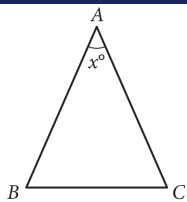


# Question ID c8d60e48

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: c8d60e48



In the given triangle,  $AB = AC$  and  $\angle ABC$  has a measure of  $67^\circ$ . What is the value of  $x$  ?

- A. 36
- B. 46
- C. 58
- D. 70

ID: c8d60e48 Answer

Correct Answer: B

Rationale

Choice B is correct. Since  $AB = AC$ , the measures of their corresponding angles,  $\angle ABC$  and  $\angle ACB$ , are equal. Since  $\angle ABC$  has a measure of  $67^\circ$ , the measure of  $\angle ACB$  is also  $67^\circ$ . Since the sum of the measures of the interior angles in a triangle is  $180^\circ$ , it follows that  $67 + 67 + x = 180$ , or  $134 + x = 180$ . Subtracting by 134 on both sides of this equation yields  $x = 46$ .

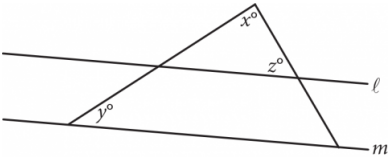
Choices A, C, and D are incorrect and may result from calculation errors.

Question Difficulty: Easy

Question ID a6dbad6b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: a6dbad6b



Note: Figure not drawn to scale.

In the figure above, lines  $\ell$  and  $m$  are parallel,  $y = 20$ , and  $z = 60$ . What is the value of  $x$ ?

- A. 120
- B. 100
- C. 90
- D. 80

ID: a6dbad6b Answer

Correct Answer: B

Rationale

Choice B is correct. Let the measure of the third angle in the smaller triangle be  $a^\circ$ . Since lines  $\ell$  and  $m$  are parallel and cut by transversals, it follows that the corresponding angles formed are congruent. So  $a^\circ = y^\circ = 20^\circ$ . The sum of the measures of the interior angles of a triangle is  $180^\circ$ , which for the interior angles in the smaller triangle yields  $a + x + z = 180$ . Given that  $z = 60$  and  $a = 20$ , it follows that  $20 + x + 60 = 180$ . Solving for  $x$  gives  $x = 180 - 60 - 20$ , or  $x = 100$ .

Choice A is incorrect and may result from incorrectly assuming that angles  $x + z = 180$ . Choice C is incorrect and may result from incorrectly assuming that the smaller triangle is a right triangle, with  $x$  as the right angle. Choice D is incorrect and may result from a misunderstanding of the exterior angle theorem and incorrectly assuming that  $x = y + z$ .

Question Difficulty: Easy

# Question ID cbe8ca31

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: cbe8ca31

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

- A.  $58^\circ$
- B.  $74^\circ$
- C.  $122^\circ$
- D.  $212^\circ$

ID: cbe8ca31 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  $180^\circ$ . It's given that in  $\triangle XYZ$ , the measure of  $\angle X$  is  $24^\circ$  and the measure of  $\angle Y$  is  $98^\circ$ . It follows that the measure of  $\angle Z$  is  $180 - 24 - 98^\circ$ , or  $58^\circ$ .

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  $\angle Z$ .

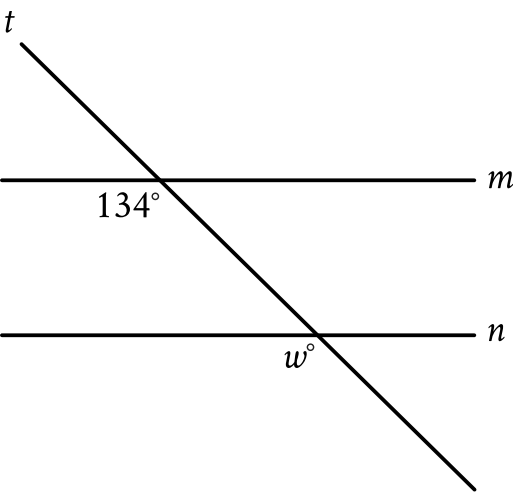
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID c24e1bda

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: c24e1bda



Note: Figure not drawn to scale.  
In the figure, line  $m$  is parallel to line  $n$ . What is the value of  $w$ ?

- A. 13
- B. 34
- C. 66
- D. 134

ID: c24e1bda Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that lines  $m$  and  $n$  are parallel. Since line  $t$  intersects both lines  $m$  and  $n$ , it's a transversal. The angles in the figure marked as  $134^\circ$  and  $w^\circ$  are on the same side of the transversal, where one is an interior angle with line  $m$  as a side, and the other is an exterior angle with line  $n$  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  $w^\circ = 134^\circ$ . Therefore, the value of  $w$  is 134.

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 f9d40000

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: f9d40000

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

- A.  $43^\circ$
- B.  $89^\circ$
- C.  $91^\circ$
- D.  $179^\circ$

ID: f9d40000 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  $180^\circ$ . It's given that in  $\triangle XYZ$ , the measure of  $\angle X$  is  $23^\circ$  and the measure of  $\angle Y$  is  $66^\circ$ . It follows that the measure of  $\angle Z$  is  $180 - 23 - 66^\circ$ , or  $91^\circ$ .

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: Easy

# Question ID 3563d76d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 3563d76d

At a certain time and day, the Washington Monument in Washington, DC, casts a shadow that is 300 feet long. At the same time, a nearby cherry tree casts a shadow that is 16 feet long. Given that the Washington Monument is approximately 555 feet tall, which of the following is closest to the height, in feet, of the cherry tree?

- A. 10
- B. 20
- C. 30
- D. 35

ID: 3563d76d Answer

### Rationale

Choice C is correct. There is a proportional relationship between the height of an object and the length of its shadow. Let  $c$  represent the height, in feet, of the cherry tree. The given relationship can be expressed by the proportion  $\frac{555}{300} = \frac{c}{16}$ . Multiplying both sides of this equation by 16 yields  $c = 29.6$ . This height is closest to the value given in choice C, 30.

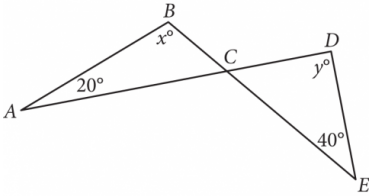
Choices A, B, and D are incorrect and may result from calculation errors.

Question Difficulty: Easy

Question ID dfc420b2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: dfc420b2



Note: Figure not drawn to scale.

In the figure above,  $\overline{AD}$  intersects  $\overline{BE}$  at C. If  $x = 100$ , what is the value of  $y$  ?

- A. 100
- B. 90
- C. 80
- D. 60

ID: dfc420b2 Answer

Correct Answer: C

Rationale

Choice C is correct. It’s given that  $x = 100$ ; therefore, substituting 100 for  $x$  in triangle ABC gives two known angle measures for this triangle. The sum of the measures of the interior angles of any triangle equals  $180^\circ$ . Subtracting the two known angle measures of triangle ABC from  $180^\circ$  gives the third angle measure:  $180^\circ - 100^\circ - 20^\circ = 60^\circ$ . This is the measure of angle BCA. Since vertical angles are congruent, the measure of angle DCE is also  $60^\circ$ . Subtracting the two known angle measures of triangle CDE from  $180^\circ$  gives the third angle measure:  $180^\circ - 60^\circ - 40^\circ = 80^\circ$ . Therefore, the value of  $y$  is 80.

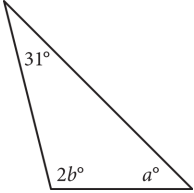
Choice A is incorrect and may result from a calculation error. Choice B is incorrect and may result from classifying angle CDE as a right angle. Choice D is incorrect and may result from finding the measure of angle BCA or DCE instead of the measure of angle CDE.

Question Difficulty: Easy

# Question ID 410bdb6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 410bdb6



In the triangle above,  $a = 45$ . What is the value of  $b$  ?

- A. 52
- B. 59
- C. 76
- D. 104

ID: 410bdb6 Answer

Correct Answer: A

Rationale

Choice A is correct. The sum of the measures of the three interior angles of a triangle is  $180^\circ$ . Therefore,  $31 + 2b + a = 180$ . Since it's given that  $a = 45$ , it follows that  $31 + 2b + 45 = 180$ , or  $2b = 104$ . Dividing both sides of this equation by 2 yields  $b = 52$ .

Choice B is incorrect and may result from a calculation error. Choice C is incorrect. This is the value of  $a + 31$ . Choice D is incorrect. This is the value of  $2b$ .

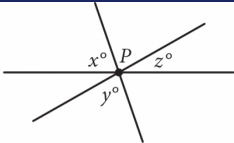
Question Difficulty: Easy



# Question ID 087cdcfd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 087cdcfd



Note: Figure not drawn to scale.

In the figure, three lines intersect at point  $P$ . If  $x = 65$  and  $y = 75$ , what is the value of  $z$  ?

- A. 140
- B. 80
- C. 40
- D. 20

ID: 087cdcfd Answer

Correct Answer: C

Rationale

Choice C is correct. The angle that is shown as lying between the  $y^\circ$  angle and the  $z^\circ$  angle is a vertical angle with the  $x^\circ$  angle. Since vertical angles are congruent and  $x = 65$ , the angle between the  $y^\circ$  angle and the  $z^\circ$  angle measures  $65^\circ$ . Since the  $65^\circ$  angle, the  $y^\circ$  angle, and the  $z^\circ$  angle are adjacent and form a straight angle, it follows that the sum of the measures of these three angles is  $180^\circ$ , which is represented by the equation  $65^\circ + y^\circ + z^\circ = 180^\circ$ . It's given that  $y = 75$ . Substituting 75 for  $y$  yields  $65^\circ + 75^\circ + z^\circ = 180^\circ$ , which can be rewritten as  $140^\circ + z^\circ = 180^\circ$ . Subtracting  $140^\circ$  from both sides of this equation yields  $z^\circ = 40^\circ$ . Therefore,  $z = 40$ .

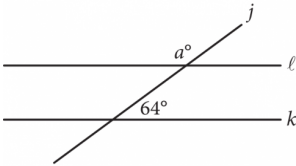
Choice A is incorrect and may result from finding the value of  $x + y$  rather than  $z$ . Choices B and D are incorrect and may result from conceptual or computational errors.

Question Difficulty: Easy

# Question ID 992f4e93

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 992f4e93



Note: Figure not drawn to scale.

In the figure above, lines  $\ell$  and  $k$  are parallel.

What is the value of  $a$  ?

- A. 26
- B. 64
- C. 116
- D. 154

ID: 992f4e93 Answer

Correct Answer: C

Rationale

Choice C is correct. Since lines  $\ell$  and  $k$  are parallel, corresponding angles formed by the intersection of line  $j$  with lines  $\ell$  and  $k$  are congruent. Therefore, the angle with measure  $a^\circ$  must be the supplement of the angle with measure  $64^\circ$ . The sum of two supplementary angles is  $180^\circ$ , so  $a = 180 - 64 = 116$ .

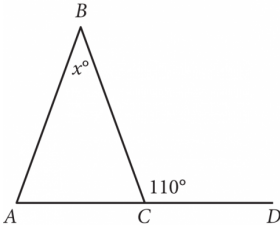
Choice A is incorrect and likely results from thinking the angle with measure  $a^\circ$  is the complement of the angle with measure  $64^\circ$ . Choice B is incorrect and likely results from thinking the angle with measure  $a^\circ$  is congruent to the angle with measure  $64^\circ$ . Choice D is incorrect and likely results from a conceptual or computational error.

Question Difficulty: Easy

Question ID 5733ce30

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 5733ce30



In the given figure,  $\overline{AC}$  extends to point  $D$ . If the measure of  $\angle BAC$  is equal to the measure of  $\angle BCA$ , what is the value of  $x$  ?

- A. 110
- B. 70
- C. 55
- D. 40

ID: 5733ce30 Answer

Correct Answer: D

Rationale

Choice D is correct. Since  $\angle BCD$  and  $\angle BCA$  form a linear pair of angles, their measures sum to  $180^\circ$ . It's given that the measure of  $\angle BCD$  is  $110^\circ$ . Therefore,  $110^\circ + \angle BCA = 180^\circ$ . Subtracting  $110^\circ$  from both sides of this equation gives the measure of  $\angle BCA$  as  $70^\circ$ . It's also given that the measure of  $\angle BAC$  is equal to the measure of  $\angle BCA$ . Thus, the measure of  $\angle BAC$  is also  $70^\circ$ . The measures of the interior angles of a triangle sum to  $180^\circ$ . Thus,  $70^\circ + 70^\circ + x^\circ = 180^\circ$ . Combining like terms on the left-hand side of this equation yields  $140^\circ + x^\circ = 180^\circ$ . Subtracting  $140^\circ$  from both sides of this equation yields  $x^\circ = 40^\circ$ , or  $x = 40$ .

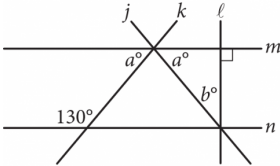
Choice A is incorrect. This is the value of the measure of  $\angle BCD$ . Choice B is incorrect. This is the value of the measure of each of the other two interior angles,  $\angle BCA$  and  $\angle BAC$ . Choice C is incorrect and may result from an error made when identifying the relationship between the exterior angle of a triangle and the interior angles of the triangle.

Question Difficulty: Easy

Question ID 3828f53d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 3828f53d



Note: Figure not drawn to scale.

In the figure above, lines  $m$  and  $n$  are parallel.  
What is the value of  $b$  ?

- A. 40
- B. 50
- C. 65
- D. 80

ID: 3828f53d Answer

Correct Answer: A

Rationale

Choice A is correct. Given that lines  $m$  and  $n$  are parallel, the angle marked  $130^\circ$  must be supplementary to the leftmost angle marked  $a^\circ$  because they are same-side interior angles. Therefore,  $130^\circ + a^\circ = 180^\circ$ , which yields  $a = 50^\circ$ . Lines  $j$  and  $m$  intersect at a right angle, so lines  $j$ ,  $l$ , and  $m$  form a right triangle where the two acute angles are  $a^\circ$  and  $b^\circ$ . The acute angles of a right triangle are complementary, so  $a^\circ + b^\circ = 90^\circ$ , which yields  $50^\circ + b^\circ = 90^\circ$ , and  $b = 40$ .

Choice B is incorrect. This is the value of  $a$ , not  $b$ . Choice C is incorrect and may be the result of dividing  $130^\circ$  by 2. Choice D is incorrect and may be the result of multiplying  $b$  by 2.

Question Difficulty: Easy

# Question ID 42b4493b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 42b4493b

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

- A. 6
- B. 39
- C. 49
- D. 51

ID: 42b4493b 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.

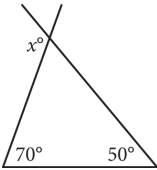
Choice D is incorrect. This is the measure, in degrees, of the acute angle whose measure is given.

Question Difficulty: Easy

# Question ID 36200a38

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Geometry and Trigonometry	Lines, angles, and triangles	<div><div></div><div></div><div></div></div>

ID: 36200a38



In the figure above, two sides of a triangle are extended. What is the value of  $x$  ?

- A. 110
- B. 120
- C. 130
- D. 140

ID: 36200a38 Answer

Correct Answer: B

Rationale

Choice B is correct. The sum of the interior angles of a triangle is  $180^\circ$ . The measures of the two interior angles of the given triangle are shown. Therefore, the measure of the third interior angle is  $180^\circ - 70^\circ - 50^\circ = 60^\circ$ . The angles of measures  $x^\circ$  and  $60^\circ$  are supplementary, so their sum is  $180^\circ$ . Therefore,  $x = 180 - 60 = 120$ .

Choice A is incorrect and may be the result of misinterpreting  $x^\circ$  as supplementary to  $70^\circ$ . Choice C is incorrect and may be the result of misinterpreting  $x^\circ$  as supplementary to  $50^\circ$ . Choice D is incorrect and may be the result of a calculation error.

Question Difficulty: Easy