Question ID bb560789

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

ID: bb560789

Triangle R has an area of 80 square centimeters (cm^2). Square S has side lengths of 4 cm. What is the total area of triangle R and square S, in cm^2?

A. 42

B. 44

C. 84

D. 96

ID: bb560789 Answer

Correct Answer:
D

Rationale

Choice D is correct. It's given that triangle R has an area of 80 cm^2. The area of a square is l^2, where l is the side length of the square. It's given that square S has side lengths of 4 cm. It follows that the area, in cm^2, of square S is 4^2, or 16. Therefore, the total area, in cm^2, of triangle R and square S is $80 + 16$, or 96.

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

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

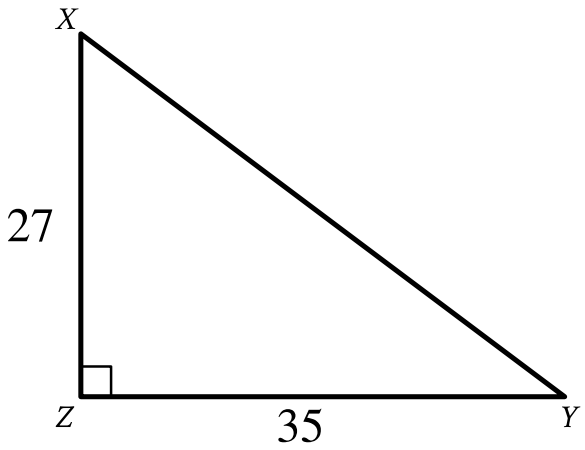
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:
Easy

Question ID 659cb706

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■■□

ID: 659cb706



Note: Figure not drawn to scale.

Triangle XYZ shown is a right triangle. Which of the following has the same value as $\sin X$?

A. $\tan X$

B. $\tan Y$

C. $\cos X$

D. $\cos Y$

ID: 659cb706 Answer

Correct Answer:
D

Rationale

Choice D is correct. The sine of an angle is equal to the cosine of its complementary angle. In the triangle shown, angle Z is a right angle; thus, angles X and Y are complementary angles. Therefore, $\cos Y$ has the same value as $\sin X$.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Question Difficulty:
Medium

Question ID deff8a2f

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

ID: deff8a2f

The circumference of the base of a right circular cylinder is 20π meters, and the height of the cylinder is 6 meters. What is the volume, in cubic meters, of the cylinder?

A. 60π

B. 120π

C. 600π

D. $2{,}400\pi$

ID: deff8a2f 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 meters. Therefore, $h = 6$. It's also given that the right circular cylinder has a base with a circumference of 20π meters. The circumference, C, of a circle is given by $C = 2\pi r$, where r is the radius of the circle. Substituting 20π for C in the formula $C = 2\pi r$ yields $20\pi = 2\pi r$. Dividing each side of this equation by 2π yields $10 = r$. Substituting 10 for r and 6 for h in the formula $V = \pi r^2 h$ yields $V = \pi(10)^2 6$, or $V = 600\pi$. Therefore, the volume, in cubic meters, of the cylinder is 600π.

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

Choice B is incorrect. This is the lateral surface area, not the volume, of the cylinder.

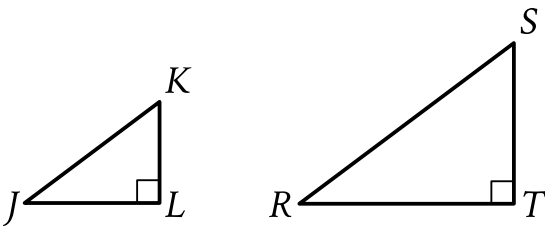
Choice D is incorrect. This is the result of using the diameter, not the radius, for the value of r in the formula $V = \pi r^2 h$.

Question Difficulty:
Hard

Question ID babd7461

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

ID: babd7461



Note: Figure not drawn to scale.

In the figure shown, triangle JKL is similar to triangle RST, where J corresponds to R and K corresponds to S. The length of $\overline{JK}$ is 15, and the perimeter of triangle JKL is 36. The length of $\overline{RS}$ is 135. What is the perimeter of triangle RST?

A. 324

B. 540

C. $2{,}916$

D. $8{,}100$

ID: babd7461 Answer

Correct Answer:
A

Rationale

Choice A is correct. It's given that triangle JKL is similar to triangle RST, where J corresponds to R and K corresponds to S. It follows that $\bar{JK}$ corresponds to $\bar{RS}$. If two triangles are similar, then the scale factor between their perimeters is equal to the scale factor between the lengths of their corresponding sides. It's given that the length of $\bar{JK}$ is 15 and the length of $\bar{RS}$ is 135. Therefore, the scale factor from the length of $\bar{JK}$ to the length of $\bar{RS}$ is $\frac{135}{15}$, or 9. It's given that the perimeter of triangle JKL is 36. Let p represent the perimeter of triangle RST. It follows that $\frac{p}{36} = 9$. Multiplying each side of this equation by 36 yields $p = 324$. Therefore, the perimeter of triangle RST is 324.

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

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

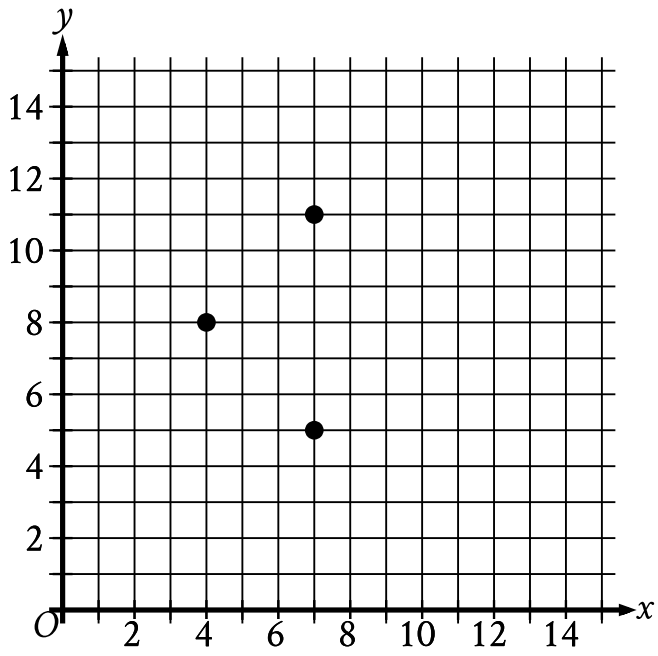
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:
Easy

Question ID 096c7ef5

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

ID: 096c7ef5



The three points shown define a circle. The circumference of this circle is $k\pi$, where k is a constant. What is the value of k?

A. 3

B. 6

C. 7

D. 9

ID: 096c7ef5 Answer

Correct Answer:
B

Rationale

Choice B is correct. It's given that the three points shown define a circle, so the center of that circle is an equal distance from each of the three points. The point $(7,8)$ is halfway between the points $(7,5)$ and $(7,11)$ and is a distance of 3 units from each of those two points. The point $(7,8)$ is also a distance of 3 units from $(4,8)$. Because the point $(7,8)$ is the same distance from all three given points, it must be the center of the circle. The radius of a circle is the distance from the center to any point on the circle. Since that distance is 3, it follows that the radius of the circle is 3. The circumference of a circle with radius r is equal to $2\pi r$. It follows that the circumference of the circle is $2(\pi)(3)$, or 6π. It's given that the circumference of the circle is $k\pi$. Therefore, the value of k is 6.

Choice A is incorrect. This is the radius of the circle, not the value of k in the expression $k\pi$.

Choice C is incorrect. This is the x-coordinate of the center of the circle, not the value of k in the expression $k\pi$.

Choice D is incorrect. This is the value of k for which $k\pi$ represents the area of the circle, in square units, not the circumference of the circle, in units.

Question Difficulty:
Medium

Question ID 2b41a4c4

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

ID: 2b41a4c4

A right rectangular prism has a length of 11 meters, a width of 8 meters, and a height of 10 meters. What is the volume, in cubic meters, of the prism?

ID: 2b41a4c4 Answer

Correct Answer:
880

Rationale

The correct answer is 880. The volume, V, of a right rectangular prism is given by the formula $V = lwh$, where l is the length, w is the width, and h is the height of the prism. It's given that a right rectangular prism has a length of 11 meters, a width of 8 meters, and a height of 10 meters. Substituting 11 for l, 8 for w, and 10 for h in the formula $V = lwh$ yields $V = (11)(8)(10)$, or $V = 880$. Therefore, the volume, in cubic meters, of the prism is 880.

Question Difficulty:
Easy

Question ID 58c26db8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■■■

ID: 58c26db8

The perimeter of an isosceles right triangle is $18 + 18\sqrt{2}$ inches. What is the length, in inches, of the hypotenuse of this triangle?

A. 9

B. $9\sqrt{2}$

C. 18

D. $18\sqrt{2}$

ID: 58c26db8 Answer

Correct Answer:
C

Rationale

Choice C is correct. The perimeter of a triangle is the sum of the lengths of its sides. Since the given triangle is an isosceles right triangle, the length of each leg is the same and the length of the hypotenuse is equal to $\sqrt{2}$ times the length of a leg. Let x represent the length, in inches, of a leg of this isosceles right triangle. Therefore, the perimeter, in inches, of the triangle is $x + x + x\sqrt{2}$, or $2x + x\sqrt{2}$, which is equivalent to $x\left(2 + \sqrt{2}\right)$. It's given that the perimeter of this triangle is $18 + 18\sqrt{2}$ inches. Thus, $x2 + \sqrt{2} = 18 + 18\sqrt{2}$. Dividing both sides of this equation by $2 + \sqrt{2}$ yields $x = \frac{18 + 18\sqrt{2}}{2 + \sqrt{2}}$. Multiplying the right-hand side of this equation by $\frac{2 - \sqrt{2}}{2 - \sqrt{2}}$ yields $x = \frac{36 + 36\sqrt{2} - 18\sqrt{2} - 36}{2}$, or $x = 9\sqrt{2}$. It follows that the length, in inches, of a leg of this isosceles right triangle is $9\sqrt{2}$. Therefore, the length, in inches, of the hypotenuse of this isosceles right triangle is $9\sqrt{2}\sqrt{2}$, or 18.

Choice A is incorrect. If this were the length of the hypotenuse, the perimeter would be $9 + 9\sqrt{2}$ inches.

Choice B is incorrect. This is the length, in inches, of a leg of this triangle, not the hypotenuse.

Choice D is incorrect. If this were the length of the hypotenuse, the perimeter would be $36 + 18\sqrt{2}$ inches.

Question Difficulty:
Hard

Question ID 03c6994f

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

ID: 03c6994f

Square A has side lengths that are 246 times the side lengths of square B. The area of square A is k times the area of square B. What is the value of k?

A. $60{,}516$

B. 492

C. 246

D. 123

ID: 03c6994f Answer

Correct Answer:
A

Rationale

Choice A is correct. The area of a square is s^2, where s is the side length of the square. Therefore, the area of square B is b^2, where b is the side length of square B. It's given that square A has side lengths that are 246 times the side lengths of square B. Therefore, the side length of square A can be represented by the expression $246b$. It follows that the area of square A is $(246b)^2$, or $60{,}516b^2$. It's given that the area of square A is k times the area of square B, so $60{,}516b^2 = kb^2$. Therefore, the value of k is $60{,}516$.

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

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

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

Question Difficulty:
Medium

Question ID 35d37640

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Circles	■■■

ID: 35d37640

Point F lies on a unit circle in the *xy*-plane and has coordinates $(1, 0)$. Point G is the center of the circle and has coordinates $(0, 0)$. Point H also lies on the circle and has coordinates $(-1, y)$, where y is a constant. Which of the following could be the positive measure of angle FGH, in radians?

A. $\frac{27\pi}{2}$

B. $\frac{29\pi}{2}$

C. 24π

D. 25π

ID: 35d37640 Answer

Correct Answer:
D

Rationale

Choice D is correct. It's given that the circle is a unit circle, which means the circle has a radius of 1. It's also given that point G is the center of the circle and has coordinates $(0, 0)$ and that point H lies on the circle and has coordinates $(-1, y)$. Since the radius of the circle is 1, the value of y must be 0, as all other points with an *x*-coordinate of -1 are a distance greater than 1 away from point G. Since F and H are points on the unit circle centered at G, let side FG be the starting side of the angle and side GH be the terminal side of the angle. Since side FG is on the positive *x*-axis and side GH is on the negative *x*-axis, side FG is half of a rotation around the unit circle, or π radians, away from side GH. Therefore, the positive measure of angle FGH, in radians, is equal to π plus an integer multiple of 2π. In other words, the positive measure of angle FGH, in radians, is an odd integer multiple of π. Of the given choices, only 25π is an odd integer multiple of π.

Choice A is incorrect. This could be the positive measure of an angle where the starting side is FG and the terminal side contains the point $(0, -1)$, not $(-1, 0)$.

Choice B is incorrect. This could be the positive measure of an angle where the starting side is FG and the terminal side contains the point $(0, 1)$, not $(-1, 0)$.

Choice C is incorrect. This could be the positive measure of an angle where the starting side is FG and the terminal side contains the point $(1, 0)$, not $(-1, 0)$.

Question Difficulty:
Hard

Question ID 5a7e3b46

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■■□

ID: 5a7e3b46

In $\triangle ABC$, $\angle B$ is a right angle and the length of $\overline{BC}$ is 136 millimeters. If $\cos A = \frac{3}{5}$, what is the length, in millimeters, of $\overline{AB}$?

A. 34

B. 102

C. 136

D. 170

ID: 5a7e3b46 Answer

Correct Answer:
B

Rationale

Choice B is correct. It's given that in $\triangle ABC$, $\angle B$ is a right angle. Therefore, $\triangle ABC$ is a right triangle, and $\bar{AC}$ is the hypotenuse of the triangle. It's also given that $\cos A = \frac{3}{5}$. Since the cosine of an acute angle in a right triangle is defined as the ratio of the length of the side adjacent to the angle to the length of the hypotenuse, the ratio of the length of $\bar{AB}$ to the length of $\bar{AC}$ is 3 to 5. It follows that the length of $\bar{AB}$ can be represented as $3a$ and the length of $\bar{AC}$ can be represented as $5a$, where a is a constant. The Pythagorean theorem states that the sum of the squares of the length of the legs of a right triangle is equal to the square of the length of its hypotenuse, so it follows that $AB^2 + BC^2 = AC^2$. Substituting $3a$ for AB and $5a$ for AC in this equation yields $3a^2 + BC^2 = 5a^2$, or $9a^2 + BC^2 = 25a^2$. Subtracting $9a^2$ from both sides of this equation yields $BC^2 = 16a^2$, or $BC = 4a$. It follows that the ratio of the length of $\bar{AB}$ to the length of $\bar{BC}$ is 3 to 4. Let x represent the length, in millimeters, of $\bar{AB}$. It's given that the length of $\bar{BC}$ is 136 millimeters. Since the ratio of the length of $\bar{AB}$ to the length of $\bar{BC}$ is 3 to 4, $\frac{x}{136} = \frac{3}{4}$. Multiplying both sides of this equation by 136 yields $x = \frac{3(136)}{4}$, or $x = 102$. Therefore, the length of $\bar{AB}$ is 102 millimeters.

Choice A is incorrect. This is the scale factor by which the 3 to 4 to 5 ratio is multiplied that results in the side lengths of $\triangle ABC$.

Choice C is incorrect. This is the length of $\bar{BC}$, not the length of $\bar{AB}$.

Choice D is incorrect. This is the length of $\bar{AC}$, not the length of $\bar{AB}$.

Question Difficulty:
Medium

Question ID a2659088

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

ID: a2659088

A right circular cylinder has a height of 8 meters (m) and a base with a radius of 12 m. What is the volume, $\mathrm{in\ m^3}$, of the cylinder?

A. 8π

B. 20π

C. 768π

D. $1{,}152\pi$

ID: a2659088 Answer

Correct Answer:
D

Rationale

Choice D is correct. The volume, V, of a right circular cylinder is given by $V = \pi r^2 h$, where r is the radius of the circular base and h is the height of the cylinder. It's given that the cylinder has a height of 8 meters and a base with a radius of 12 meters. Substituting 12 for r and 8 for h in $V = \pi r^2 h$ yields $V = \pi(12)^2 8$, or $V = 1{,}152\pi$. Therefore, the volume, in $\mathrm{m^3}$, of the cylinder is $1{,}152\pi$.

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. This is the volume, in $\mathrm{m^3}$, of a cylinder with a radius of 8 meters and a height of 12 meters.

Question Difficulty:
Medium

Question ID 502d9690

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

ID: 502d9690

Rectangle $ABCD$ is similar to rectangle $EFGH$. The area of rectangle $ABCD$ is 648 square inches, and the area of rectangle $EFGH$ is 72 square inches. The length of the longest side of rectangle $ABCD$ is 36 inches. What is the length, in inches, of the longest side of rectangle $EFGH$?

A. 4

B. 9

C. 12

D. 36

ID: 502d9690 Answer

Correct Answer:
C

Rationale

Choice C is correct. It's given that rectangle $ABCD$ is similar to rectangle $EFGH$. Therefore, if the length of each side of rectangle $ABCD$ is k times the length of the corresponding side of rectangle $EFGH$, then the area of rectangle $ABCD$ is k^2 times the area of rectangle $EFGH$. It's given that the area of rectangle $ABCD$ is 648 square inches and the area of rectangle $EFGH$ is 72 square inches. It follows that $k^2 = \frac{648}{72}$, or $k^2 = 9$. Taking the square root of each side of this equation yields $k = \sqrt{9}$, or $k = 3$. It follows that the length of each side of rectangle $ABCD$ is 3 times the length of the corresponding side of rectangle $EFGH$. It's given that the length of the longest side of rectangle $ABCD$ is 36 inches. Therefore, 36 inches is 3 times the length of the longest side of rectangle $EFGH$, and the longest side of rectangle $EFGH$ is equal to $\frac{36}{3}$, or 12, inches.

Choice A is incorrect. This is the length, in inches, of the longest side of a rectangle with side lengths that are $\frac{1}{9}$ the corresponding side lengths of rectangle $ABCD$, rather than a rectangle with an area that is $\frac{1}{9}$ the area of rectangle $ABCD$.

Choice B is incorrect. This is the factor by which the area of rectangle $ABCD$ is larger than the area of rectangle $EFGH$, not the length, in inches, of the longest side of rectangle $EFGH$.

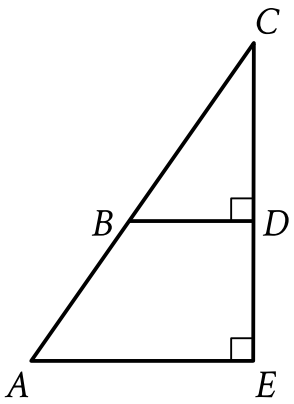
Choice D is incorrect. This is the length, in inches, of the longest side of rectangle $ABCD$, not rectangle $EFGH$.

Question Difficulty:
Hard

Question ID 2f7c92ad

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■■□

ID: 2f7c92ad



Note: Figure not drawn to scale.

In the figure shown, triangle CAE is similar to triangle CBD. The measure of angle CBD is 57°, and $AE = 26(BD)$. What is the measure of angle CAE?

A. $(26 \cdot 57)^\circ$

B. $(26 + 57)^\circ$

C. 57°

D. 26°

ID: 2f7c92ad Answer

Correct Answer:
C

Rationale

Choice C is correct. It's given that triangle CAE is similar to triangle CBD. Corresponding angles in similar triangles have equal measure. Angle BCD and angle ACE represent the same angle. It follows that angle BCD and angle ACE have equal measure and are corresponding angles. It's given in the figure that angle BDC and angle AEC are right angles and therefore have equal measure. It follows that angle BDC and angle AEC are corresponding angles. Therefore, angle CBD and angle CAE are corresponding angles and have equal measure. It's given that the measure of angle CBD is $57°$, so the measure of angle CAE is $57°$.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

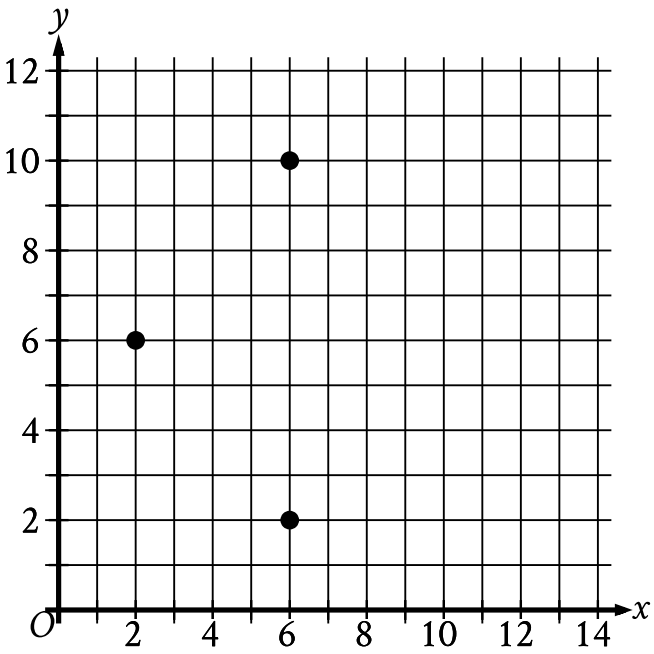
Choice D is incorrect and may result from conceptual errors.

Question Difficulty:
Medium

Question ID b2528e6b

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

ID: b2528e6b



The three points shown define a circle. The circumference of this circle is $k\pi$, where k is a constant. What is the value of k?

ID: b2528e6b Answer

Correct Answer:
8

Rationale

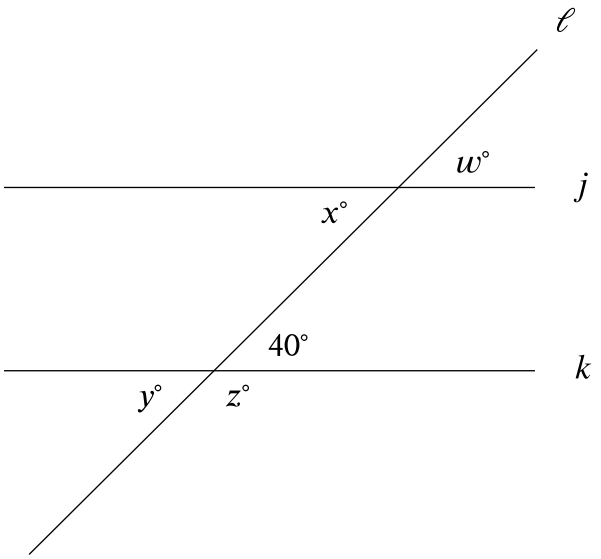
The correct answer is 8. It's given that the three points shown define a circle, so the center of that circle is an equal distance from each of the three points. The point $(6,6)$ is halfway between the points $(6,2)$ and $(6,10)$, and is a distance of 4 units from each of those two points. The point $(6,6)$ is also a distance of 4 units from $(2,6)$. Because the point $(6,6)$ is the same distance from all three points shown, it must be the center of the circle. Since that distance is 4, it follows that the radius of the circle is 4. The circumference of a circle with radius r is equal to $2\pi r$. It follows that the circumference of the given circle is $2\pi(4)$, or 8π. It's given that the circumference of the circle is $k\pi$. Therefore, the value of k is 8.

Question Difficulty:
Hard

Question ID 9d078710

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■□□

ID: 9d078710



Note: Figure not drawn to scale.

In the figure shown, line ℓ intersects lines j and k. Which additional piece of information is sufficient to prove that lines j and k are parallel?

A. $w = 40$

B. $x = 140$

C. $y = 40$

D. $z = 140$

ID: 9d078710 Answer

Correct Answer:
A

Rationale

Choice A is correct. In the figure shown, lines j and k are parallel if and only if a pair of corresponding angles are congruent. It's given that one angle has a measure of $40°$ and that the corresponding angle has a measure of $w°$. Therefore, $w = 40$ is sufficient to prove that lines j and k are parallel.

Choice B is incorrect. The angle measuring $x°$ and the angle measuring $40°$ are alternate interior angles. Thus, if lines j and k are parallel, x is equal to 40, not 140.

Choice C is incorrect. The angle measuring $y°$ and the angle measuring $40°$ are vertical angles. Thus, $y = 40$, whether lines j and k are parallel or not.

Choice D is incorrect. The angle measuring $z°$ is supplementary to the angle measuring $40°$. Thus, $z = 180 - 40$, or $z = 140$, whether lines j and k are parallel or not.

Question Difficulty:
Easy

Question ID 0e40dfb0

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

ID: 0e40dfb0

A rectangle has a length of 3 units and a width of 39 units. Which expression gives the area, in square units, of this rectangle?

A. $2(3 + 39)$

B. $2(3 \cdot 39)$

C. $3 + 39$

D. $3 \cdot 39$

ID: 0e40dfb0 Answer

Correct Answer:
D

Rationale

Choice D is correct. The area of a rectangle is given by lw, where l is the length of the rectangle and w is the width of the rectangle. It's given that a rectangle has a length of 3 units and a width of 39 units. It follows that the area of the rectangle is $3 \cdot 39$ square units. Therefore, the expression that gives the area, in square units, of this rectangle, is $3 \cdot 39$.

Choice A is incorrect. This expression gives the perimeter, in units, of this rectangle.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Question Difficulty:
Easy

Question ID fc5ef8d3

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

ID: fc5ef8d3

The table gives the perimeters of similar triangles TUV and XYZ, where $\overline{TU}$ corresponds to $\overline{XY}$. The length of $\overline{TU}$ is 6.

	Perimeter
Triangle TUV	50
Triangle XYZ	150

What is the length of $\overline{XY}$?

A. 2

B. 6

C. 18

D. 56

ID: fc5ef8d3 Answer

Correct Answer:
C

Rationale

Choice C is correct. It's given that triangle TUV is similar to triangle XYZ, and $\bar{TU}$ corresponds to $\bar{XY}$. If two triangles are similar, then the ratio of their perimeters is equal to the ratio of their corresponding sides. It's given that the perimeter of triangle TUV is 50, the perimeter of triangle XYZ is 150, and the length of $\bar{TU}$ is 6. Let n represent the length of $\bar{XY}$. It follows that $\frac{50}{150} = \frac{6}{n}$, or $\frac{1}{3} = \frac{6}{n}$. Multiplying each side of this equation by n yields $\frac{n}{3} = 6$. Multiplying each side of this equation by 3 yields $n = 18$. Therefore, the length of $\bar{XY}$ is 18.

Choice A is incorrect. This is the solution to $\frac{3}{1} = \frac{6}{n}$, not $\frac{1}{3} = \frac{6}{n}$.

Choice B is incorrect. This is the length of $\bar{TU}$, not $\bar{XY}$.

Choice D is incorrect. This is the sum of the length of $\bar{TU}$ and the perimeter of triangle TUV, not the length of $\bar{XY}$.

Question Difficulty:
Easy

Question ID 2085e10e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■■□

ID: 2085e10e

In triangle DEF, the measure of angle D is 47° and the measure of angle E is 97°. In triangle RST, the measure of angle R is 47° and the measure of angle S is 97°. Which of the following additional pieces of information is needed to determine whether triangle DEF is similar to triangle RST?

A. The measure of angle F

B. The measure of angle T

C. The measure of angle F and the measure of angle T

D. No additional information is needed.

ID: 2085e10e Answer

Correct Answer:
D

Rationale

Choice D is correct. When two angles of one triangle are congruent to two angles of another triangle, the triangles are similar. It's given that in triangle DEF, the measure of angle D is $47°$ and the measure of angle E is $97°$. It's also given that in triangle RST, the measure of angle R is $47°$ and the measure of angle S is $97°$. It follows that angle D is congruent to angle R and that angle E is congruent to angle S. Therefore, triangle DEF is similar to triangle RST and no additional information is needed.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Question Difficulty:
Medium

Question ID aef4fd8a

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

ID: aef4fd8a

The length of each side of a square is 94 centimeters (cm). Which expression gives the area, in cm^2, of the square?

A. $2 \cdot 94$

B. $2 \cdot 94 \cdot 94$

C. $4 \cdot 94$

D. $94 \cdot 94$

ID: aef4fd8a Answer

Correct Answer:
D

Rationale

Choice D is correct. The area of a square is given by s^2, where s is the length of each side of the square. It's given that the length of each side of a square is 94 cm. It follows that the area, in cm^2, of the square is 94^2, or $94 \cdot 94$. Therefore, the expression that gives the area, in cm^2, of the square is $94 \cdot 94$.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect. This expression gives the perimeter, in cm, of the square.

Question Difficulty:
Medium

Question ID 9c0a0eca

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

ID: 9c0a0eca

A triangle has a base length of 10 centimeters and a corresponding height of 70 centimeters. What is the area, in square centimeters, of the triangle?

A. 700

B. 350

C. 175

D. 80

ID: 9c0a0eca Answer

Correct Answer:
B

Rationale

Choice B is correct. The area, A, of a triangle is given by $A = \frac{1}{2}bh$, where b is the length of a base of the triangle and h is the corresponding height of the triangle. It's given that a triangle has a base length of 10 centimeters and a corresponding height of 70 centimeters. Substituting 10 for b and 70 for h in the formula $A = \frac{1}{2}bh$ yields $A = \frac{1}{2}1070$, or $A = 350$. Therefore, the area, in square centimeters, of the triangle is 350.

Choice A is incorrect. This is the product of the given base and height of the triangle, not its area.

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

Choice D is incorrect. This is the sum of the given base and height of the triangle, not its area.

Question Difficulty:
Medium

Question ID 50774285

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

ID: 50774285

Each base of a right rectangular prism has a length of 19 inches and a width of 8 inches. The prism has a volume of $2{,}736$ cubic inches. What is the height, in inches, of the prism?

A. 18

B. 27

C. 144

D. 152

ID: 50774285 Answer

Correct Answer:
A

Rationale

Choice A is correct. The volume, V, of a rectangular prism is given by the formula $V = lwh$, where l is the length of the base, w is the width of the base, and h is the height of the prism. It's given that each base of a right rectangular prism has a length of 19 inches and a width of 8 inches, and that the prism has a volume of $2{,}736$ cubic inches. Substituting 19 for l, 8 for w, and $2{,}736$ for V in the formula $V = lwh$ gives $2{,}736 = (19)(8)(h)$, or $2{,}736 = 152h$. Dividing each side of this equation by 152 yields $18 = h$. Therefore, the height, in inches, of the prism is 18.

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

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

Choice D is incorrect. This is the area, in square inches, of the base of the prism, not the height, in inches, of the prism.

Question Difficulty:
Easy

Question ID 7a8ad237

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■■□

ID: 7a8ad237

Triangles ABC and DEF are congruent, where A corresponds to D, and B and E are right angles. The measure of angle A is 69°. What is the measure, in degrees, of angle F?

ID: 7a8ad237 Answer

Correct Answer:
21

Rationale

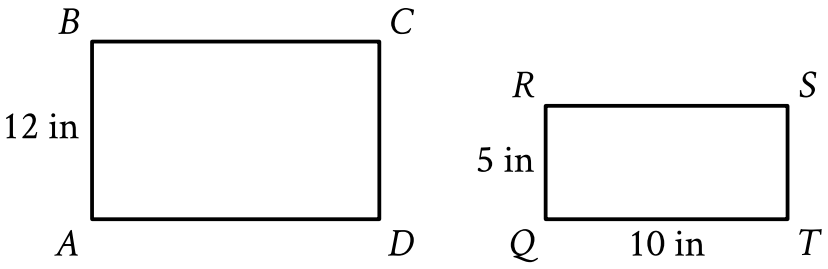
The correct answer is 21. It's given that triangles ABC and DEF are congruent with angle A corresponding to angle D. Corresponding angles of congruent triangles are congruent and, therefore, have equal measure. It's given that the measure of angle A is $69°$. It follows that the measure of angle D is also $69°$. It's given that angle E is a right angle. Therefore, the measure of angle E is $90°$. Let x represent the measure, in degrees, of angle F. Since the measures of the angles in a triangle sum to $180°$, it follows that $69 + 90 + x = 180$, or $159 + x = 180$. Subtracting 159 from both sides of this equation yields $x = 21$. Therefore, the measure, in degrees, of angle F is 21.

Question Difficulty:
Medium

Question ID e9c5bfb2

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

ID: e9c5bfb2



Note: Figure not drawn to scale.

Rectangles $ABCD$ and $QRST$ shown are similar, where A, B, C, and D correspond to Q, R, S, and T, respectively. What is the length, in inches (in), of $\overline{AD}$?

A. 60

B. 24

C. 17

D. 10

ID: e9c5bfb2 Answer

Correct Answer:
B

Rationale

Choice B is correct. It's given that rectangles $ABCD$ and $QRST$ are similar, where A, B, C, and D correspond to Q, R, S, and T, respectively. It follows that $\bar{AB}$ corresponds to $\bar{QR}$ and $\bar{AD}$ corresponds to $\bar{QT}$. If two rectangles are similar, then the lengths of their corresponding sides are proportional. It's given in the figure that the length of $\bar{AB}$ is 12 inches, the length of $\bar{QR}$ is 5 inches, and the length of $\bar{QT}$ is 10 inches. If x is the length, in inches, of $\bar{AD}$, then $\frac{12}{5}$ is equivalent to $\frac{x}{10}$. Therefore, the value of x can be found using the equation $\frac{12}{5} = \frac{x}{10}$. Multiplying each side of this equation by 10 yields $\frac{120}{5} = x$, or $24 = x$. Therefore, the length, in inches, of $\bar{AD}$ is 24.

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

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

Choice D is incorrect. This is the length, in inches, of $\bar{QT}$, not $\bar{AD}$.

Question Difficulty:
Medium

Question ID 2d521ca9

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

ID: 2d521ca9

The measure of angle Z is 60°. What is the measure, in radians, of angle Z?

A. $\frac{1}{6}\pi$

B. $\frac{1}{3}\pi$

C. $\frac{2}{3}\pi$

D. 1π

ID: 2d521ca9 Answer

Correct Answer:
B

Rationale

Choice B is correct. The measure of an angle, in radians, can be found by multiplying its measure, in degrees, by $\frac{\pi}{180}$. It's given that the measure of angle Z is $60°$. It follows that the measure, in radians, of angle Z is $60\frac{\pi}{180}$, or $\frac{1}{3}\pi$.

Choice A is incorrect. This is the measure, in radians, of an angle whose measure is $30°$, not $60°$.

Choice C is incorrect. This is the measure, in radians, of an angle whose measure is $120°$, not $60°$.

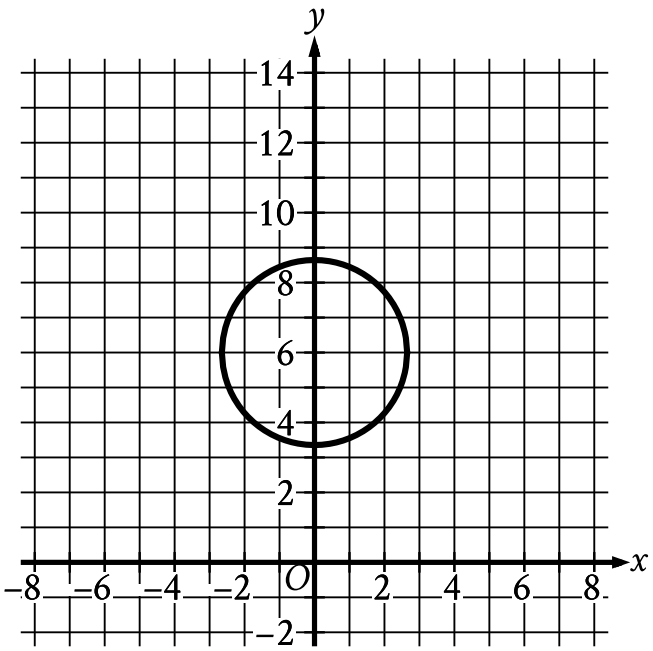
Choice D is incorrect. This is the measure, in radians, of an angle whose measure is $180°$, not $60°$.

Question Difficulty:
Medium

Question ID 1b2b20b9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Circles	■■■

ID: 1b2b20b9



Circle A shown is defined by the equation $x^2 + (y - 6)^2 = 7$. Circle B (not shown) has the same radius but is translated 96 units to the right. If the equation of circle B is $(x - h)^2 + (y - k)^2 = a$, where h, k, and a are constants, what is the value of $4a$?

ID: 1b2b20b9 Answer

Correct Answer:
28

Rationale

The correct answer is 28. The equation of a circle in the *xy*-plane can be written as $(x - t)^2 + (y - s)^2 = r^2$, where the center of the circle is (t, s) and the radius of the circle is r. It's given that circle A is defined by the equation $x^2 + (y - 6)^2 = 7$, which can be written as $(x - 0)^2 + (y - 6)^2 = \sqrt{7}^2$. It follows that $r = \sqrt{7}$ and the radius of circle A is $\sqrt{7}$. It's also given that circle B has the same radius as circle A. If the equation of circle B is $(x - h)^2 + (y - k)^2 = a$, then $a = r^2$. Substituting $\sqrt{7}$ for r in this equation yields $a = \sqrt{7}^2$, or $a = 7$. It follows that the value of $4a$ is $4(7)$, or 28.

Question Difficulty:
Hard

Question ID ee540927

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

ID: ee540927

$$x^2 + 58x + y^2 = 0$$

In the *xy*-plane, the graph of the given equation is a circle. What are the coordinates (x, y) of the center of the circle?

A. $(0, 29)$

B. $(0, -29)$

C. $(29, 0)$

D. $(-29, 0)$

ID: ee540927 Answer

Correct Answer:
D

Rationale

Choice D is correct. It's given that in the *xy*-plane, the graph of $x^2 + 58x + y^2 = 0$ is a circle. The equation of a circle in the *xy*-plane can be written as $(x - h)^2 + (y - k)^2 = r^2$, where the coordinates of the center of the circle are (h, k) and the radius of the circle is r. By completing the square, the equation $x^2 + 58x + y^2 = 0$ can be rewritten as $x^2 + 58x + \frac{58}{2}^2 + y^2 = 0 + \frac{58}{2}^2$, or $x^2 + 58x + 841 + y^2 = 841$. This equation is equivalent to $(x + 29)^2 + y^2 = 841$, or $x - (-29)^2 + (y - 0)^2 = 841$. Therefore, h is -29 and k is 0, and the coordinates (x, y) of the center of the circle are $(-29, 0)$.

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 2855cb58

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Circles	■■■

ID: 2855cb58

A circle in the *xy*-plane has its center at $(16, 17)$ and has a radius of $7k$. Which equation represents this circle?

A. $(x - 16)^2 + (y - 17)^2 = 49k$

B. $(x - 16)^2 + (y - 17)^2 = 49k^2$

C. $(x - 16)^2 + (y - 17)^2 = 7k$

D. $(x - 16)^2 + (y - 17)^2 = 7k^2$

ID: 2855cb58 Answer

Correct Answer:
B

Rationale

Choice B is correct. The equation of a circle in the *xy*-plane can be written as $(x - h)^2 + (y - k)^2 = r^2$, where the center of the circle is (h, k) and the radius of the circle is r. It's given that this circle has a center at $(16, 17)$ and a radius of $7k$. Substituting 16 for h, 17 for k, and $7k$ for r in $(x - h)^2 + (y - k)^2 = r^2$ yields $(x - 16)^2 + (y - 17)^2 = (7k)^2$, or $(x - 16)^2 + (y - 17)^2 = 49k^2$. Therefore, the equation that represents this circle is $(x - 16)^2 + (y - 17)^2 = 49k^2$.

Choice A is incorrect. This equation represents a circle with radius $7\sqrt{k}$, not $7k$.

Choice C is incorrect. This equation represents a circle with radius $\sqrt{7k}$, not $7k$.

Choice D is incorrect. This equation represents a circle with radius $\sqrt{7}\,k$, not $7k$.

Question Difficulty:
Hard

Question ID fc8aa563

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

ID: fc8aa563

What is the center of the circle in the *xy*-plane defined by the equation $(x-1)^2+(y+7)^2=1$?

A. $(-1,-7)$

B. $(-1,7)$

C. $(1,-7)$

D. $(1,7)$

ID: fc8aa563 Answer

Correct Answer:
C

Rationale

Choice C is correct. The equation of a circle in the *xy*-plane can be written as $(x-h)^2+(y-k)^2=r^2$, where the center of the circle is (h,k) and the radius of the circle is r. It's given that the circle in the *xy*-plane is defined by the equation $(x-1)^2+(y+7)^2=1$. This equation can be written as $(x-1)^2+(y-(-7))^2=1$. For this equation, it follows that $h=1$ and $k=-7$. Therefore, the center of the circle in the *xy*-plane defined by the given equation is $(1,-7)$.

Choice A is incorrect. This is the center of the circle in the *xy*-plane that is defined by the equation $(x+1)^2+(y+7)^2=1$, not $(x-1)^2+(y+7)^2=1$.

Choice B is incorrect. This is the center of the circle in the *xy*-plane that is defined by the equation $(x+1)^2+(y-7)^2=1$, not $(x-1)^2+(y+7)^2=1$.

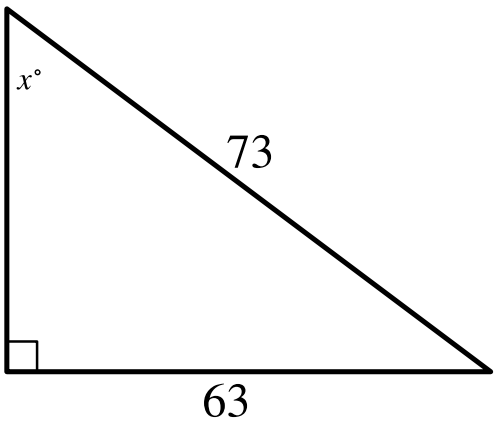
Choice D is incorrect. This is the center of the circle in the *xy*-plane that is defined by the equation $(x-1)^2+(y-7)^2=1$, not $(x-1)^2+(y+7)^2=1$.

Question Difficulty:
Medium

Question ID a6097ec2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■□□

ID: a6097ec2



Note: Figure not drawn to scale.

In the right triangle shown, what is the value of $\sin x°$?

A. $\frac{1}{73}$

B. $\frac{10}{73}$

C. $\frac{63}{73}$

D. $\frac{136}{73}$

ID: a6097ec2 Answer

Correct Answer:
C

Rationale

Choice C is correct. The sine of an acute angle in a right triangle is the ratio of the length of the side opposite that angle to the length of the hypotenuse. In the right triangle shown, it's given that the length of the side opposite the angle with measure $x°$ is 63 units and the length of the hypotenuse is 73 units. Therefore, the value of $\sin x°$ is $\frac{63}{73}$.

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

Question Difficulty:
Easy

Question ID 322a6dfe

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■■■

ID: 322a6dfe

Quadrilaterals $PQRS$ and $WXYZ$ are similar, where P, Q, and R correspond to W, X, and Y, respectively. The measure of $\angle S$ is 135°, $PS = 45$, and $WZ = 9$. What is the measure of $\angle Z$?

A. 5°

B. 27°

C. 45°

D. 135°

ID: 322a6dfe Answer

Correct Answer:
D

Rationale

Choice D is correct. Corresponding angles in similar figures have equal measure. It's given that quadrilaterals $PQRS$ and $WXYZ$ are similar and that P, Q, and R correspond to W, X, and Y. It follows that $\angle S$ corresponds to $\angle Z$. It's also given that the measure of $\angle S$ is $135°$. Therefore, the measure of $\angle Z$ is $135°$.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

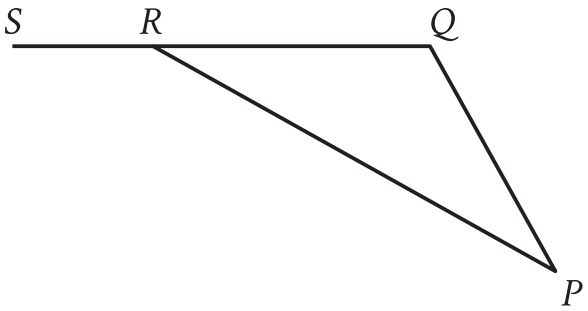
Choice C is incorrect. This is the supplement of the measure of $\angle Z$, not the measure of $\angle Z$.

Question Difficulty:
Hard

Question ID 014edcb7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■■□

ID: 014edcb7



Note: Figure not drawn to scale.

In triangle PQR, $\overline{QR}$ is extended to point S. The measure of $\angle PQR$ is 132°, and the measure of $\angle PRS$ is 163°. What is the measure of $\angle QPR$?

A. 48°

B. 31°

C. 24°

D. 17°

ID: 014edcb7 Answer

Correct Answer:
B

Rationale

Choice B is correct. In the figure shown, since $\bar{QS}$ is a line segment, the sum of the measures of $\angle PRS$ and $\angle PRQ$ is $180°$. It's given that the measure of $\angle PRS$ is $163°$. Thus, the measure of $\angle PRQ$ is $(180 - 163)°$, or $17°$. The sum of the measures of the interior angles of a triangle is $180°$. It's given that the measure of $\angle PQR$ is $132°$. Therefore, the measure of $\angle QPR$ is $(180 - 17 - 132)°$, or $31°$.

Choice A is incorrect. This is the measure of the supplement of $\angle PQR$, not the measure of $\angle QPR$.

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

Choice D is incorrect. This is the measure of $\angle PRQ$, not the measure of $\angle QPR$.

Question Difficulty:
Medium

Question ID 6708546e

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

ID: 6708546e

Parallelogram $ABCD$ is similar to parallelogram $PQRS$. The length of each side of parallelogram $PQRS$ is 2 times the length of its corresponding side of parallelogram $ABCD$. The area of parallelogram $ABCD$ is 5 square centimeters. What is the area, in square centimeters, of parallelogram $PQRS$?

A. 7

B. 10

C. 20

D. 25

ID: 6708546e Answer

Correct Answer:
C

Rationale

Choice C is correct. It's given that parallelogram $ABCD$ is similar to parallelogram $PQRS$. When two parallelograms are similar, if the scale factor between their corresponding side lengths is k, the scale factor between their areas is k^2. It's given that the length of each side of parallelogram $PQRS$ is 2 times the length of its corresponding side of parallelogram $ABCD$, so the scale factor between their corresponding side lengths is 2. It follows that the scale factor between their areas is 2^2, or 4. It's given that the area, in square centimeters, of parallelogram $ABCD$ is 5. It follows that the area, in square centimeters, of parallelogram $PQRS$ is $5(4)$, or 20.

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

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

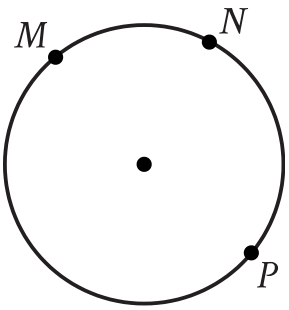
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:
Hard

Question ID 800e71b8

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

ID: 800e71b8



Points M, N, and P lie on the circle shown. On this circle, minor arc MN has a length of 39 centimeters and major arc MPN has a length of 195 centimeters. What is the circumference, in centimeters, of the circle shown?

A. 39

B. 156

C. 195

D. 234

ID: 800e71b8 Answer

Correct Answer:
D

Rationale

Choice D is correct. Since the endpoints of minor arc MN and major arc MPN are the same, and the arcs together form a full circle, the sum of the lengths of these two arcs is equal to the circumference of the circle. It's given that the length of minor arc MN is 39 centimeters and the length of major arc MPN is 195 centimeters. Therefore, the circumference of the circle, in centimeters, is $39 + 195$, or 234.

Choice A is incorrect. This is the length, in centimeters, of minor arc MN, not the circumference, in centimeters, of the circle.

Choice B is incorrect. This is the difference of the lengths of major arc MPN and minor arc MN, in centimeters.

Choice C is incorrect. This is the length, in centimeters, of major arc MPN, not the circumference, in centimeters, of the circle.

Question Difficulty:
Medium

Question ID f2495de4

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

ID: f2495de4

What is the value of $\cos \frac{565\pi}{6}$?

A. $\frac{1}{2}$

B. 1

C. $\frac{\sqrt{3}}{2}$

D. $\sqrt{3}$

ID: f2495de4 Answer

Correct Answer:
C

Rationale

Choice C is correct. The cosine of an angle is equal to the cosine of $n\,(\,2\pi\,)$ radians more than the angle, where n is an integer constant. Since $\frac{565\pi}{6}$ is equivalent to $47\left(\,2\pi\,\right)+\frac{\pi}{6}$, $\cos\left(\frac{565\pi}{6}\right)$ can be rewritten as $\cos\left(47\left(\,2\pi\,\right)+\frac{\pi}{6}\right)$, which is equal to $\cos\left(\frac{\pi}{6}\right)$. Therefore, the value of $\cos\left(\frac{565\pi}{6}\right)$ is equal to the value of $\cos\left(\frac{\pi}{6}\right)$, which is $\frac{\sqrt{3}}{2}$.

Alternate approach: A trigonometric ratio can be found using the unit circle, that is, a circle with radius 1 unit. The cosine of a number t is the *x*-coordinate of the point resulting from traveling a distance of t counterclockwise from the point $(\,1,0\,)$ around a unit circle centered at the origin in the *xy*-plane. A unit circle has a circumference of 2π. It follows that since $\frac{565\pi}{6}$ is equal to $47\left(\,2\pi\,\right)+\frac{\pi}{6}$, traveling a distance of $\frac{565\pi}{6}$ counterclockwise around a unit circle means traveling around the circle completely 47 times and then another $\frac{\pi}{6}$ beyond that. That is, traveling $\frac{565\pi}{6}$ results in the same point as traveling $\frac{\pi}{6}$. Traveling $\frac{\pi}{6}$ counterclockwise from the point $(\,1,0\,)$ around a unit circle centered at the origin in the *xy*-plane results in the point $\left(\frac{\sqrt{3}}{2},\frac{1}{2}\right)$. Thus, the value of $\cos\frac{565\pi}{6}$ is the *x*-coordinate of the point $\left(\frac{\sqrt{3}}{2},\frac{1}{2}\right)$, which is $\frac{\sqrt{3}}{2}$.

Choice A is incorrect. This is the value of $\sin\frac{565\pi}{6}$, not $\cos\frac{565\pi}{6}$.

Choice B is incorrect. This is the value of the cosine of a multiple of 2π, not $\frac{565\pi}{6}$.

Choice D is incorrect. This is the value of $\frac{1}{\tan\frac{565\pi}{6}}$, not $\cos\frac{565\pi}{6}$.

Question Difficulty:
Easy

Question ID bbaac300

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■□□

ID: bbaac300

Triangle ABC is similar to triangle DEF, where angle A corresponds to angle D, and angles C and F are right angles. If $\cos B = \frac{1}{22}$, what is the value of $\cos E$?

A. $\frac{1}{22}$

B. $\frac{1}{23}$

C. $\frac{21}{22}$

D. $\frac{22}{23}$

ID: bbaac300 Answer

Correct Answer:
A

Rationale

Choice A is correct. The cosine of an acute angle in a right triangle is defined as the ratio of the length of the leg adjacent to that angle to the length of the hypotenuse. It's given that angle C is a right angle in triangle ABC and that angle F is a right angle in triangle DEF. Therefore, $\cos B$ is equal to the ratio of the length of side BC to the length of side AB, and $\cos E$ is equal to the ratio of the length of side EF to the length of side DE. It's also given that triangle ABC is similar to triangle DEF, where angle A corresponds to angle D. Since similar triangles have proportional side lengths, $\frac{BC}{AB} = \frac{EF}{DE}$. Therefore, the value of $\cos B$ is equal to the value of $\cos E$. Since $\cos B = \frac{1}{22}$, the value of $\cos E$ is $\frac{1}{22}$.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty:
Easy

Question ID fa2771d5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Circles	■■■

ID: fa2771d5

Circle A has equation $(x-7)^2+(y+3)^2=1$. In the xy-plane, circle B is obtained by translating circle A to the right 4 units. Which equation represents circle B?

A. msup $+(y+7)^2=1$

B. msup $+(y+3)^2=1$

C. msup $+(y+3)^2=1$

D. msup $+(y-1)^2=1$

ID: fa2771d5 Answer

Correct Answer:
C

Rationale

Choice C is correct. The equation of a circle in the *xy*-plane can be written as $(x-h)^2+(y-k)^2=r^2$, where the center of the circle is (h,k) and the radius of the circle is r units. It's given that circle A has the equation $(x-7)^2+(y+3)^2=1$, which can be written as $(x-7)^2+(y-(-3))^2=1^2$. It follows that $h=7$, $k=-3$, and $r=1$. Therefore, the center of circle A is $(7,-3)$ and its radius is 1 unit. If circle A is translated 4 units to the right, the *x*-coordinate of the center will increase by 4, while the *y*-coordinate and the radius of the circle will remain unchanged. Translating the center of circle A to the right 4 units yields $(7+4,-3)$, or $(11,-3)$. Therefore, the center of circle B is $(11,-3)$. Substituting 11 for h, -3 for k, and 1 for r into the equation $(x-h)^2+(y-k)^2=r^2$ yields $(x-11)^2+(y-(-3))^2=1$, or $(x-11)^2+(y+3)^2=1$. Therefore, the equation $(x-11)^2+(y+3)^2=1$ represents circle B.

Choice A is incorrect. This equation represents a circle obtained by shifting circle A down, rather than right, 4 units.

Choice B is incorrect. This equation represents a circle obtained by shifting circle A left, rather than right, 4 units.

Choice D is incorrect. This equation represents a circle obtained by shifting circle A up, rather than right, 4 units.

Question Difficulty:
Hard

Question ID b96ff36e

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

ID: b96ff36e

In the *xy*-plane, the graph of the equation $(x-3)^2+(y-5)^2=9$ is a circle. The point $(6, c)$, where c is a constant, lies on this circle. What is the value of c?

ID: b96ff36e Answer

Correct Answer:
5

Rationale

The correct answer is 5. It's given that in the *xy*-plane, the graph of the equation $(x-3)^2+(y-5)^2=9$ is a circle. It's also given that the point $(6, c)$, where c is a constant, lies on this circle. It follows that the ordered pair $(6, c)$ makes the equation $(x-3)^2+(y-5)^2=9$ true. Substituting 6 for x and c for y in this equation yields $(6-3)^2+(c-5)^2=9$, or $9+(c-5)^2=9$. Subtracting 9 from each side of this equation yields $(c-5)^2=0$. It follows that the value of c is 5.

Question Difficulty:
Medium

Question ID a490003a

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

ID: a490003a

The width of a rectangle is 7 centimeters. The length of the rectangle is 40 centimeters longer than the width. What is the area, in square centimeters, of this rectangle?

A. 7

B. 14

C. 54

D. 329

ID: a490003a Answer

Correct Answer:
D

Rationale

Choice D is correct. It's given that the width of this rectangle is 7 centimeters and that the length of this rectangle is 40 centimeters longer than the width. Therefore, the length of this rectangle is $7 + 40$, or 47, centimeters. The area of a rectangle can be found by multiplying its length and its width. Therefore the area, in square centimeters, of this rectangle is 747, or 329.

Choice A is incorrect. This is the width, in centimeters, not the area, in square centimeters, of this rectangle.

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

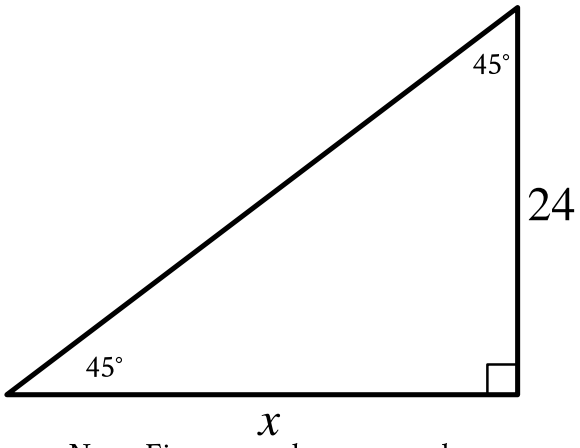
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:
Easy

Question ID 145337bc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■□□

ID: 145337bc



Note: Figure not drawn to scale.

In the triangle shown, what is the value of x?

A. 24

B. 45

C. 48

D. 69

ID: 145337bc Answer

Correct Answer:
A

Rationale

Choice A is correct. Since the two acute angles have the same measure and the third angle is a right angle, the triangle shown is an isosceles right triangle. In an isosceles right triangle, the two legs have the same length. The figure shows that the length of one leg of the triangle is 24 and the length of the other leg of the triangle is x. It follows that the value of x is 24.

Choice B is incorrect. This is the measure, in degrees, of one of the angles shown.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty:
Easy

Question ID 468613c0

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

ID: 468613c0

A triangle has a base length of 56 centimeters and a height of 112 centimeters. What is the area, in square centimeters, of the triangle?

A. 168

B. $1{,}568$

C. $3{,}136$

D. $6{,}272$

ID: 468613c0 Answer

Correct Answer:
C

Rationale

Choice C is correct. The area, A, of a triangle is given by the formula $A = \frac{1}{2}bh$, where b is the base length and h is the height of the triangle. It's given that a triangle has a base length of 56 centimeters and a height of 112 centimeters. Substituting 56 for b and 112 for h in the formula $A = \frac{1}{2}bh$ yields $A = \left(\frac{1}{2}\right)\left(56\right)\left(112\right)$, or $A = 3{,}136$. Therefore, the area, in square centimeters, of the triangle is $3{,}136$.

Choice A is incorrect. This is the value of $56 + 112$, not $\left(\frac{1}{2}\right)\left(56\right)\left(112\right)$.

Choice B is incorrect. This is the value of $\left(\frac{1}{4}\right)\left(56\right)\left(112\right)$, not $\left(\frac{1}{2}\right)\left(56\right)\left(112\right)$.

Choice D is incorrect. This is the value of $\left(56\right)\left(112\right)$, not $\left(\frac{1}{2}\right)\left(56\right)\left(112\right)$.

Question Difficulty:
Medium

Question ID 14e7c1f4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■■■

ID: 14e7c1f4

For two acute angles, $\angle Q$ and $\angle R$, $\cos(Q) = \sin(R)$. The measures, in degrees, of $\angle Q$ and $\angle R$ are $x + 61$ and $4x + 4$, respectively. What is the value of x?

A. 5

B. 19

C. 23

D. 29

ID: 14e7c1f4 Answer

Correct Answer:
A

Rationale

Choice A is correct. It's given that for two acute angles, $\angle Q$ and $\angle R$, $\cos(Q) = \sin(R)$. For two acute angles, if the sine of one angle is equal to the cosine of the other angle, the angles are complementary. It follows that $\angle Q$ and $\angle R$ are complementary. That is, the sum of the measures of the angles is 90 degrees. It's given that the measure of $\angle Q$ is $x + 61$ degrees and the measure of $\angle R$ is $4x + 4$ degrees. It follows that $(x + 61) + (4x + 4) = 90$. By combining like terms, this equation can be rewritten as $5x + 65 = 90$. Subtracting 65 from each side of this equation yields $5x = 25$. Dividing each side of this equation by 5 yields $x = 5$.

Choice B is incorrect. This would be the value of x if $\cos(Q) = \cos(R)$ rather than $\cos(Q) = \sin(R)$.

Choice C is incorrect. This would be the value of x if $\cos(Q) = -\cos(R)$ rather than $\cos(Q) = \sin(R)$ and if $\angle R$ were obtuse rather than acute.

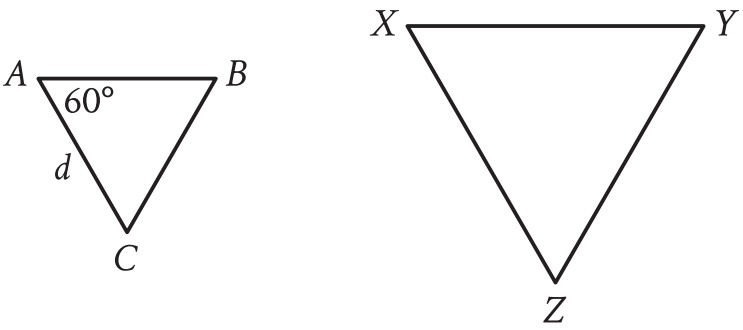
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:
Hard

Question ID e0d2e21a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■□□

ID: e0d2e21a



Note: Figures not drawn to scale.

For the triangles shown, triangle ABC is dilated by a scale factor of 3 to obtain triangle XYZ, where $d = 16$. What is the measure, in degrees, of angle X?

A. 20

B. 57

C. 60

D. 63

ID: e0d2e21a Answer

Correct Answer:
C

Rationale

Choice C is correct. It's given that triangle XYZ is obtained by a dilation of triangle ABC. It follows that triangle ABC is similar to triangle XYZ, where A corresponds to X. Since corresponding angles in similar triangles have the same measure and the measure of angle A is 60 degrees, it follows that the measure of angle X is also 60 degrees.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty:
Easy

Question ID c984f1a5

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

ID: c984f1a5

A hemisphere is half of a sphere. If a hemisphere has a radius of 27 inches, which of the following is closest to the volume, in cubic inches, of this hemisphere?

A. $1{,}500$

B. $6{,}100$

C. $30{,}900$

D. $41{,}200$

ID: c984f1a5 Answer

Correct Answer:
D

Rationale

Choice D is correct. The volume, V, of a sphere is given by $V = \frac{4}{3}\pi r^3$, where r is the radius of the sphere. Since a hemisphere is half of a sphere, it follows that the volume, V, of a hemisphere is given by $V = \frac{1}{2}\frac{4}{3}\pi r^3$, or $V = \frac{2}{3}\pi r^3$. Substituting 27 for r in this formula yields $V = \frac{2}{3}\pi 27^3$, which gives $V = 13{,}122\pi$, or V is approximately equal to $41{,}223.98$. Therefore, the choice that is closest to the volume, in cubic inches, of this hemisphere is $41{,}200$.

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

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

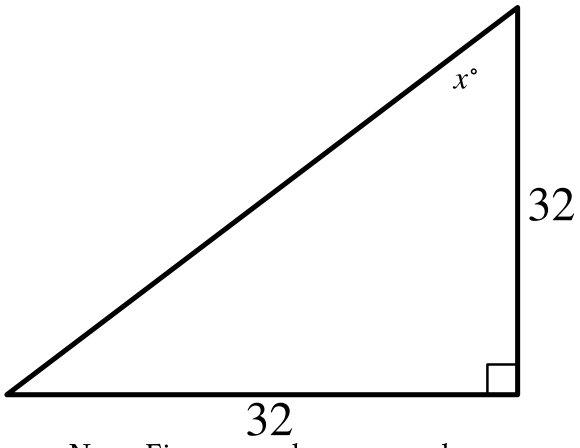
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:
Hard

Question ID a71617d3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■■□

ID: a71617d3



Note: Figure not drawn to scale.

In the triangle shown, what is the value of x?

ID: a71617d3 Answer

Correct Answer:
45

Rationale

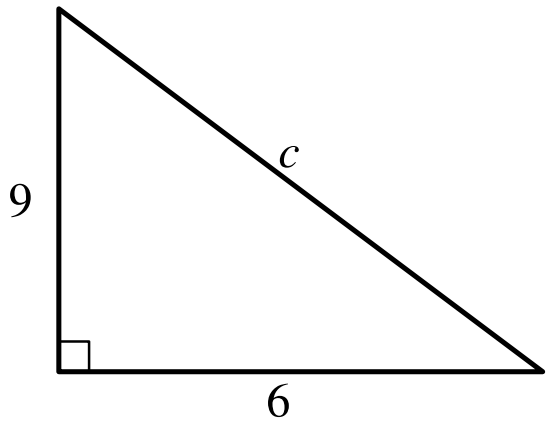
The correct answer is 45. An isosceles right triangle has a right angle and two legs of equal length. In the triangle shown, one angle is a right angle and the two legs each have a length of 32. Thus, the given triangle is an isosceles right triangle. In an isosceles right triangle, the measures of the two non-right angles are $45°$. It follows that the value of x is 45.

Question Difficulty:
Medium

Question ID 36661021

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■□□

ID: 36661021



Note: Figure not drawn to scale.

In the right triangle shown, which of the following is closest to the value of c?

A. 7.5

B. 10.8

C. 15

D. 58.5

ID: 36661021 Answer

Correct Answer:
B

Rationale

Choice B is correct. By the Pythagorean theorem, if a right triangle has a hypotenuse with length t and legs with lengths r and s, then $r^2 + s^2 = t^2$. It's given in the right triangle shown that the legs have lengths of 9 and 6 and the hypotenuse has a length of c. Substituting 9 for r, 6 for s, and c for t in $r^2 + s^2 = t^2$ yields $9^2 + 6^2 = c^2$, or $117 = c^2$. Taking the square root of both sides of this equation yields $\pm\sqrt{117} = c$. Since the length of a side of a triangle must be positive, the value of c is $\sqrt{117}$, which is approximately equal to 10.8167. Of the choices, 10.8 is the closest to the value of c.

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

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

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

Question Difficulty:

Easy

Question ID d03e29f1

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

ID: d03e29f1

$$(x-6)^2+(y-3)^2=81$$

The graph of the given equation in the *xy*-plane is a circle. What is the length of the radius of this circle?

A. 3

B. 6

C. 9

D. 81

ID: d03e29f1 Answer

Correct Answer:
C

Rationale

Choice C is correct. The equation of a circle in the *xy*-plane can be written as $x - h^2 + y - k^2 = r^2$, where the center of the circle is (h, k) and the radius of the circle is r. The graph of the given equation, $x - 6^2 + y - 3^2 = 81$, is a circle in the *xy*-plane. This equation can be written as $x - 6^2 + y - 3^2 = 9^2$, where $h = 6$, $k = 3$, and $r = 9$. Therefore, the radius of this circle is 9.

Choice A is incorrect. This is the *y*-coordinate of the center, not the radius, of the circle defined by the given equation.

Choice B is incorrect. This is the *x*-coordinate of the center, not the radius, of the circle defined by the given equation.

Choice D is incorrect. This is the value of the radius squared, not the radius, of the circle defined by the given equation.

Question Difficulty:
Easy

Question ID fecc446d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	■■■

ID: fecc446d

A line intersects two parallel lines, forming four acute angles and four obtuse angles. The measure of one of these eight angles is $(7x - 250)^\circ$. The sum of the measures of four of the eight angles is k°. Which of the following could NOT be equivalent to k, for all values of x?

A. $-14x + 1{,}540$

B. $14x - 320$

C. $-28x + 1{,}720$

D. 360

ID: fecc446d Answer

Correct Answer:
A

Rationale

Choice A is correct. It's given that a line intersects two parallel lines, forming four acute angles and four obtuse angles. Since there are two parallel lines intersected by a transversal, all four acute angles have the same measure and all four obtuse angles have the same measure. Additionally, each acute angle is supplementary to each obtuse angle. It's given that the measure of one of these eight angles is $(7x - 250)^\circ$. It follows that a supplementary angle has measure $(180 - (7x - 250))^\circ$, or $(-7x + 430)^\circ$. It's also given that the sum of the measures of four of the eight angles is k°. It follows that the possible values of k are $4(7x - 250)$; $(7x - 250) + 3(-7x + 430)$; $2(7x - 250) + 2(-7x + 430)$; $3(7x - 250) + (-7x + 430)$; and $4(-7x + 430)$. These values are equivalent to $28x - 1{,}000$; $-14x + 1{,}040$; 360; $14x - 320$; and $-28x + 1{,}720$, respectively. It follows that of the given choices, only $-14x + 1{,}540$ could NOT be equivalent to k, for all values of x.

Choice B is incorrect. This is the sum of three angles with measure $(7x - 250)^\circ$ and one angle with measure $(-7x + 430)^\circ$.

Choice C is incorrect. This is the sum of four angles with measure $(-7x + 430)^\circ$.

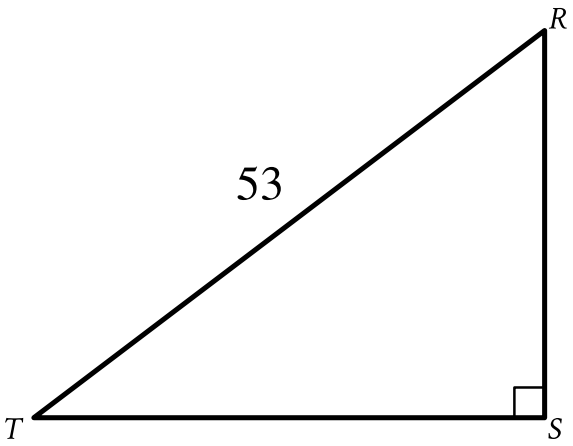
Choice D is incorrect. This is the sum of two angles with measure $(7x - 250)^\circ$ and two angles with measure $(-7x + 430)^\circ$.

Question Difficulty:
Hard

Question ID a67b9f88

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Right triangles and trigonometry	■■■

ID: a67b9f88



Note: Figure not drawn to scale.

In the triangle shown, $RS = \sqrt{105}$. What is the value of $\sin R$?

ID: a67b9f88 Answer

Correct Answer:
.9811, 52/53

Rationale

The correct answer is $\frac{52}{53}$. In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the two legs. The length of the hypotenuse of the right triangle shown is 53. It's given that $RS = \sqrt{105}$. Therefore, the length of one of the legs of the triangle shown is $\sqrt{105}$. Let x represent TS, the length of the other leg of the triangle shown. Therefore, $53^2 = \left(\sqrt{105}\right)^2 + x^2$, or $2{,}809 = 105 + x^2$. Subtracting 105 from both sides of this equation yields $2{,}704 = x^2$. Taking the positive square root of both sides of this equation yields $52 = x$. Therefore, TS, the length of the other leg of the triangle shown, is 52. The sine of an acute angle in a right triangle is defined as the ratio of the length of the leg opposite the angle to the length of the hypotenuse. The length of the leg opposite angle R is 52, and the length of the hypotenuse is 53. Therefore, the value of $\sin R$ is $\frac{52}{53}$. Note that 52/53 or .9811 are examples of ways to enter a correct answer.

Question Difficulty:
Hard