the formula $A = \pi r^2$ yields $A = \pi 43^2$, or $A = 1,849\pi$. Therefore, the area, in square meters, of the circle is $1,849\pi$.

Choice A is incorrect. This is the area, in square meters, of a circle with a radius of $\sqrt{\frac{43}{2}}$ meters.

Choice B is incorrect. This is the area, in square meters, of a circle with a radius of $\sqrt{43}$ meters.

Choice C is incorrect. This is the circumference, in meters, of the circle.

Question Difficulty: Medium

Question ID fb51f672

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: fb51f672

What is the area, in square centimeters, of a rectangle with a length of **34 centimeters (cm)** and a width of **29 cm**?

ID: fb51f672 Answer

Correct Answer: 986

Rationale

The correct answer is 986. The area, A , of a rectangle is given by $A = lw$, where l is the length of the rectangle and w is its width. It's given that the length of the rectangle is 34 centimeters (cm) and the width is 29 cm. Substituting 34 for l and 29 for w in the equation $A = lw$ yields $A = 3429$, or $A = 986$. Therefore, the area, in square centimeters, of this rectangle is 986.

Question Difficulty: Medium

Question ID 9a7ee377

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Geometry and Trigonometry	Area and volume	<div><div></div><div></div><div></div></div>

ID: 9a7ee377

A rectangle has an area of **63** square meters and a length of **9** meters. What is the width, in meters, of the rectangle?

- A. **7**
- B. **54**
- C. **81**
- D. **567**

ID: 9a7ee377 Answer

Correct Answer: A

Rationale

Choice A is correct. The area A , in square meters, of a rectangle is the product of its length l , in meters, and its width w , in meters; thus, $A = lw$. It's given that a rectangle has an area of 63 square meters and a length of 9 meters. Substituting 63 for A and 9 for l in the equation $A = lw$ yields $63 = 9w$. Dividing both sides of this equation by 9 yields $7 = w$. Therefore, the width, in meters, of the rectangle is 7.

Choice B is incorrect. This is the difference between the area, in square meters, and the length, in meters, of the rectangle, not the width, in meters, of the rectangle.

Choice C is incorrect. This is the square of the length, in meters, not the width, in meters, of the rectangle.

Choice D is incorrect. This is the product of the area, in square meters, and the length, in meters, of the rectangle, not the width, in meters, of the rectangle.

Question Difficulty: Medium