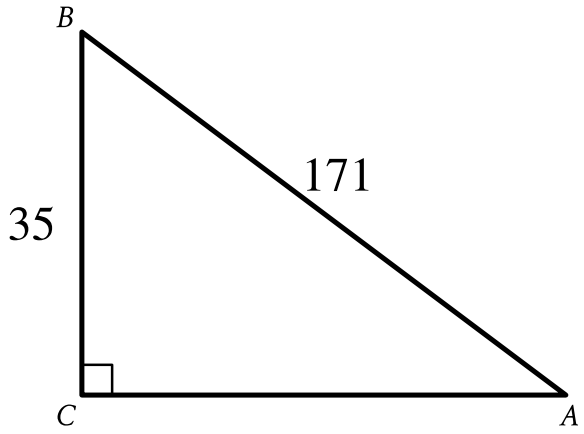
Question ID a8417ef2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: a8417ef2



Note: Figure not drawn to scale.

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

A. $\frac{1}{171}$

B. $\frac{35}{171}$

C. $\frac{171}{35}$

D. 171

ID: a8417ef2 Answer

Correct Answer: B

Rationale

Choice B 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. The hypotenuse of a right triangle is the side opposite the right angle. In right triangle ABC, side BC is the side opposite angle A and side AB is the hypotenuse. It's given that the length of side BC is 35 units and the length of side AB is 171 units. Therefore, the value of $\sin A$ is $\frac{35}{171}$.

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

Choice C is incorrect. This is the ratio of the length of the hypotenuse to the length of the side opposite angle A rather than the ratio of the length of the side opposite angle A to the length of the hypotenuse.

Choice D is incorrect. This is the length of the hypotenuse rather than $\sin A$.

Question Difficulty: Medium

Question ID 5def1eea

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: 5def1eea

A right triangle has legs with lengths of 11 centimeters and 9 centimeters. What is the length of this triangle's hypotenuse, in centimeters?

A. $\sqrt{40}$

B. $\sqrt{202}$

C. 20

D. 202

ID: 5def1eea Answer

Correct Answer: B

Rationale

Choice B is correct. The Pythagorean theorem states that for a right triangle, $c^2 = a^2 + b^2$, where c represents the length of the hypotenuse and a and b represent the lengths of the legs. It's given that a right triangle has legs with lengths of 11 centimeters and 9 centimeters. Substituting 11 for a and 9 for b in the formula $c^2 = a^2 + b^2$ yields $c^2 = 11^2 + 9^2$, which is equivalent to $c^2 = 121 + 81$, or $c^2 = 202$. Taking the square root of each side of this equation yields $c = \pm\sqrt{202}$. Since c represents a length, c must be positive. Therefore, the length of the triangle's hypotenuse, in centimeters, is $\sqrt{202}$.

Choice A is incorrect. This is the result of solving the equation $c^2 = 11(2) + 9(2)$, not $c^2 = 11^2 + 9^2$.

Choice C is incorrect. This is the result of solving the equation $c(2) = 11(2) + 9(2)$, not $c^2 = 11^2 + 9^2$.

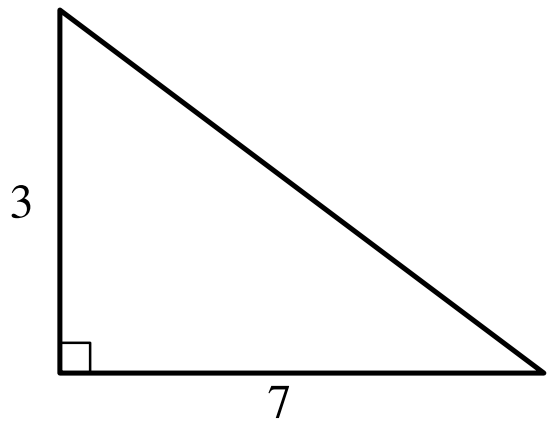
Choice D is incorrect. This is the result of solving the equation $c = 11^2 + 9^2$, not $c^2 = 11^2 + 9^2$.

Question Difficulty: Medium

Question ID 377c4069

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: 377c4069



Note: Figure not drawn to scale.

The lengths of the legs of a right triangle are shown. Which of the following is closest to the length of the triangle's hypotenuse?

A. 3.2

B. 5

C. 7.6

D. 20

ID: 377c4069 Answer

Correct Answer: C

Rationale

Choice C is correct. The Pythagorean theorem states that for a right triangle, $a^2 + b^2 = c^2$, where a and b represent the lengths of the legs of the triangle and c represents the length of its hypotenuse. In the triangle shown, the legs have lengths of 3 and 7. Substituting 3 for a and 7 for b in the equation $a^2 + b^2 = c^2$ yields $3^2 + 7^2 = c^2$, which is equivalent to $9 + 49 = c^2$, or $58 = c^2$. Taking the positive square root of both sides of this equation yields $\sqrt{58} = c$. Thus, the value of c is approximately 7.6. Therefore, of the given choices, 7.6 is the closest to the length of the triangle's hypotenuse.

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

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

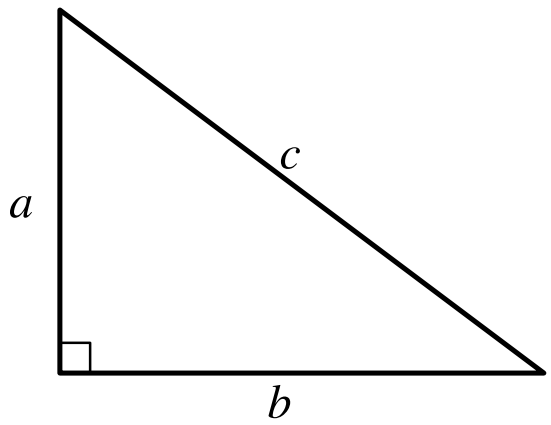
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 8cbc6dc5

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: 8cbc6dc5



Note: Figure not drawn to scale.

For the right triangle shown, $a = 4$ and $b = 5$. Which expression represents the value of c?

A. $4 + 5$

B. $\sqrt{(4)(5)}$

C. $\sqrt{4 + 5}$

D. $\sqrt{4^2 + 5^2}$

ID: 8cbc6dc5 Answer

Correct Answer: D

Rationale

Choice D is correct. By the Pythagorean theorem, if a right triangle has a hypotenuse with length c and legs with lengths a and b, then $c^2 = a^2 + b^2$. In the right triangle shown, the hypotenuse has length c and the legs have lengths a and b. It's given that $a = 4$ and $b = 5$. Substituting 4 for a and 5 for b in the Pythagorean theorem yields $c^2 = 4^2 + 5^2$. Taking the square root of both sides of this equation yields $c = \pm\sqrt{4^2 + 5^2}$. Since the length of a side of a triangle must be positive, the value of c is $\sqrt{4^2 + 5^2}$.

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

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

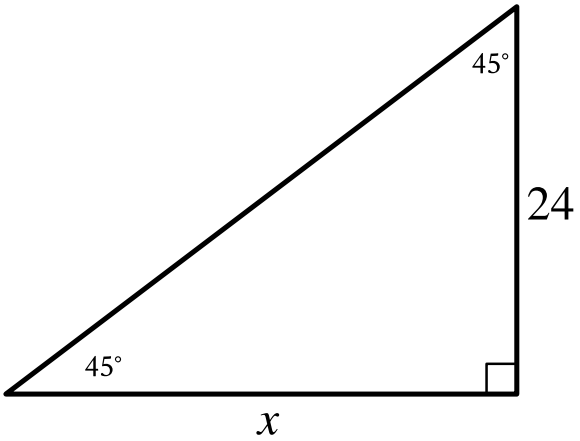
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID b56d6fef

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: b56d6fef



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: b56d6fef 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.

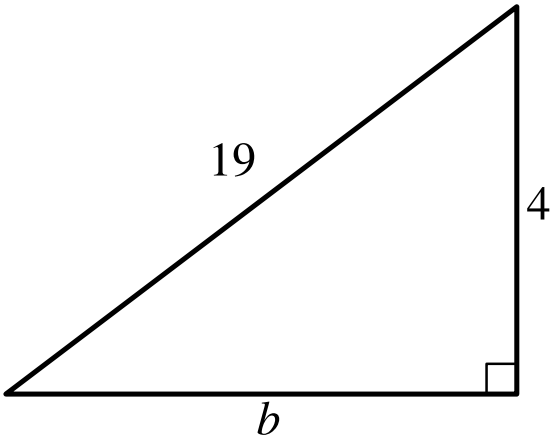
Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 7bd4ca87

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: 7bd4ca87



Note: Figure not drawn to scale.

Which equation shows the relationship between the side lengths of the given triangle?

A. $4b = 19$

B. $4 + b = 19$

C. $4^2 + b^2 = 19^2$

D. $4^2 - b^2 = 19^2$

ID: 7bd4ca87 Answer

Correct Answer: C

Rationale

Choice C is correct. The Pythagorean theorem states that in a right triangle, the sum of the squares of the lengths of the two legs is equal to the square of the length of the hypotenuse. Therefore, $a^2 + b^2 = c^2$, where a and b are the lengths of the legs and c is the length of the hypotenuse. For the given right triangle, the lengths of the legs are 4 and b, and the length of the hypotenuse is 19. Substituting 4 for a and 19 for c in the equation $a^2 + b^2 = c^2$ yields $4^2 + b^2 = 19^2$. Thus, the relationship between the side lengths of the given triangle is $4^2 + b^2 = 19^2$.

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: Medium

Question ID f6b6c4bc

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: f6b6c4bc

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: f6b6c4bc 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.

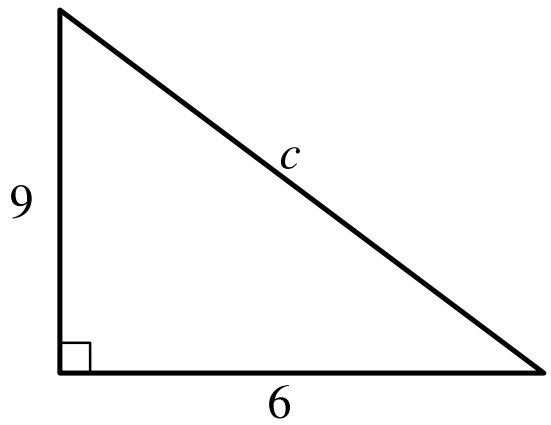
Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 6b2b9230

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: 6b2b9230



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: 6b2b9230 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.

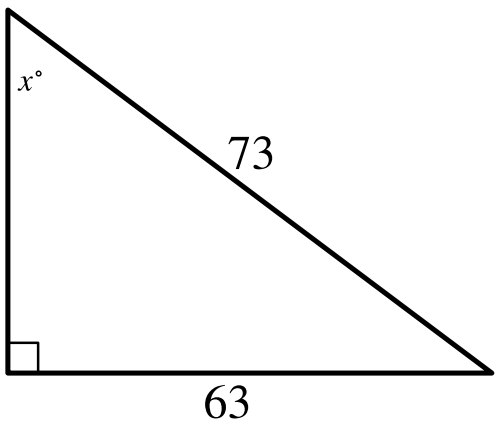
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID c5fdc5b9

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Right triangles and trigonometry	Medium

ID: c5fdc5b9



Note: Figure not drawn to scale.

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

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

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

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

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

ID: c5fdc5b9 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 $\sin x^\circ$ 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: Medium