Question ID d9e83476

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

ID: d9e83476

Quadrilateral $P'Q'R'S'$ is similar to quadrilateral $PQRS$, where P, Q, R, and S correspond to P', Q', R', and S', respectively. The measure of angle P is 30°, the measure of angle Q is 50°, and the measure of angle R is 70°. The length of each side of $P'Q'R'S'$ is 3 times the length of each corresponding side of $PQRS$. What is the measure of angle P'?

A. 10°

B. 30°

C. 40°

D. 90°

ID: d9e83476 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that quadrilateral $P'Q'R'S'$ is similar to quadrilateral $PQRS$, where P, Q, R, and S correspond to P', Q', R', and S', respectively. Since corresponding angles of similar quadrilaterals are congruent, it follows that the measure of angle P is equal to the measure of angle P'. It's given that the measure of angle P is 30°. Therefore, the measure of angle P' is 30°.

Choice A is incorrect. This is $\frac{1}{3}$ the measure of angle P'.

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

Choice D is incorrect. This is 3 times the measure of angle P'.

Question Difficulty: Medium

Question ID b954d48e

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

ID: b954d48e

In triangle ABC, the measure of angle A is 54°, the measure of angle B is 90°, and the measure of angle C is $\left(\frac{k}{2}\right)^\circ$. What is the value of k?

A. 36

B. 45

C. 72

D. 108

ID: b954d48e Answer

Correct Answer: C

Rationale

Choice C is correct. The sum of the interior angles of a triangle is 180°. It's given that the interior angles of triangle ABC are 54°, 90°, and $\left(\frac{k}{2}\right)^\circ$. It follows that $54 + 90 + \frac{k}{2} = 180$, or $144 + \frac{k}{2} = 180$. Subtracting 144 from each side of this equation yields $\frac{k}{2} = 36$. Multiplying each side of this equation by 2 yields $k = 72$. Therefore, the value of k is 72.

Choice A is incorrect. This is the value of $\frac{k}{2}$, not k.

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

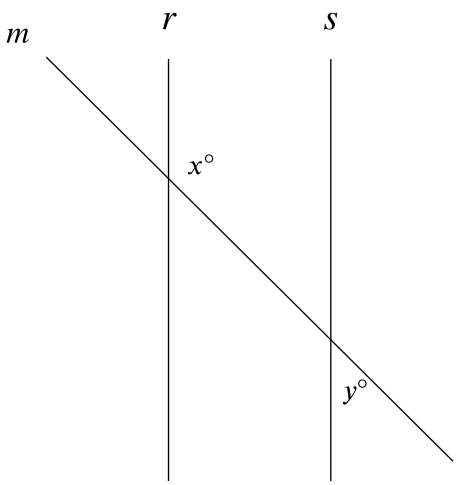
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 681fe1cf

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

ID: 681fe1cf



Note: Figure not drawn to scale.

In the figure shown, lines r and s are parallel, and line m intersects both lines. If $y < 65$, which of the following must be true?

A. $x < 115$

B. $x > 115$

C. $x + y < 180$

D. $x + y > 180$

ID: 681fe1cf Answer

Correct Answer: B

Rationale

Choice B is correct. In the figure shown, the angle measuring y° is congruent to its vertical angle formed by lines s and m, so the measure of the vertical angle is also y°. The vertical angle forms a same-side interior angle pair with the angle measuring x°. It's given that lines r and s are parallel. Therefore, same-side interior angles in the figure are supplementary, which means the sum of the measure of the vertical angle and the measure of the angle measuring x° is 180°, or $x + y = 180$. Subtracting x from both sides of this equation yields $y = 180 - x$. Substituting $180 - x$ for y in the inequality $y < 65$ yields $180 - x < 65$. Adding x to both sides of this inequality yields $180 < 65 + x$. Subtracting 65 from both sides of this inequality yields $115 < x$, or $x > 115$. Thus, if $y < 65$, it must be true that $x > 115$.

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

Choice C is incorrect. $x + y$ must be equal to, not less than, 180.

Choice D is incorrect. $x + y$ must be equal to, not greater than, 180.

Question Difficulty: Medium

Question ID 7eb3fa96

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

ID: 7eb3fa96

Right triangles LMN and PQR are similar, where L and M correspond to P and Q, respectively. Angle M has a measure of 53°. What is the measure of angle Q?

A. 37°

B. 53°

C. 127°

D. 143°

ID: 7eb3fa96 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that triangle LMN is similar to triangle PQR. Corresponding angles of similar triangles are congruent. Since angle M and angle Q correspond to each other, they must be congruent. Therefore, if the measure of angle M is 53°, then the measure of angle Q is also 53°.

Choice A is incorrect and may result from concluding that angle M and angle Q are complementary rather than congruent.

Choice C is incorrect and may result from concluding that angle M and angle Q are supplementary rather than congruent.

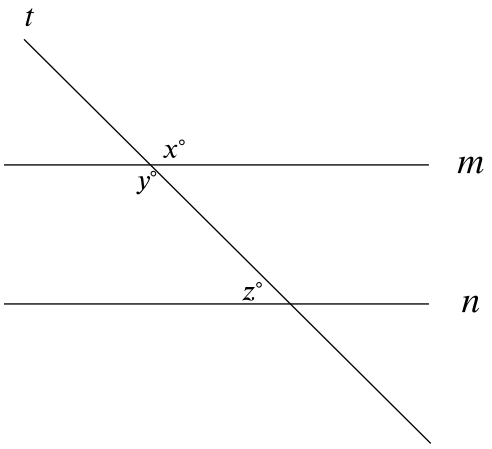
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 8bca291d

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

ID: 8bca291d



Note: Figure not drawn to scale.

In the figure, lines m and n are parallel. If $x = 6k + 13$ and $y = 8k - 29$, what is the value of z?

A. 3

B. 21

C. 41

D. 139

ID: 8bca291d Answer

Correct Answer: C

Rationale

Choice C is correct. Vertical angles, which are angles that are opposite each other when two lines intersect, are congruent. The figure shows that lines t and m intersect. It follows that the angle with measure x° and the angle with measure y° are vertical angles, so $x = y$. It's given that $x = 6k + 13$ and $y = 8k - 29$. Substituting $6k + 13$ for x and $8k - 29$ for y in the equation $x = y$ yields $6k + 13 = 8k - 29$. Subtracting $6k$ from both sides of this equation yields $13 = 2k - 29$. Adding 29 to both sides of this equation yields $42 = 2k$, or $2k = 42$. Dividing both sides of this equation by 2 yields $k = 21$. It's given that lines m and n are parallel, and the figure shows that lines m and n are intersected by a transversal, line t. If two parallel lines are intersected by a transversal, then the same-side interior angles are supplementary. It follows that the same-side interior angles with measures y° and z° are supplementary, so $y + z = 180$. Substituting $8k - 29$ for y in this equation yields $8k - 29 + z = 180$. Substituting 21 for k in this equation yields $8(21) - 29 + z = 180$, or $139 + z = 180$. Subtracting 139 from both sides of this equation yields $z = 41$. Therefore, the value of z is 41.

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

Choice B is incorrect. This is the value of k, not z.

Choice D is incorrect. This is the value of x or y, not z.

Question Difficulty: Medium

Question ID ba00aba9

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

ID: ba00aba9

Two nearby trees are perpendicular to the ground, which is flat. One of these trees is 10 feet tall and has a shadow that is 5 feet long. At the same time, the shadow of the other tree is 2 feet long. How tall, in feet, is the other tree?

A. 3

B. 4

C. 8

D. 27

ID: ba00aba9 Answer

Correct Answer: B

Rationale

Choice B is correct. Each tree and its shadow can be modeled using a right triangle, where the height of the tree and the length of its shadow are the legs of the triangle. At a given point in time, the right triangles formed by two nearby trees and their respective shadows will be similar. Therefore, if the height of the other tree is x, in feet, the value of x can be calculated by solving the proportional relationship $\frac{10 \text{ feet tall}}{5 \text{ feet long}} = \frac{x \text{ feet tall}}{2 \text{ feet long}}$. This equation is equivalent to $\frac{10}{5} = \frac{x}{2}$, or $2 = \frac{x}{2}$. Multiplying each side of the equation $2 = \frac{x}{2}$ by 2 yields $4 = x$. Therefore, the other tree is 4 feet tall.

Choice A is incorrect and may result from calculating the difference between the lengths of the shadows, rather than the height of the other tree.

Choice C is incorrect and may result from calculating the difference between the height of the 10-foot-tall tree and the length of the shadow of the other tree, rather than calculating the height of the other tree.

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

Question Difficulty: Medium

Question ID 7ecb3059

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

ID: 7ecb3059

In triangle JKL, the measures of $\angle K$ and $\angle L$ are each 48°. What is the measure of $\angle J$, in degrees? (Disregard the degree symbol when entering your answer.)

ID: 7ecb3059 Answer

Correct Answer: 84

Rationale

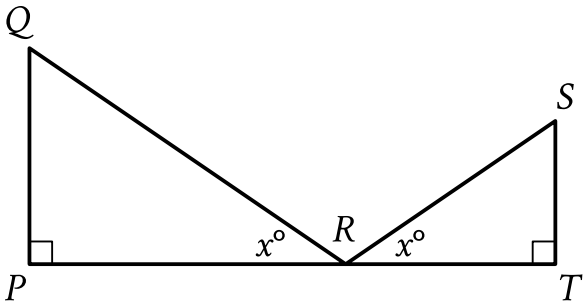
The correct answer is 84. The sum of the measures of the interior angles of a triangle is 180°. It's given that in triangle JKL, the measures of $\angle K$and $\angle L$ are each 48°. Adding the measures, in degrees, of $\angle K$ and $\angle L$ gives $48 + 48$, or 96. Therefore, the measure of $\angle J$, in degrees, is $180 - 96$, or 84.

Question Difficulty: Medium

Question ID 427423db

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

ID: 427423db



Note: Figure not drawn to scale.

$\triangle QPR$ is similar to $\triangle STR$. The lengths represented by $\overline{ST}$, $\overline{QP}$, $\overline{PR}$, and $\overline{QR}$ in the figure are 14, 15, 20, and 25, respectively. What is the length of $\overline{SR}$?

A. $\frac{350}{15}$

B. $\frac{350}{20}$

C. $\frac{210}{20}$

D. $\frac{210}{25}$

ID: 427423db Answer

Correct Answer: A

Rationale

Choice A is correct. The figure shows that angle P in $\triangle QPR$ and angle T in $\triangle STR$ are right angles. It follows that angle P is congruent to angle T. The figure also shows that the measures of angle QRP and angle SRT are both x°. Therefore, angle QRP is congruent to angle SRT. It's given that $\triangle QPR$ is similar to $\triangle STR$. Since angle P is congruent to angle T, and angle QRP is congruent to angle SRT, it follows that $\overline{QR}$ corresponds to $\overline{SR}$, and $\overline{QP}$ corresponds to $\overline{ST}$. Since corresponding sides of similar triangles are proportional, it follows that $\frac{SR}{QR} = \frac{ST}{QP}$. It's also given that the lengths of $\overline{ST}$, $\overline{QP}$, and $\overline{QR}$ are 14, 15, and 25, respectively. Substituting 14 for ST, 15 for QP, and 25 for QR in the equation $\frac{SR}{QR} = \frac{ST}{QP}$ yields $\frac{SR}{25} = \frac{14}{15}$. Multiplying each side of this equation by 25 yields $SR = \left(\frac{14}{15}\right)(25)$, or $SR = \frac{350}{15}$. Thus, the length of $\overline{SR}$ is $\frac{350}{15}$.

Choice B is incorrect. This is the result of solving the equation $\frac{SR}{25} = \frac{14}{20}$, not $\frac{SR}{25} = \frac{14}{15}$.

Choice C is incorrect. This is the result of solving the equation $\frac{SR}{14} = \frac{15}{20}$, not $\frac{SR}{25} = \frac{14}{15}$.

Choice D is incorrect. This is the result of solving the equation $\frac{SR}{14} = \frac{15}{25}$, not $\frac{SR}{25} = \frac{14}{15}$.

Question Difficulty: Medium

Question ID 48b69ecb

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

ID: 48b69ecb

Each side of equilateral triangle S is multiplied by a scale factor of k to create equilateral triangle T. The length of each side of triangle T is greater than the length of each side of triangle S. Which of the following could be the value of k?

A. $\frac{29}{28}$

B. 1

C. $\frac{28}{29}$

D. 0

ID: 48b69ecb Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that each side of equilateral triangle S is multiplied by a scale factor of k to create equilateral triangle T. Since the length of each side of triangle T is greater than the length of each side of triangle S, the scale factor of k must be greater than 1. Of the given choices, only $\frac{29}{28}$ is greater than 1.

Choice B is incorrect. If each side of equilateral triangle S is multiplied by a scale factor of 1, the length of each side of triangle T would be equal to the length of each side of triangle S.

Choice C is incorrect. If each side of equilateral triangle S is multiplied by a scale factor of $\frac{28}{29}$, the length of each side of triangle T would be less than the length of each side of triangle S.

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

Question Difficulty: Medium

Question ID 338f0d42

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

ID: 338f0d42

Triangle ABC is similar to triangle XYZ, where A, B, and C correspond to X, Y, and Z, respectively. In triangle ABC, the length of $\overline{AB}$ is 170 and the length of $\overline{BC}$ is 850. In triangle XYZ, the length of $\overline{YZ}$ is 60. What is the length of $\overline{XY}$?

A. 204

B. 182

C. 60

D. 12

ID: 338f0d42 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that triangle ABC is similar to triangle XYZ, where A, B, and C correspond to X, Y, and Z, respectively. It follows that side AB corresponds to side XY and side BC corresponds to side YZ. Since the lengths of corresponding sides in similar triangles are proportional, it follows that $\frac{XY}{AB} = \frac{YZ}{BC}$. Substituting 170 for AB, 60 for YZ, and 850 for BC in this equation yields $\frac{XY}{170} = \frac{60}{850}$. Multiplying each side of this equation by 170 yields $XY = 12$. Therefore, the length of $\overline{XY}$ is 12.

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

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

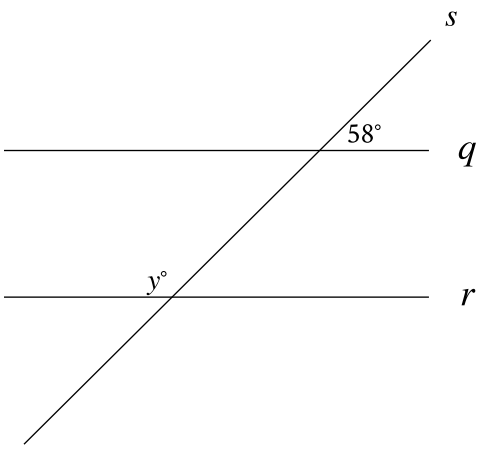
Choice C is incorrect. This is the length of $\overline{YZ}$, not $\overline{XY}$.

Question Difficulty: Medium

Question ID 14b418db

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

ID: 14b418db



Note: Figure not drawn to scale.

In the figure, line q is parallel to line r, and both lines are intersected by line s. If $y = 2x + 8$, what is the value of x?

ID: 14b418db Answer

Correct Answer: 57

Rationale

The correct answer is 57. Based on the figure, the angle with measure y° and the angle vertical to the angle with measure 58° are same side interior angles. Since vertical angles are congruent, the angle vertical to the angle with measure 58° also has measure 58°. It's given that lines q and r are parallel. Therefore, same side interior angles between lines q and r are supplementary. It follows that $y + 58 = 180$. If $y = 2x + 8$, then the value of x can be found by substituting $2x + 8$ for y in the equation $y + 58 = 180$, which yields $(2x + 8) + 58 = 180$, or $2x + 66 = 180$. Subtracting 66 from both sides of this equation yields $2x = 114$. Dividing both sides of this equation by 2 yields $x = 57$. Thus, if $y = 2x + 8$, the value of x is 57.

Question Difficulty: Medium

Question ID 35d7123b

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

ID: 35d7123b

Triangle ABC is similar to triangle XYZ, such that A, B, and C correspond to X, Y, and Z respectively. The length of each side of triangle XYZ is 2 times the length of its corresponding side in triangle ABC. The measure of side AB is 16. What is the measure of side XY?

A. 14

B. 16

C. 18

D. 32

ID: 35d7123b Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that triangle ABC is similar to triangle XYZ, such that A, B, and C correspond to X, Y, and Z, respectively. Therefore, side AB corresponds to side XY. Since the length of each side of triangle XYZ is 2 times the length of its corresponding side in triangle ABC, it follows that the measure of side XY is 2 times the measure of side AB. Thus, since the measure of side AB is 16, then the measure of side XY is $2(16)$, or 32.

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

Choice B is incorrect. This is the measure of side AB, not side XY.

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

Question Difficulty: Medium