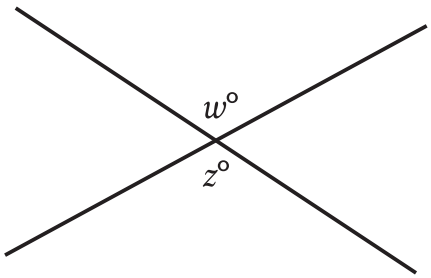
Question ID 0e245a77

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 0e245a77



Note: Figure not drawn to scale.

In the figure, two lines intersect at a point. If $w = 136$, what is the value of z?

A. 36

B. 44

C. 68

D. 136

ID: 0e245a77 Answer

Correct Answer: D

Rationale

Choice D is correct. In the figure shown, the angles with measures w° and z° are vertical angles. Since vertical angles are congruent, $w = z$. Therefore, if $w = 136$, the value of z is 136.

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

Choice B is incorrect. This is the measure, in degrees, of an angle that's supplementary, not congruent, to the angle with measure w°.

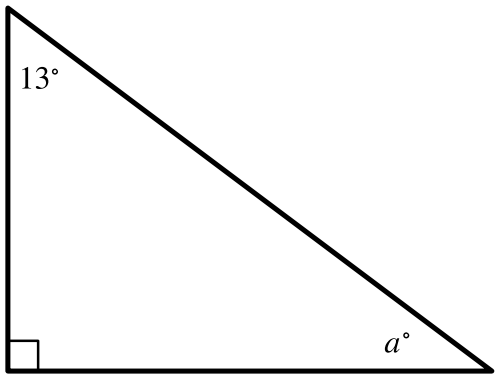
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID f9addc5d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: f9addc5d



Note: Figure not drawn to scale.

In the right triangle shown, what is the value of a?

A. 13

B. 77

C. 90

D. 103

ID: f9addc5d Answer

Correct Answer: B

Rationale

Choice B is correct. The triangle shown is a right triangle, where the interior angle shown with a right angle symbol has a measure of 90°. It's shown that the other two interior angles measure 13° and a°. The sum of the measures of the interior angles of a triangle is 180°; therefore, $90 + 13 + a = 180$. Combining like terms on the left-hand side of this equation yields $103 + a = 180$. Subtracting 103 from both sides of this equation yields $a = 77$.

Choice A is incorrect. This is the measure, in degrees, of the other acute interior angle of the right triangle, not the value of a.

Choice C is incorrect. This is the measure, in degrees, of the right angle of the right triangle, not the value of a.

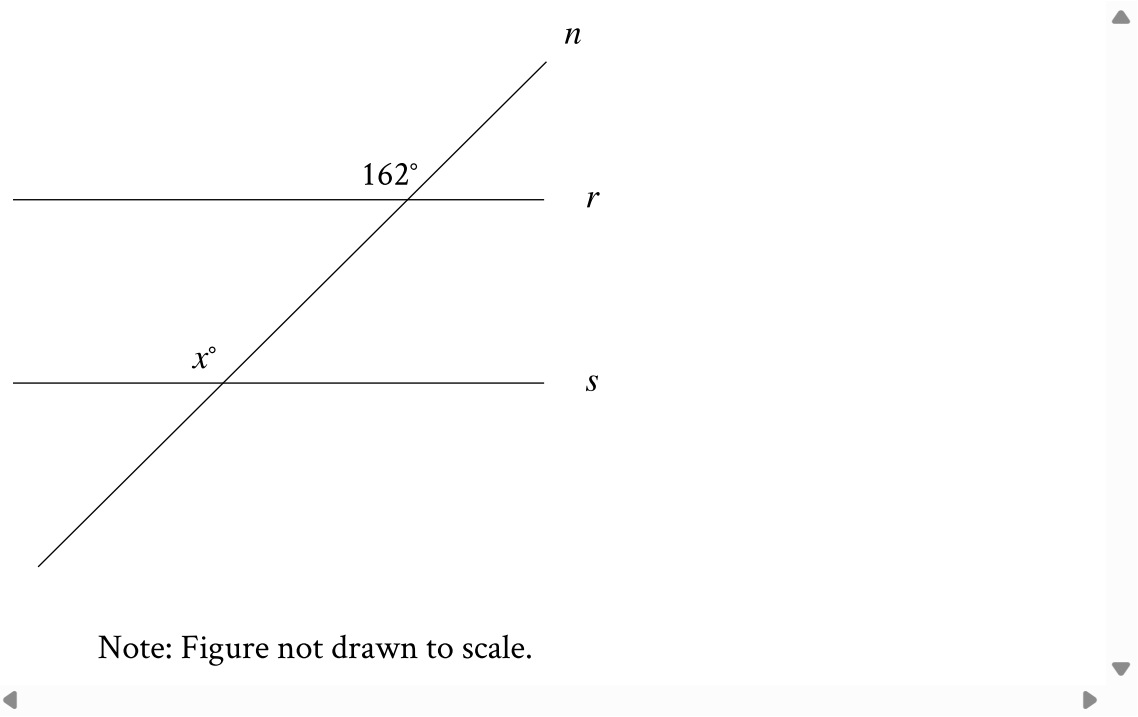
Choice D is incorrect. This is the sum of the measures, in degrees, of the other two interior angles of the right triangle, not the value of a.

Question Difficulty: Medium

Question ID 77fea3f6

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 77fea3f6



Note: Figure not drawn to scale.

In the figure, line n intersects lines r and s. Line r is parallel to line s. What is the value of x?

ID: 77fea3f6 Answer

Correct Answer: 162

Rationale

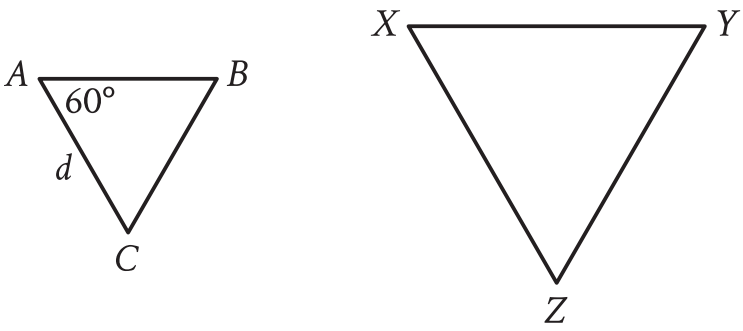
The correct answer is 162. It's given that line r is parallel to line s. Since line n intersects both lines r and s, it's a transversal. The angles in the figure marked as 162° and x° are on the same side of the transversal, where one is an interior angle with line s as a side, and the other is an exterior angle with line r as a side. Thus, the marked angles are corresponding angles. When two parallel lines are intersected by a transversal, corresponding angles are congruent and, therefore, have equal measure. It follows that the value of x is 162.

Question Difficulty: Medium

Question ID 6cb8d47f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 6cb8d47f



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: 6cb8d47f 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: Medium

Question ID 61c79894

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 61c79894

Triangles EFG and JKL are congruent, where E, F, and G correspond to J, K, and L, respectively. The measure of angle E is 45° and the measure of angle F is 20°. What is the measure of angle J?

A. 20°

B. 45°

C. 135°

D. 160°

ID: 61c79894 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that triangles EFG and JKL are congruent such that angle E corresponds to angle J. Corresponding angles of congruent triangles are congruent, so angle E and angle J must be congruent. Therefore, if the measure of angle E is 45°, then the measure of angle J is also 45°.

Choice A is incorrect. This is the measure of angle K, not angle J.

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 ae474eb4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: ae474eb4

In $\triangle XYZ$, the measure of $\angle X$ is 23° and the measure of $\angle Y$ is 66°. What is the measure of $\angle Z$?

A. 43°

B. 89°

C. 91°

D. 179°

ID: ae474eb4 Answer

Correct Answer: C

Rationale

Choice C is correct. The triangle angle sum theorem states that the sum of the measures of the interior angles of a triangle is 180°. It's given that in $\triangle XYZ$, the measure of $\angle X$ is 23° and the measure of $\angle Y$ is 66°. It follows that the measure of $\angle Z$ is $(180 - 23 - 66)^\circ$, or 91°.

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

Choice B is incorrect. This is the sum of the measures of $\angle X$ and $\angle Y$, not the measure of $\angle Z$.

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

Question Difficulty: Medium

Question ID 020141da

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 020141da

In a right triangle, the measure of one of the acute angles is 51°. What is the measure, in degrees, of the other acute angle?

A. 6

B. 39

C. 49

D. 51

ID: 020141da Answer

Correct Answer: B

Rationale

Choice B is correct. The sum of the measures of the interior angles of a triangle is 180 degrees. Since the triangle is a right triangle, it has one angle that measures 90 degrees. Therefore, the sum of the measures, in degrees, of the remaining two angles is $180 - 90$, or 90. It's given that the measure of one of the acute angles in the triangle is 51 degrees. Therefore, the measure, in degrees, of the other acute angle is $90 - 51$, or 39.

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 measure, in degrees, of the acute angle whose measure is given.

Question Difficulty: Medium

Question ID 9bc228cb

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 9bc228cb

In triangle ABC, the measure of angle B is 52° and the measure of angle C is 17°. What is the measure of angle A?

A. 21°

B. 35°

C. 69°

D. 111°

ID: 9bc228cb Answer

Correct Answer: D

Rationale

Choice D is correct. The sum of the angle measures of a triangle is 180°. Adding the measures of angles B and C gives $52 + 17 = 69^\circ$. Therefore, the measure of angle A is $180 - 69 = 111^\circ$.

Choice A is incorrect and may result from subtracting the sum of the measures of angles B and C from 90°, instead of from 180°.

Choice B is incorrect and may result from subtracting the measure of angle C from the measure of angle B.

Choice C is incorrect and may result from adding the measures of angles B and C but not subtracting the result from 180°.

Question Difficulty: Medium

Question ID 889921f9

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 889921f9

In $\triangle RST$, the measure of $\angle R$ is 63°. Which of the following could be the measure, in degrees, of $\angle S$?

A. 116

B. 118

C. 126

D. 180

ID: 889921f9 Answer

Correct Answer: A

Rationale

Choice A is correct. The sum of the measures of the angles of a triangle is 180°. Therefore, the sum of the measures of $\angle R$, $\angle S$, and $\angle T$ is 180°. It's given that the measure of $\angle R$ is 63°. It follows that the sum of the measures of $\angle S$ and $\angle T$ is $(180 - 63)^\circ$, or 117°. Therefore, the measure of $\angle S$, in degrees, must be less than 117. Of the given choices, only 116 is less than 117. Thus, the measure, in degrees, of $\angle S$ could be 116.

Choice B is incorrect. If the measure of $\angle S$ is 118°, then the sum of the measures of the angles of the triangle is greater than, not equal to, 180°.

Choice C is incorrect. If the measure of $\angle S$ is 126°, then the sum of the measures of the angles of the triangle is greater than, not equal to, 180°.

Choice D is incorrect. This is the sum of the measures of the angles of a triangle, in degrees.

Question Difficulty: Medium

Question ID 74343bea

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 74343bea

In $\triangle XYZ$, the measure of $\angle X$ is 24° and the measure of $\angle Y$ is 98°. What is the measure of $\angle Z$?

A. 58°

B. 74°

C. 122°

D. 212°

ID: 74343bea Answer

Correct Answer: A

Rationale

Choice A is correct. The triangle angle sum theorem states that the sum of the measures of the interior angles of a triangle is 180°. It's given that in $\triangle XYZ$, the measure of $\angle X$ is 24° and the measure of $\angle Y$ is 98°. It follows that the measure of $\angle Z$ is $(180 - 24 - 98)^\circ$, or 58°.

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

Choice C is incorrect. This is the sum of the measures of $\angle X$ and $\angle Y$, not the measure of $\angle Z$.

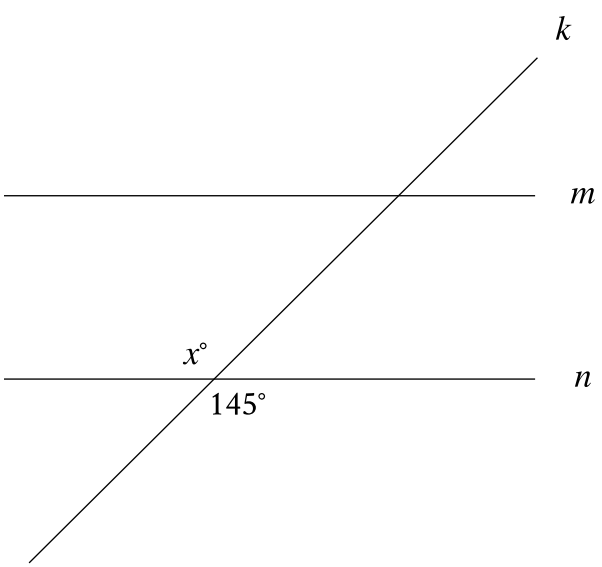
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 832e0f0d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 832e0f0d



Note: Figure not drawn to scale.

In the figure, line m is parallel to line n, and line k intersects both lines. Which of the following statements is true?

A. The value of x is less than 145.

B. The value of x is greater than 145.

C. The value of x is equal to 145.

D. The value of x cannot be determined.

ID: 832e0f0d Answer

Correct Answer: C

Rationale

Choice C is correct. Vertical angles, or angles that are opposite each other when two lines intersect, are congruent. It's given that line k intersects line n. Based on the figure, the angle with measure x° and the angle with measure 145° are vertical angles. Therefore, the value of x is equal to 145.

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

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

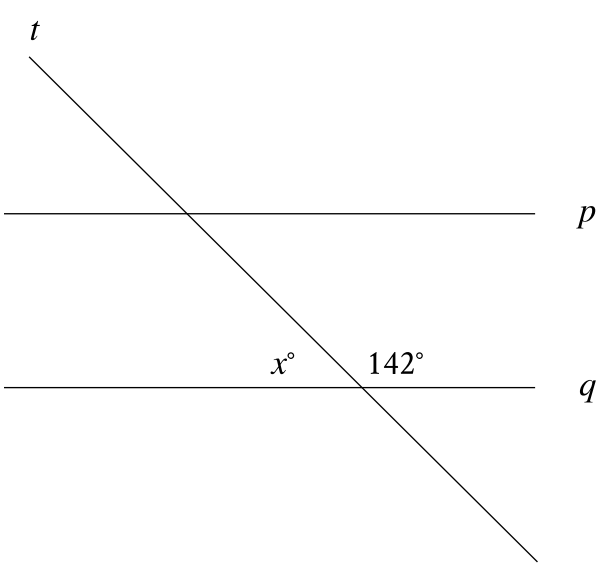
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID c0826656

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: c0826656



Note: Figure not drawn to scale.

In the figure, line p is parallel to line q, and line t intersects both lines. What is the value of $x + 142$?

A. 52

B. 90

C. 142

D. 180

ID: c0826656 Answer

Correct Answer: D

Rationale

Choice D is correct. In the figure shown, the angle marked x° and the angle marked 142° form a linear pair of angles. If two angles form a linear pair of angles, the sum of the measures of the angles is 180°. Therefore, the value of $x + 142$ is 180.

Choice A is incorrect. This is 90 less than 142, not the sum of x and 142.

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

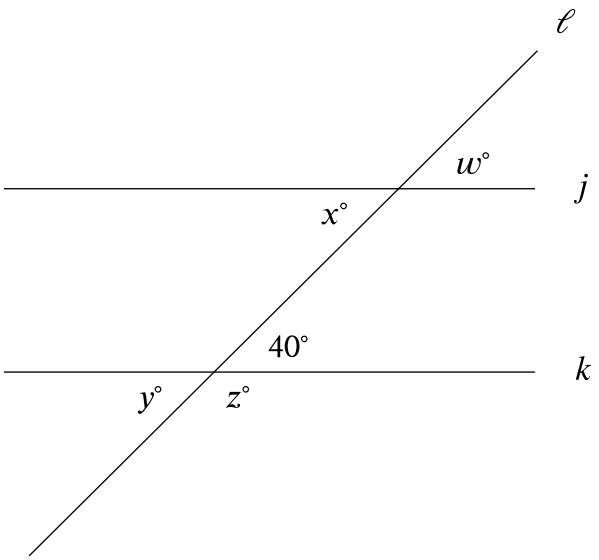
Choice C is incorrect. This is the measure, in degrees, of one of the angles shown.

Question Difficulty: Medium

Question ID c2518db3

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: c2518db3



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: c2518db3 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: Medium

Question ID 201ae66a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Geometry and Trigonometry	Lines, angles, and triangles	Medium

ID: 201ae66a

In triangle ABC, $AB = 4{,}680\ \text{millimeters (mm)}$ and $BC = 4{,}680\ \text{mm}$. Which statement is sufficient to prove that triangle ABC is equilateral?

A. $AC = 4{,}680\ \text{mm}$

B. $AC = 468\ \text{mm}$

C. $AC = 46.8\ \text{mm}$

D. $AC = 4.68\ \text{mm}$

ID: 201ae66a Answer

Correct Answer: A

Rationale

Choice A is correct. In an equilateral triangle, all three sides have the same length. It's given that in triangle ABC, $AB = 4{,}680\ \text{mm}$ and $BC = 4{,}680\ \text{mm}$. Therefore, if $AC = 4{,}680\ \text{mm}$, then all three sides of triangle ABC have the same length, so triangle ABC is equilateral. Therefore, $AC = 4{,}680\ \text{mm}$ is sufficient to prove that triangle ABC is equilateral.

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