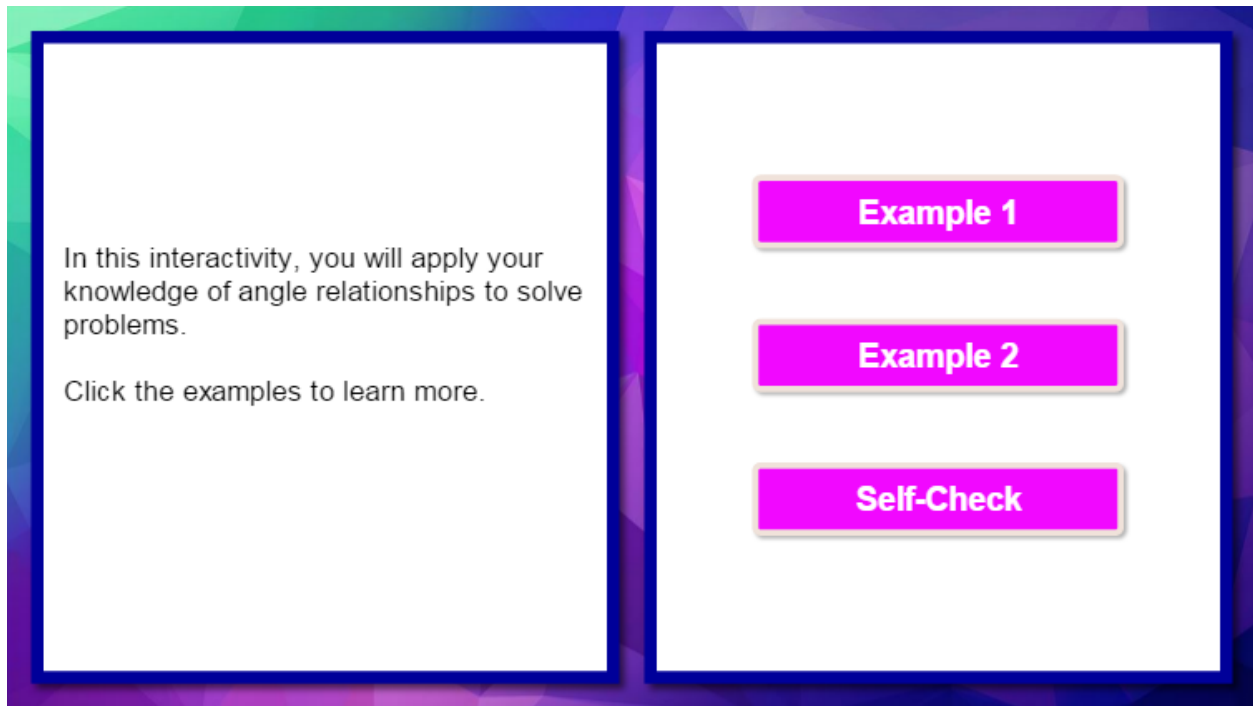


Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Introduction



In this interactivity, you will apply your knowledge of angle relationships to solve problems.

Click the examples to learn more.

[Example 1](#)

[Example 2](#)

[Self-Check](#)

The image shows a digital interface with a blue and purple geometric background. It is divided into two main panels. The left panel contains introductory text. The right panel contains three pink buttons with white text, labeled 'Example 1', 'Example 2', and 'Self-Check'.

In this interactivity, you will apply your knowledge of angle relationships to solve problems.

Click the examples to learn more.

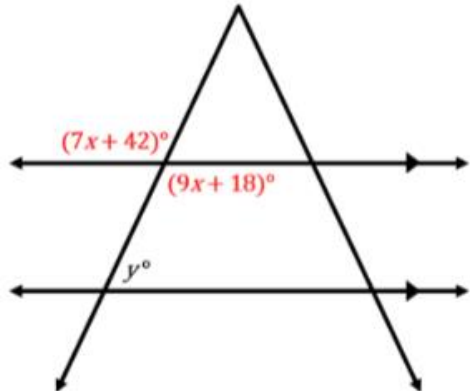
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1

Example 1

Given the diagram, find x and y .



To find x , you may choose to begin by focusing on these angles.

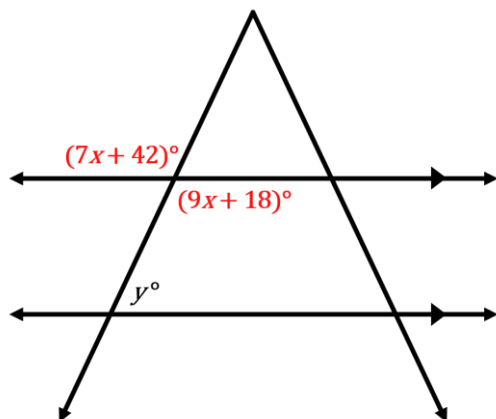
These angles _____.

- form a linear pair
- are vertical angles
- are alternate interior angles

Select the correct answer and click **SUBMIT** to check your response.

Submit

Given the diagram, find x and y .



To find x , you may choose to begin by focusing on these angles.

These angles _____.

- form a linear pair
- are vertical angles
- are alternate interior angles

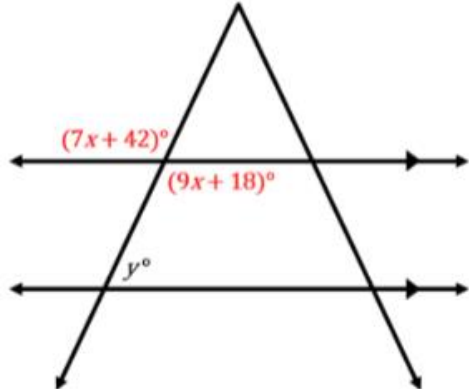
Select the correct answer and click **SUBMIT** to check your response.

Module 2: Angles Formed by a Transversal Intersecting Parallel Lines
Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



To find x , you may choose to begin by focusing on these angles.

These angles _____.

✔ are vertical angles

Vertical angles are nonadjacent angles formed by intersecting lines.

Click **NEXT** to continue.

Next

The correct answer is: These angles *are vertical angles*.

Vertical angles are nonadjacent angles formed by intersecting lines.

Click **NEXT** to continue.

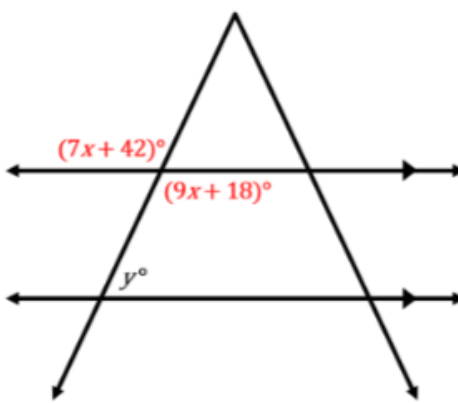
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



The diagram shows a triangle with two horizontal parallel lines intersecting it. The top line is labeled with an angle of $(7x + 42)^\circ$ on the left side and $(9x + 18)^\circ$ on the right side. The bottom line is labeled with an angle of y° on the left side.

Recall that vertical angles are congruent. Therefore, you can use the equation $7x + 42 = 9x + 18$ to find x .

$x =$

Enter the value of x in the box above and click **SUBMIT** to check your response.

Submit

Recall that vertical angles are congruent. Therefore, you can use the equation $7x + 42 = 9x + 18$ to find x .

$$x = \underline{\hspace{2cm}}$$

Enter the value of x in the box above and click **SUBMIT** to check your response.

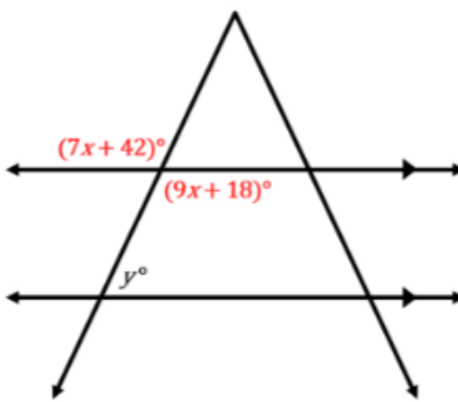
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



Recall that vertical angles are congruent. Therefore, you can use the equation $7x + 42 = 9x + 18$ to find x .

$x = 12$ ✓

$7x + 42 = 9x + 18$	
$-2x + 42 = 18$	Subtract $9x$ from each side.
$-2x = -24$	Subtract 42 from each side.
$x = 12$	Divide each side by -2 .


Click **NEXT** to continue.

Next

The correct answer is 12.

$$\begin{array}{ll} 7x + 42 = 9x + 18 & \\ -2x + 42 = 18 & \text{Subtract } 9x \text{ from each side.} \\ -2x = -24 & \text{Subtract 42 from each side.} \\ x = 12 & \text{Divide each side by } -2. \end{array}$$

Click **NEXT** to continue.

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EDUCATION

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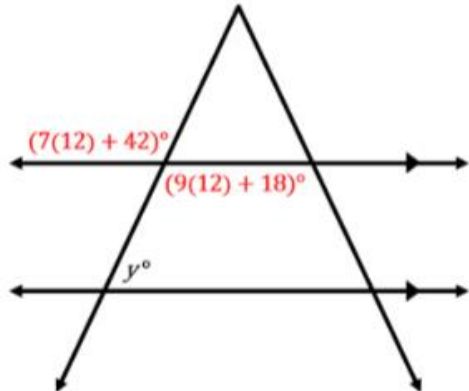
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



The diagram shows a triangle with two horizontal parallel lines intersecting its sides. The top-left exterior angle is labeled $(7(12) + 42)^\circ$. The top-right exterior angle is labeled $(9(12) + 18)^\circ$. The bottom-left interior angle is labeled y° .

To find y , it may be helpful to determine the measures of the vertical angles. To do this, substitute 12 for x into the algebraic expressions that represent the measures of the vertical angles.

After substituting 12 for x into the algebraic expressions, you find that the measure of each angle is _____.

84°
108°
126°

Select the correct answer and click **SUBMIT** to check your response.

Submit

To find y , it may be helpful to determine the measures of the vertical angles. To do this, substitute 12 for x into the algebraic expressions that represent the measures of the vertical angles.

- $7(12) + 42$
- $9(12) + 18$

After substituting 12 for x into the algebraic expressions, you find that the measure of each angle is _____.

- 84°
108°
126°

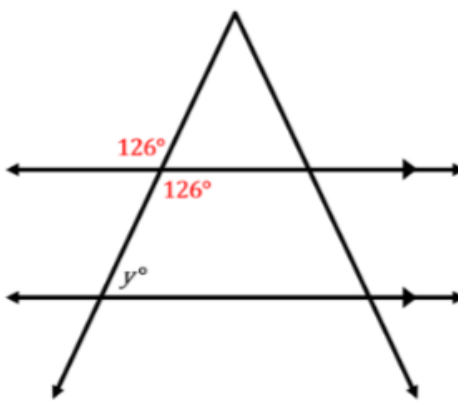
Select the correct answer and click **SUBMIT** to check your response.

Module 2: Angles Formed by a Transversal Intersecting Parallel Lines
Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



To find y , it may be helpful to determine the measures of the vertical angles. To do this, substitute 12 for x into the algebraic expressions that represent the measures of the vertical angles.

After substituting 12 for x into the algebraic expressions, you find that the measure of each angle is _____.

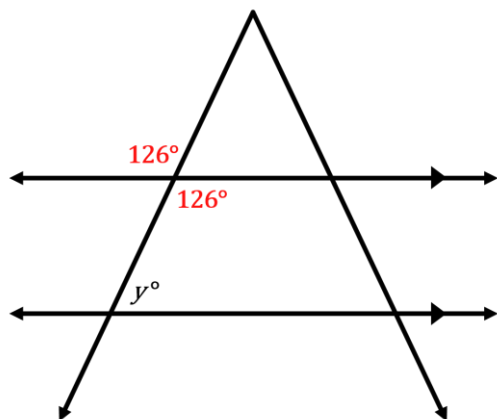
✓ 126°

Substitute 12 for x .

$7x + 42$	$9x + 18$
$7(12) + 42$	$9(12) + 18$
$84 + 42$	$108 + 18$
126	126

Click **NEXT** to continue. Next

The correct answer is 126° .



Substitute 12 for x .

$7x + 42$	$9x + 18$
$7(12) + 42$	$9(12) + 18$
$84 + 42$	$108 + 18$
126	126

Click **NEXT** to continue.

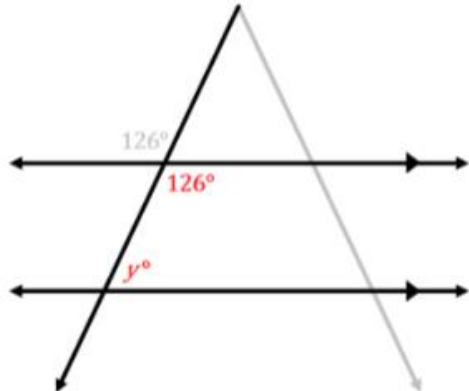
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



Next, focus your attention on the angles highlighted in the diagram. Notice that they are in the interior of the parallel lines and on the same side of the transversal.

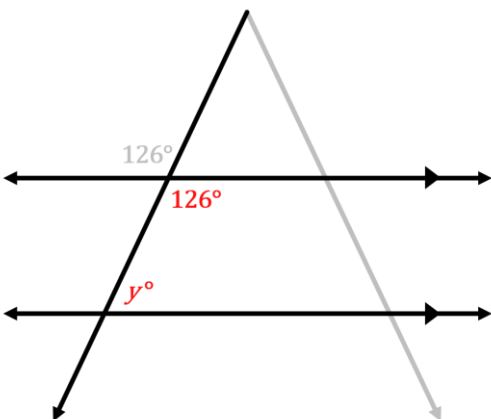
Recall that if a transversal intersects two parallel lines, same-side interior angles are _____.

congruent
supplementary

Select the correct answer and click **SUBMIT** to check your response.

Submit

Next, focus your attention on the angles highlighted in the diagram. Notice that they are in the interior of the parallel lines and on the same side of the transversal.



Recall that if a transversal intersects two parallel lines, same-side interior angles are ____.

congruent
supplementary

Select the correct answer and click **SUBMIT** to check your response.

Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .

Next, focus your attention on the angles highlighted in the diagram. Notice that they are in the interior of the parallel lines and on the same side of the transversal.

Recall that if a transversal intersects two parallel lines, same-side interior angles are _____.

✓ supplementary

Click **NEXT** to continue.

Next

The correct answer is *supplementary*.

Click **NEXT** to continue.

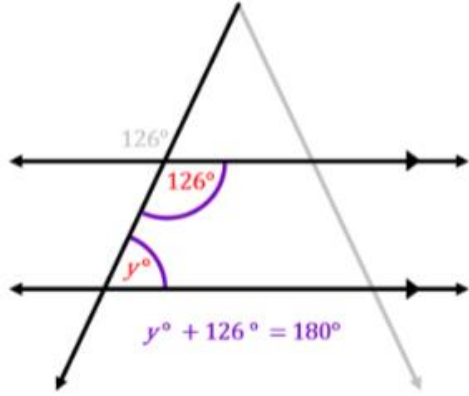
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



$y^\circ + 126^\circ = 180^\circ$

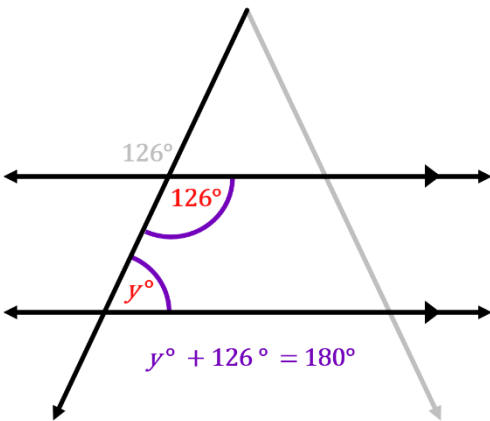
You can use the equation $y + 126 = 180$ to find y .

$y =$

Enter the value of y in the box above and click **SUBMIT** to check your response.

Submit

You can use the equation $y + 126 = 180$ to find y .



$y =$ _____

Enter the value of y in the box above and click **SUBMIT** to check your response.

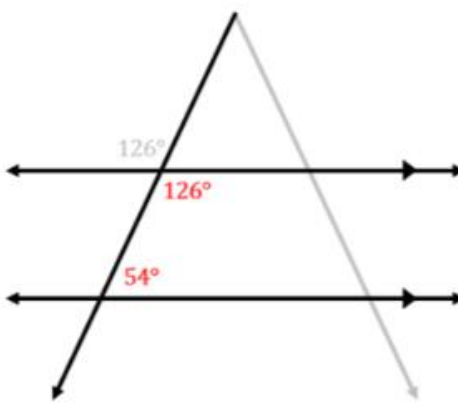
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

Given the diagram, find x and y .



You can use the equation $y + 126 = 180$ to find y .

$y = 54$ ✓

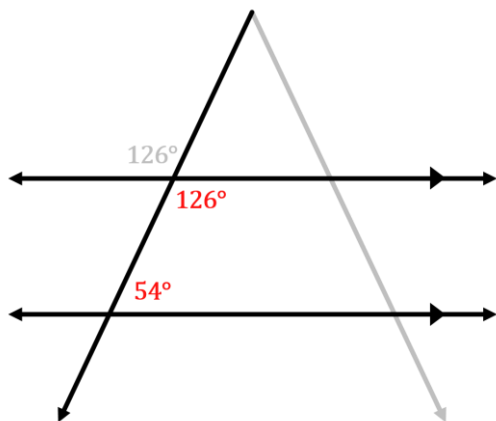
$y + 126 = 180$
 $y = 54$ Subtract 126 from each side.

Click **NEXT** to continue.

Next

The correct answer is 54.

$$y + 126 = 180$$
$$y = 54 \quad \text{Subtract 126 from each side.}$$



Click **NEXT** to continue.

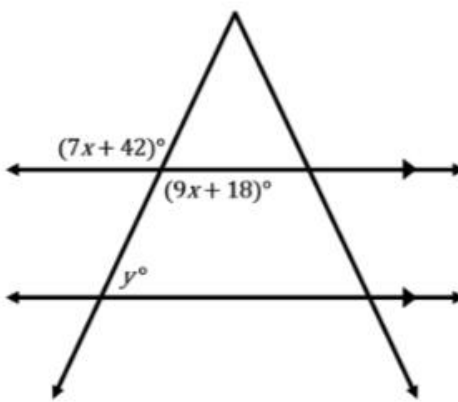
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 1 (continued)

Example 1

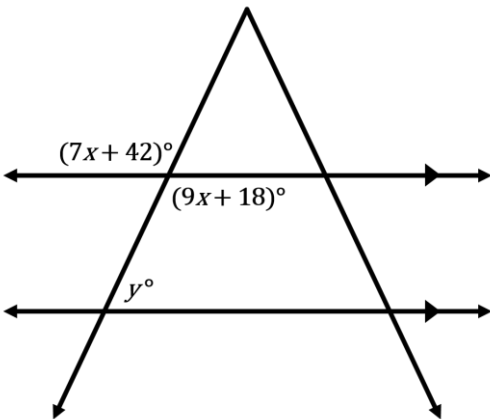
Given the diagram, find x and y .



Your work is complete. You have used your knowledge of angle relationships to find that $x = 12$ and $y = 54$.

Menu

Your work is complete. You have used your knowledge of angle relationships to find that $x = 12$ and $y = 54$.



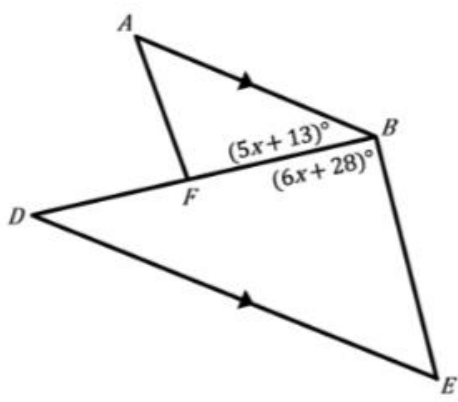
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 2

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



To find the $m\angle BDE$, begin by finding x .

Because you know that $m\angle ABE = 118^\circ$, you can use the Angle Addition Postulate to write an equation to solve for x .

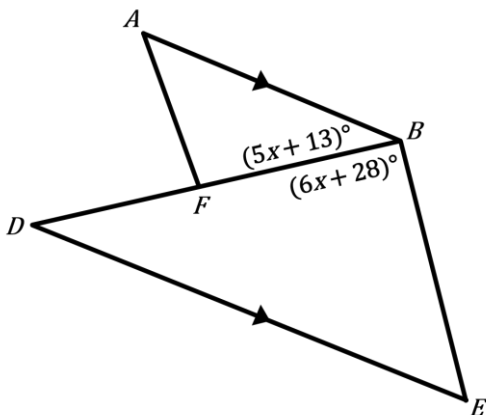
Which of the following equations can be used to find x ?

- $5x + 13 + 6x + 28 = 180$
- $5x + 13 = 6x + 28$
- $5x + 13 + 6x + 28 = 118$

Select the correct answer and click **SUBMIT** to check your response.

Submit

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



To find the $m\angle BDE$, begin by finding x .

Because you know that $m\angle ABE = 118^\circ$, you can use the Angle Addition Postulate to write an equation to solve for x .

Which of the following equations can be used to find x ?

$5x + 13 + 6x + 28 = 180$

$5x + 13 = 6x + 28$

$5x + 13 + 6x + 28 = 118$

Select the correct answer and click **SUBMIT** to check your response.

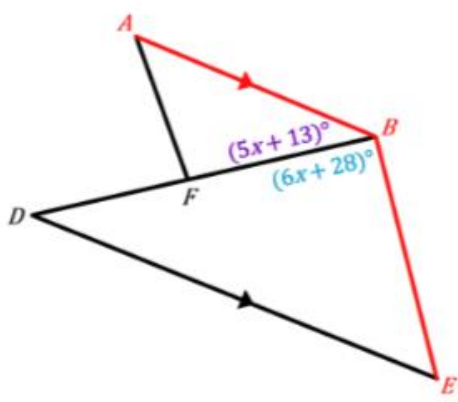
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 2 (continued)

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



To find the $m\angle BDE$, begin by finding x .

Because you know that $m\angle ABE = 118^\circ$, you can use the Angle Addition Postulate to write an equation to solve for x .

Which of the following equations can be used to find x ?

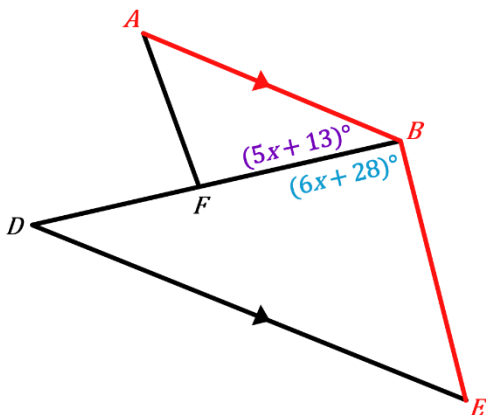
✓ $5x + 13 + 6x + 28 = 118$

The given statement informs you that $m\angle ABE = 118^\circ$.

$$m\angle ABD + m\angle EBD = m\angle ABE$$
$$(5x + 13)^\circ + (6x + 28)^\circ = 118^\circ$$

Click **NEXT** to continue. Next

The correct answer is 118.



The given statement informs you that $m\angle ABE = 118^\circ$.

$$m\angle ABD + m\angle EBD = m\angle ABE$$
$$(5x + 13)^\circ + (6x + 28)^\circ = 118^\circ$$

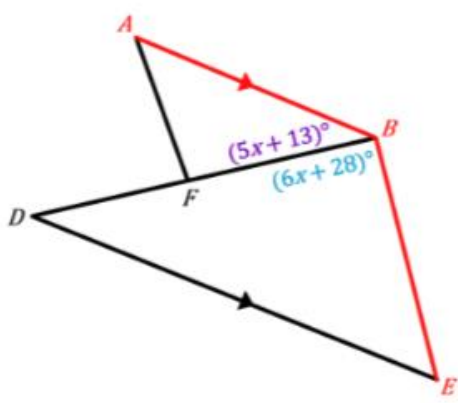
Click **NEXT** to continue.

Module 2: Angles Formed by a Transversal Intersecting Parallel Lines
Topic 1 Content: More Applications of Angle Relationships

Example 2 (continued)

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



Next, find x by solving the equation $5x + 13 + 6x + 28 = 118$.

$x =$

Enter the value of x in the box above and click **SUBMIT** to check your response.

Submit

Next, find x by solving the equation $5x + 13 + 6x + 28 = 118$.

$x =$ _____

Enter the value of x in the box above and click **SUBMIT** to check your response.

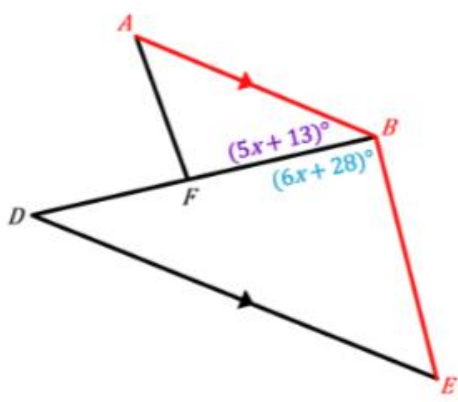
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 2 (continued)

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



Next, find x by solving the equation $5x + 13 + 6x + 28 = 118$.

$x = 7$ ✓

Solve the equation to find x .

$$5x + 13 + 6x + 28 = 118$$
$$11x + 41 = 118 \quad \text{Combine like terms.}$$
$$11x = 77 \quad \text{Subtract 41 from each side.}$$
$$x = 7 \quad \text{Divide each side by 7.}$$

Click **NEXT** to continue.

Next

The correct answer is 7.

Solve the equation to find x .

$$5x + 13 + 6x + 28 = 118$$

$$11x + 41 = 118$$

$$11x = 77$$

$$x = 7$$

Combine like terms.

Subtract 41 from each side.

Divide each side by 7.

Click **NEXT** to continue.

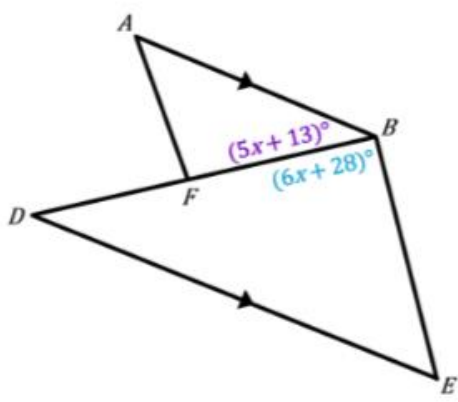
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 2 (continued)

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



To find $m\angle BDE$, it may be helpful to determine $m\angle ABD$ and $m\angle EBD$. To do this, substitute 7 for x in each algebraic expression.

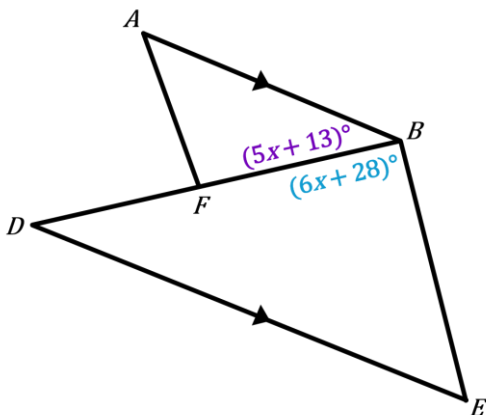
After substituting x into each algebraic expression, you find that ____ and ____.

$m\angle ABD = 48^\circ$ $m\angle EBD = 58^\circ$
 $m\angle ABD = 60^\circ$ $m\angle EBD = 70^\circ$

Select all the correct answers that apply and click **SUBMIT** to check your response.

Submit

To find $m\angle BDE$, it may be helpful to determine $m\angle ABD$ and $m\angle EBD$.



To do this, substitute 7 for x in each algebraic expression.

After substituting x into each algebraic expression, you find that ____ and ____.

$m\angle ABD = 48^\circ$

$m\angle ABD = 60^\circ$

$m\angle EBD = 58^\circ$

$m\angle EBD = 70^\circ$

Select all the correct answers that apply and click **SUBMIT** to check your response.

Module 2: Angles Formed by a Transversal Intersecting Parallel Lines
Topic 1 Content: More Applications of Angle Relationships

Example 2 (continued)

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.

To find $m\angle BDE$, it may be helpful to determine $m\angle ABD$ and $m\angle EBD$. To do this, substitute 7 for x in each algebraic expression.

After substituting x into each algebraic expression, you find that ____ and ____.

$m\angle ABD = 48^\circ$ ✓ $m\angle EBD = 70^\circ$ ✓

Substitute 7 for x in each expression.

$5x + 13$	$6x + 28$
$5(7) + 13$	$6(7) + 28$
$35 + 13$	$42 + 28$
48	70

Click **NEXT** to continue. Next

The correct answers are $m\angle ABD = 48^\circ$ and $m\angle EBD = 70^\circ$.

Substitute 7 for x in each expression.

$5x + 13$	$6x + 28$
$5(7) + 13$	$6(7) + 28$
$35 + 13$	$42 + 28$
48	70

Click **NEXT** to continue.

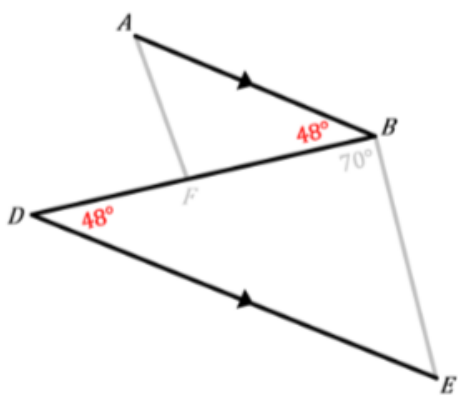
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Example 2 (continued)

Example 2

Given the diagram and $m\angle ABE = 118^\circ$, find $m\angle BDE$.



The diagram shows two parallel lines, \overline{AB} and \overline{DE} , intersected by transversals \overline{AD} and \overline{BE} . The angle $\angle ABE$ is labeled as 118° . The angle $\angle DBE$ is labeled as 70° . The angle $\angle BDE$ is labeled as 48° .

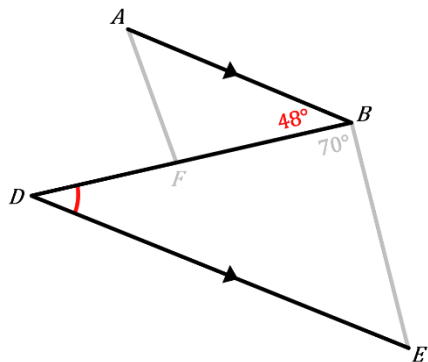
Next, notice that \overline{DB} is a transversal that intersects parallel segments \overline{AB} and \overline{DE} .

Recall that if a transversal intersects parallel lines, then alternate interior angles are congruent. Therefore, $\angle ABD \cong \angle BDE$.

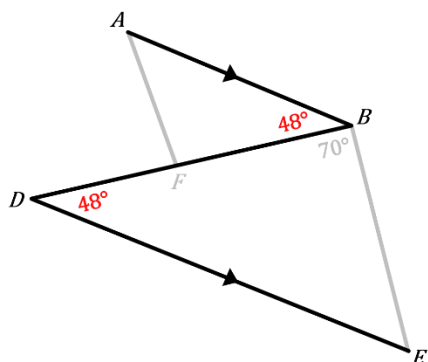
Thus, $m\angle BDE = 48^\circ$.

Menu

Next, notice that \overline{DB} is a transversal that intersects parallel segments \overline{AB} and \overline{DE} .



Recall that if a transversal intersects parallel lines, then alternate interior angles are congruent. Therefore, $\angle ABD \cong \angle BDE$. Thus, $m\angle BDE = 48^\circ$.

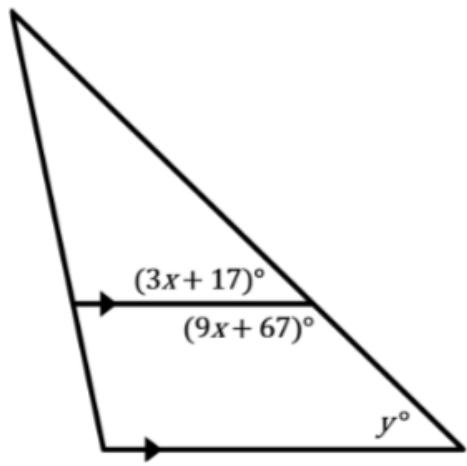


Module 2: Angles Formed by a Transversal Intersecting Parallel Lines
Topic 1 Content: More Applications of Angle Relationships

Self-Check

Self-Check

Find x and y . Select the correct answers, and then click **SUBMIT** to check your response.



$x = 139$
 $y = 9$
 $y = 41$
 $x = 8$

Submit

Solve the problem in the image above to check your understanding of the content.

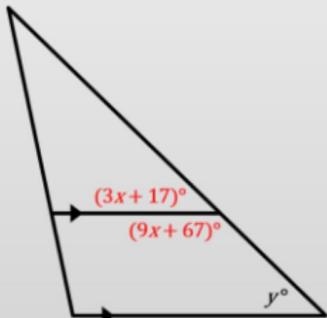
Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Self-Check: Answer

Correct

Find y . You selected the correct response. You may choose to begin by finding x . Notice that the angles near the top of the figure form a linear pair. Because a linear pair is supplementary, you can set up the following equation and solve for x .

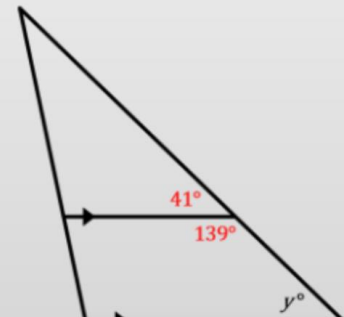
$$3x + 17 + 9x + 67 = 180$$
$$12x + 84 = 180 \quad \text{Combine like terms.}$$
$$12x = 96 \quad \text{Subtract 84 from each side.}$$
$$x = 8 \quad \text{Divide each side by 12.}$$


Correct

Find y . Next, substitute 8 for x in each expression to find the measures of the angles included in the linear pair.

$3x + 17$	$9x + 67$
$3(8) + 17$	$9(8) + 67$
$24 + 17$	$72 + 67$
41	139

The measures of the angles included in the linear pair are 41° and 139° .



For your reference, the images above show the correct solution to the self-check problem.

Module 2: Angles Formed by a Transversal Intersecting Parallel Lines

Topic 1 Content: More Applications of Angle Relationships

Self-Check: Answer (continued)

Correct

Find y . If a transversal intersects parallel lines, then corresponding angles are congruent. Therefore, $y = 41$.

Part 1 Part 2 **Part 3** Continue

For your reference, the image above shows the correct solution to the self-check problem.