

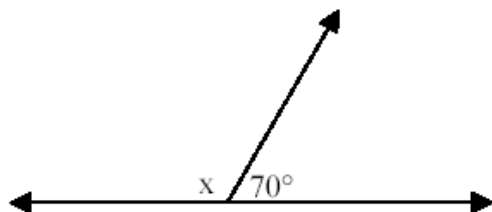
Complementary, Supplementary, & Vertical Angles

Type of Angles	Definition/Description	Diagram
Complementary Angles		
Supplementary Angles		
Vertical Angles		

Examples:

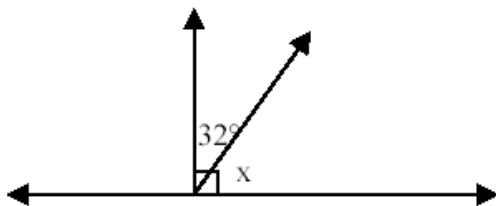
1) These two angles are _____.

Find angle x :



2) These two angles are _____.

Find angle x :

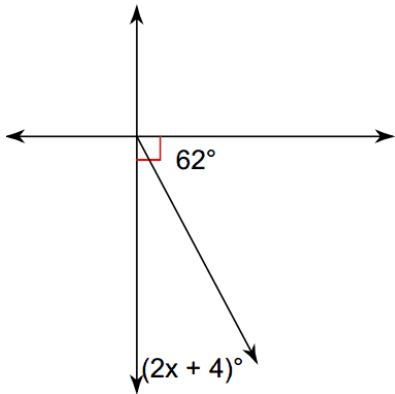


3) The complement of a 24° angle has a measure of _____.

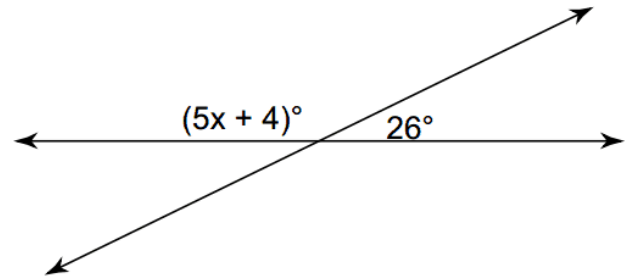
4) The supplement of a 85° angle has a measure of _____.

Examples 5-12: Solve for x in each diagram, then solve for the unknown angle.

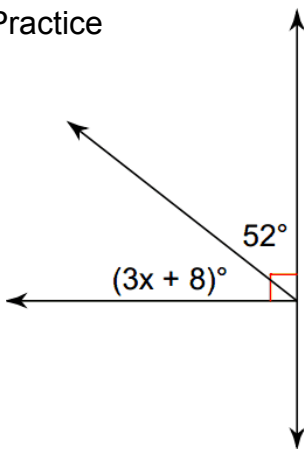
5)



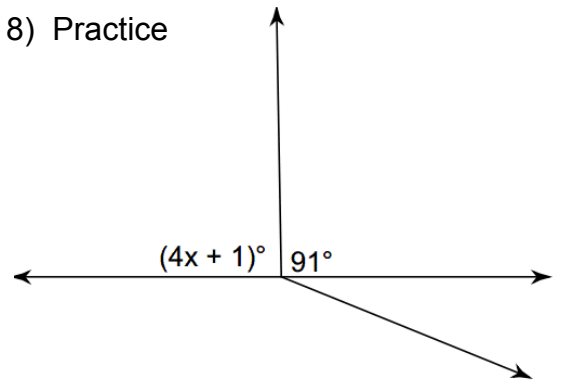
6)



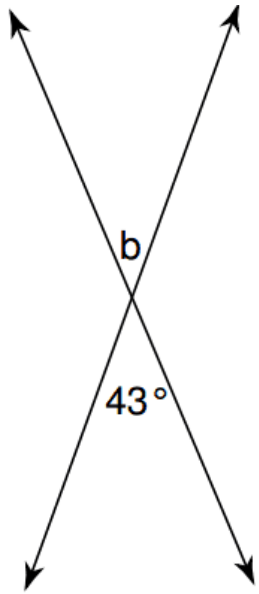
7) Practice



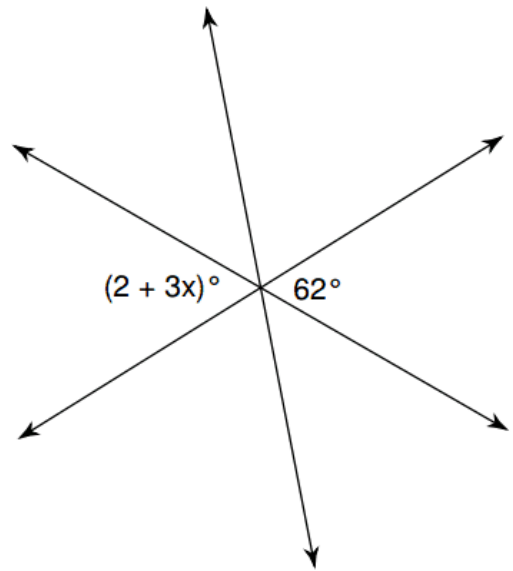
8) Practice



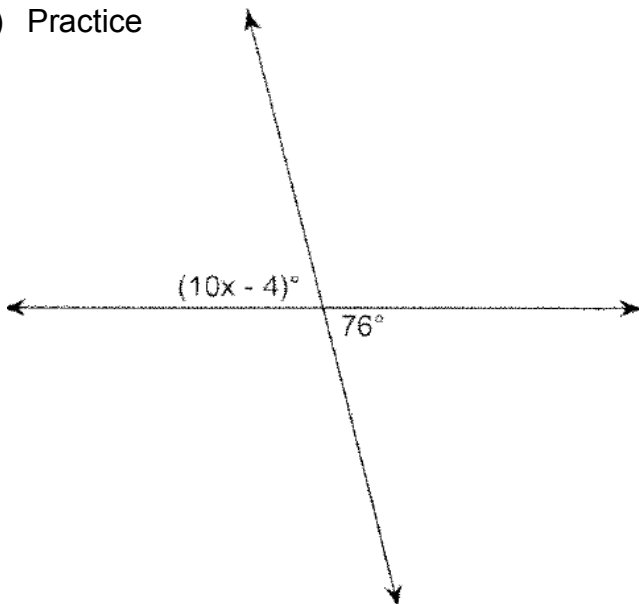
9)



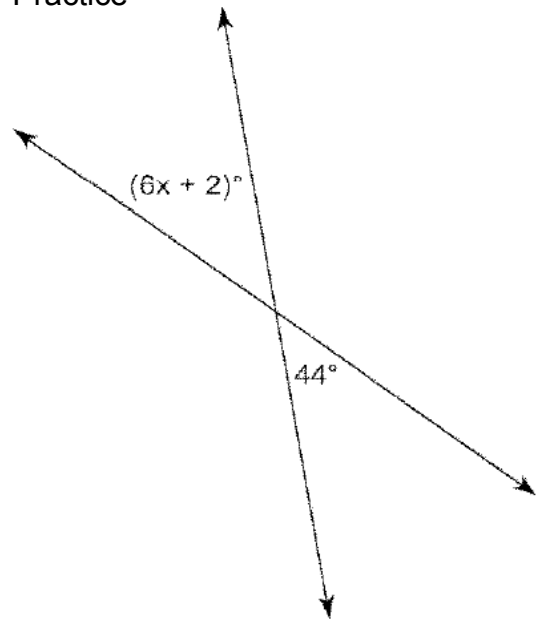
10)



11) Practice



12) Practice

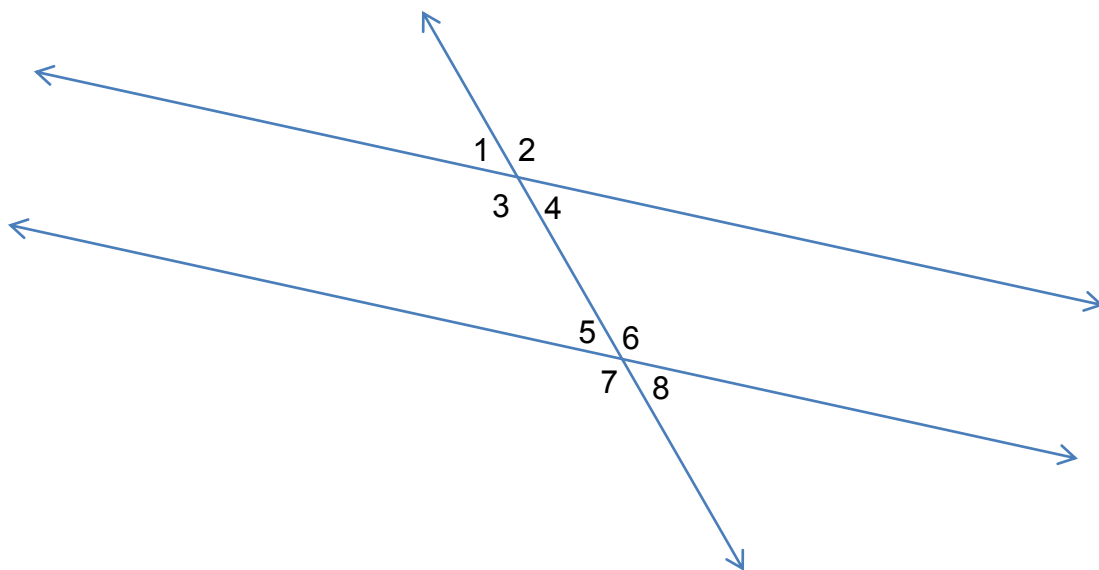


Parallel Lines Cut by a Transversal

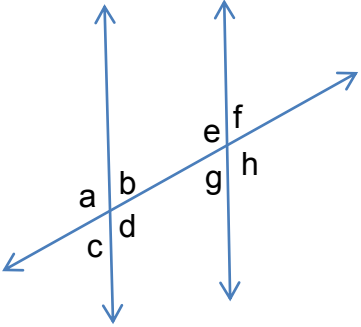
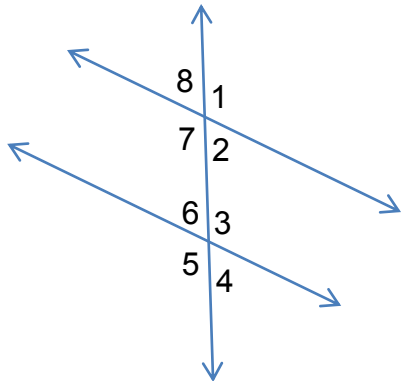
Parallel lines are _____

A transversal is _____

When we have parallel lines cut by a transversal, the angles formed have many properties.

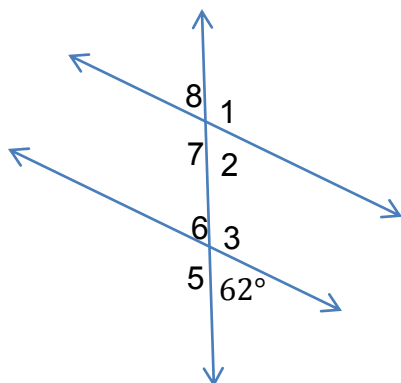


Types of Angles	Definition/Description	Statements
Corresponding Angles		
Alternate Interior Angles		
Alternate Exterior Angles		

Diagram	Corresponding Angles	Alternate Interior Angles	Alternate Exterior Angles
			
			

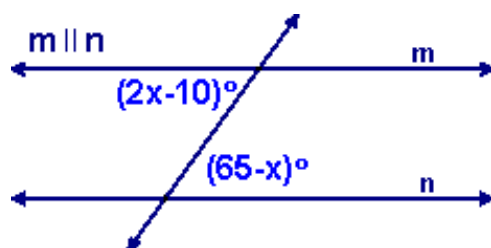
Parallel Lines Cut by a Transversal

Example 1: Determine the measure of all the angles and write them on the diagram.



Solve for x , then calculate the angle measures.

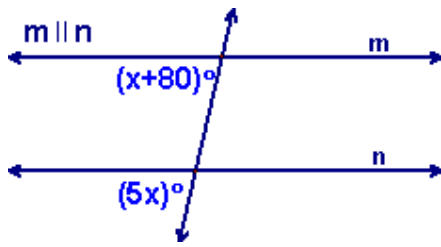
Example 2:



Type of Angles: _____

$x =$ _____
angle = _____
angle = _____

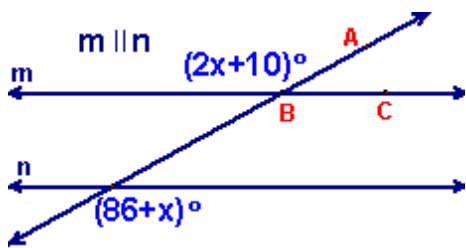
Example 3:



Type of Angles: _____

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

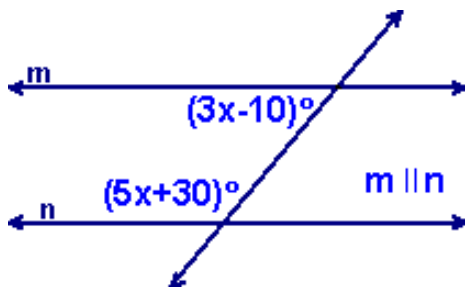
Example 4:



Type of Angles: _____

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

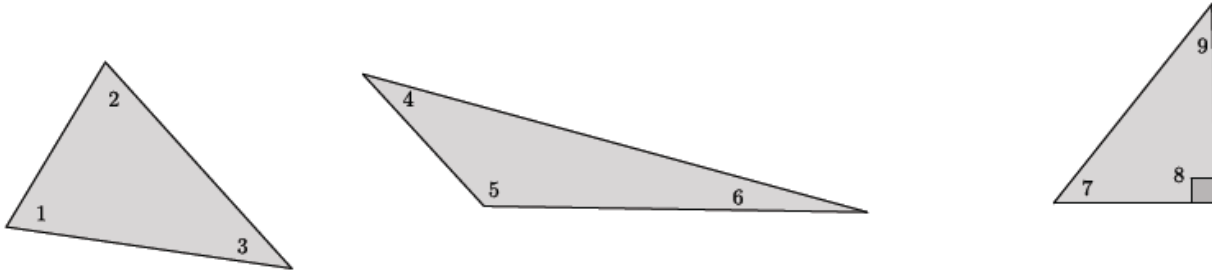
Example 5:



Type of Angles: _____

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

The **Angle Sum Theorem** for triangles states that the sum of the interior angles of a triangle is always _____. It does not matter what kind of triangle (ex. Acute, obtuse, right) when you add the measure of the three angles, you always get a sum of 180.

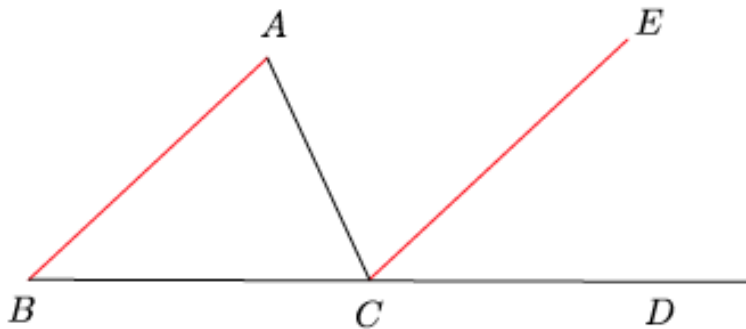


$$\angle 1 + \angle 2 + \angle 3 = \angle 4 + \angle 5 + \angle 6 = \angle 7 + \angle 8 + \angle 9 = 180$$

Note that the sum of angles 7 and 9 must equal 90° because of the known right angle in the right triangle.

Exploratory Challenge 1

Let triangle ABC be given. On the ray from B to C , take a point D so that C is between B and D . Through point C , draw a line parallel to AB as shown. Extend the parallel lines AB and CE . Line AC is the transversal that intersects the parallel lines.



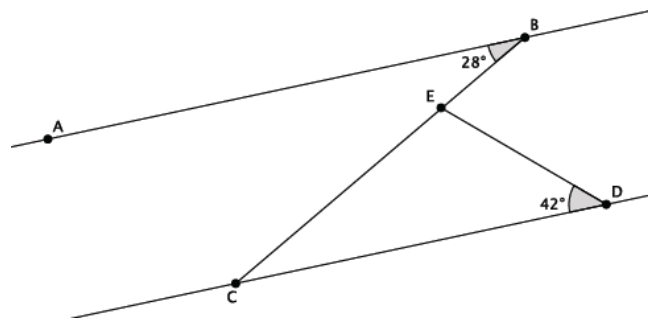
- Name the three interior angles of triangle ABC .
- Name the straight angle.
- What kinds of angles are $\angle ABC$ and $\angle ECD$? What does that mean about their measures?

d. What kinds of angles are $\angle BAC$ and $\angle ECA$? What does that mean about their measures?

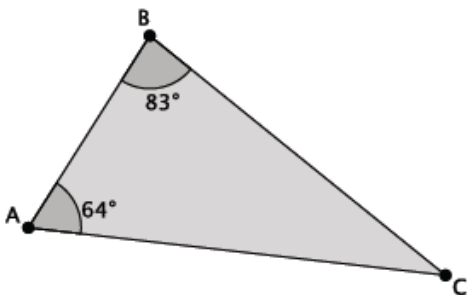
e. We know that $\angle BCD = \angle BCA + \angle ECA + \angle ECD = 180^\circ$. Use substitution to show that the three interior angles of the triangle have a sum of 180° .

Examples:

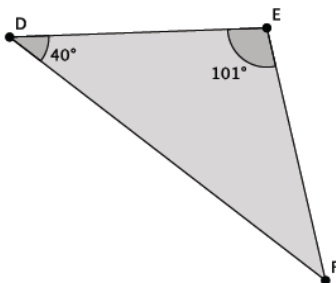
1. In the diagram below, line AB is parallel to line CD , i.e., $L_{AB} \parallel L_{CD}$. The measure of angle $\angle ABC = 28^\circ$, and the measure of angle $\angle EDC = 42^\circ$. Find the measure of angle $\angle CED$.



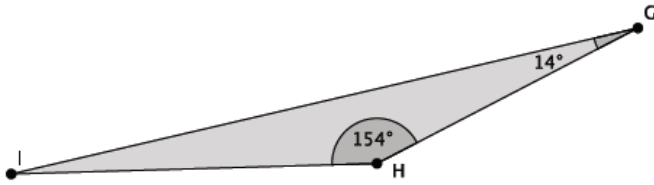
2. What is the measure of $\angle ACB$?



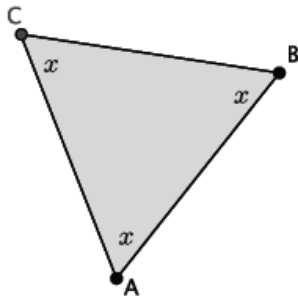
3. What is the measure of $\angle EFD$?



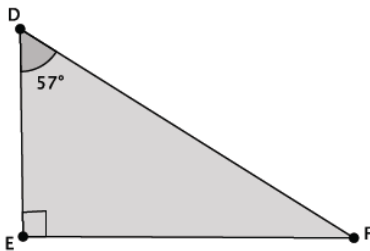
4. What is the measure of $\angle HIG$?



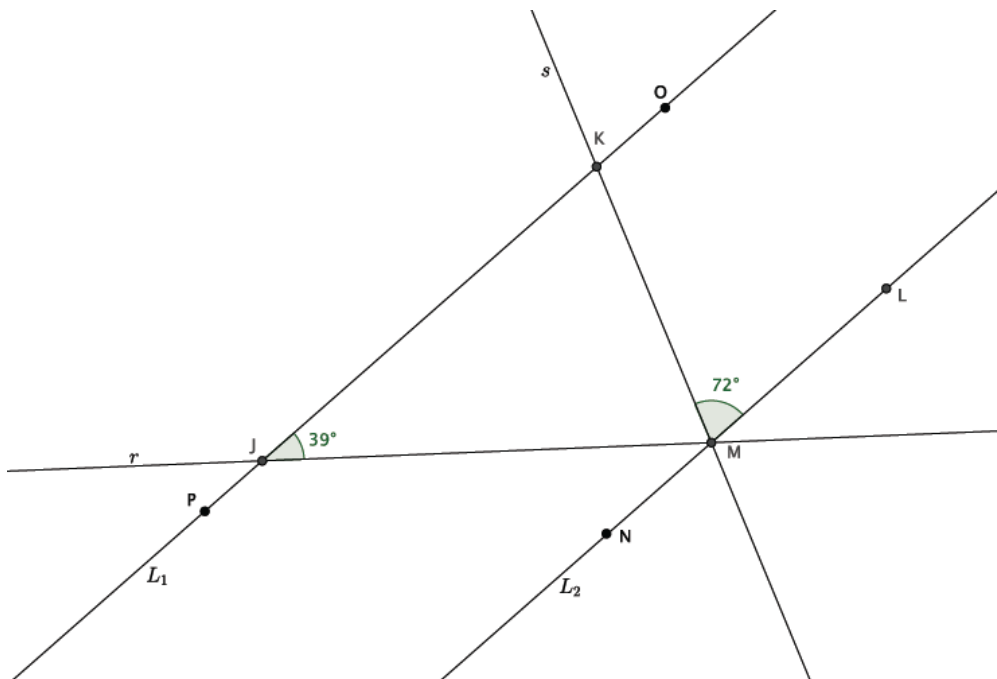
5. What is the measure of $\angle ABC$?



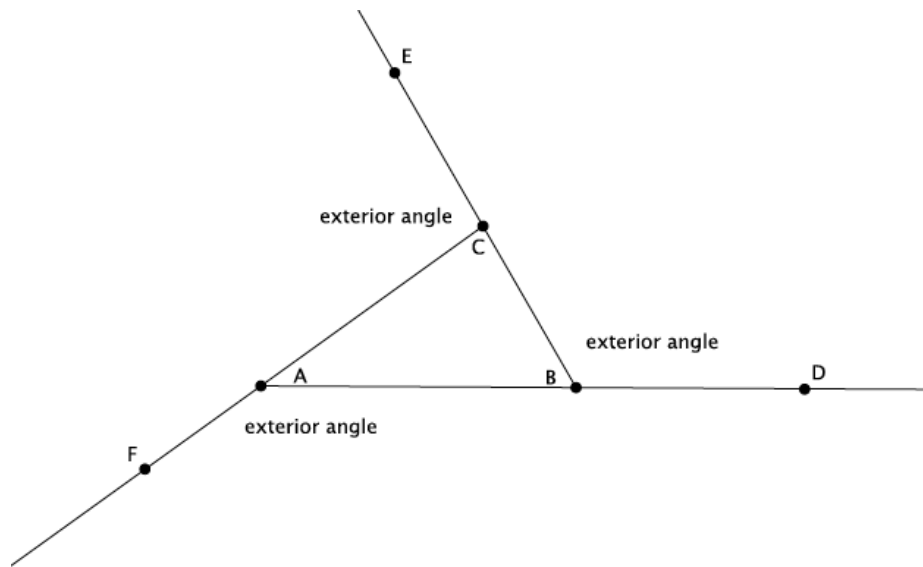
6. Triangle DEF is a right triangle. What is the measure of $\angle EFD$?



7. In the diagram below, lines L_1 and L_2 are parallel. Transversals r and s intersect both lines at the points shown below. Determine the measure of $\angle JMK$. Explain how you know you are correct.



Use the diagram below to complete the following questions.



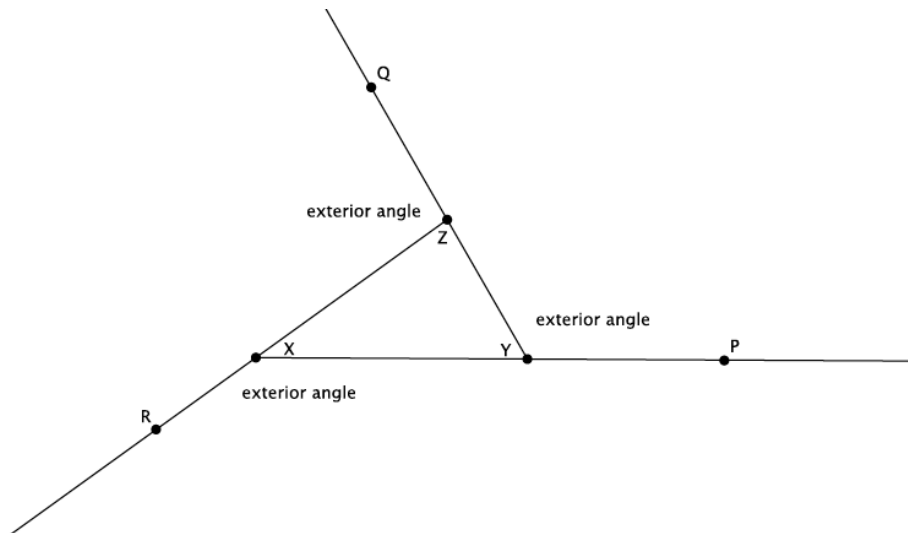
- What do we know about the sum of interior angles of a triangle? Name the angles.
- What do we know about the degree of a straight angle?
- Let's look specifically at straight angle $\angle ABD$. Name the angles that make up this straight angle.
- Because the triangle and the straight angle both have measures of 180° , we can write them as equal to one another. That is, since

$$\angle ABC + \angle BCA + \angle CAB = 180$$
 and

$$\angle ABC + \angle CBD = 180$$
 then,

$$\angle ABC + \angle BCA + \angle CAB = \angle ABC + \angle CBD$$
- Which angle is common to both the triangle and the straight angle?
- If we subtract the measure of $\angle ABC$ from both the triangle and the straight angle, we get:
- What kind of angle is $\angle CBD$?
- We call angles $\angle BCA$ and $\angle CAB$ the _____ because they are the farthest "remotest" from the exterior angles. The equation $\angle BCA + \angle CAB = \angle CBD$ means that the sum of the remote interior angles are equal to the exterior angle of the triangle.

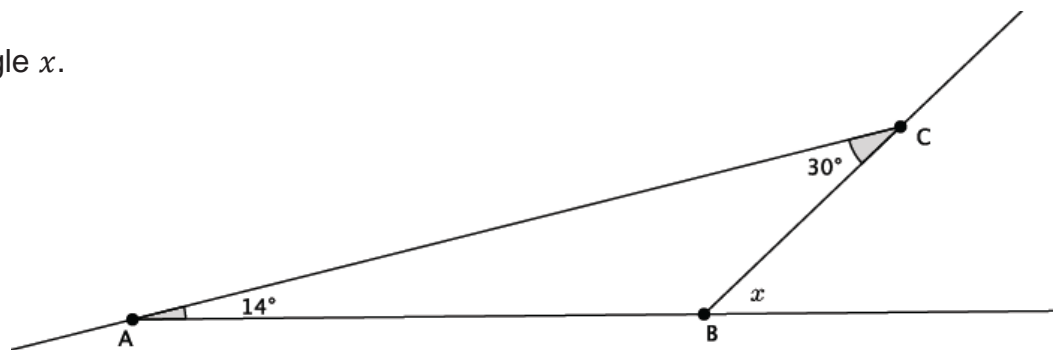
Use the diagram below to complete Exercises 1–3.



1. Name an exterior angle and the related remote interior angles.
2. Name a second exterior angle and the related remote interior angles.
3. Name a third exterior angle and the related remote interior angles.

Example 1

Find the measure of angle x .

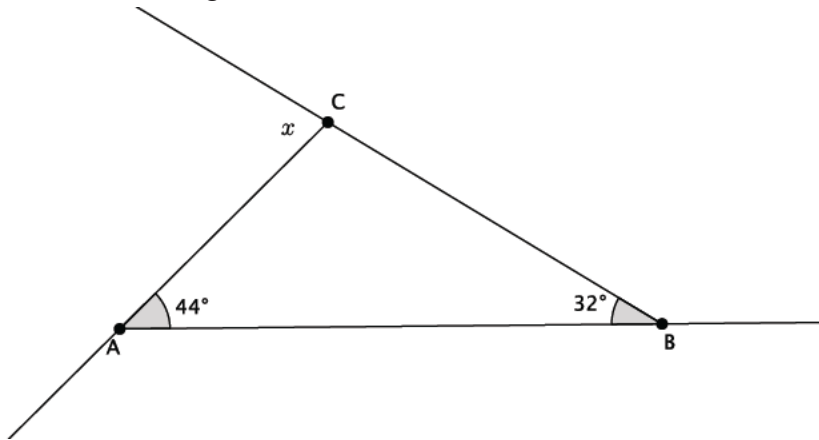


Informal Argument:

We know that triangles have a sum of _____ angles that is equal to _____. We also know that _____ angles are _____. Angle _____ must be _____ which means that angle $x =$ _____.

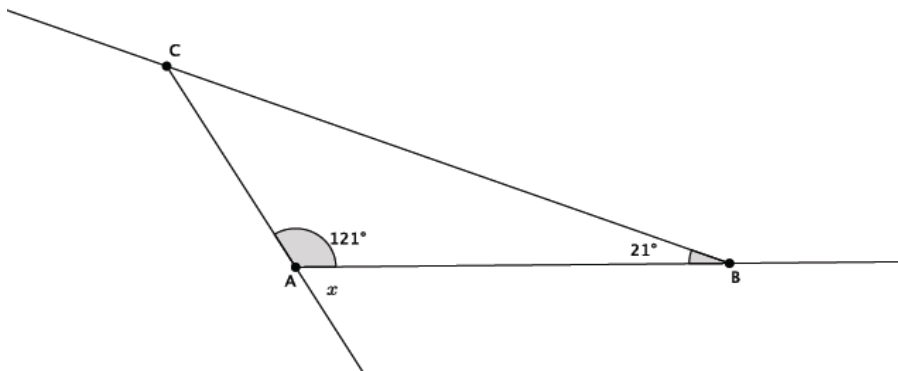
Example 2

Find the measure of angle x .



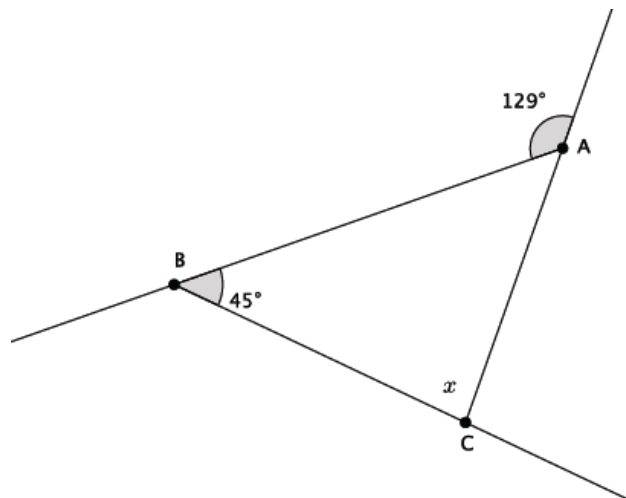
Example 3

Find the measure of angle x .



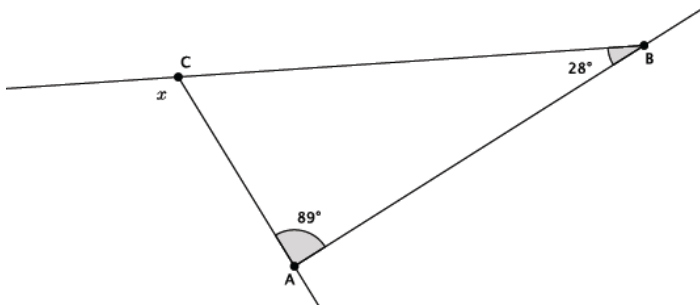
Example 4

Find the measure of angle x .

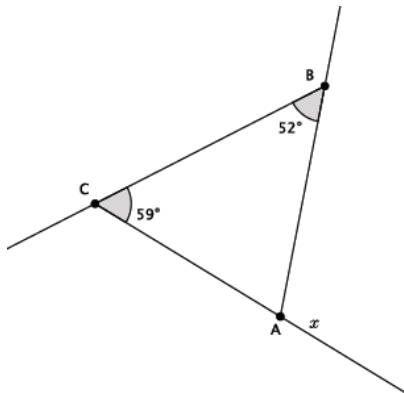


Exercises 4–6

4. Find the measure of angle x .



5. Find the measure of angle x .



6. Find the measure of angle x .

