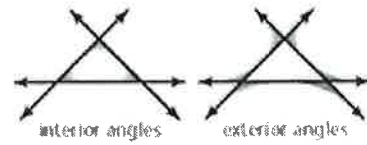


## How Can You Write and Solve Simple Equations For an Unknown Angle in a Figure? (Topic #3)

The angles inside a polygon are called **interior angles**.  
 When the sides of a polygon are extended, other angles  
 are formed. The angles outside the polygon that are  
 adjacent to the interior angles are called **exterior angles**.



<b>Interior Angle Measures of a Triangle</b>	
Words	The sum of the interior angle measures of a triangle is $180^\circ$ .
Algebra	$x + y + z = 180$



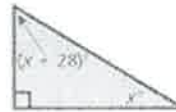
**EXAMPLE1: Finding Angle Measures**

Find each value of  $x$ . Then classify each triangle according to its angles and sides.

a)



b)



**PRACTICE: Find the value of  $x$ . Then classify each triangle according to its angles and sides.**

1.

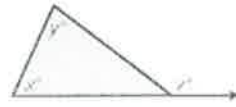


2.



### Exterior Angle Measures of a Triangle

**Words** The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.

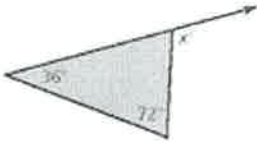


**Algebra**  $z = x + y$

#### EXAMPLE 2: Finding Exterior Angle Measures

Find the measure of the exterior angle.

a)

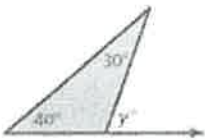


b)

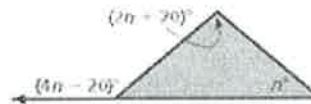


#### PRACTICE: Find the measure of each exterior angle.

3.



4.



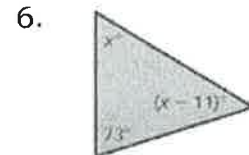
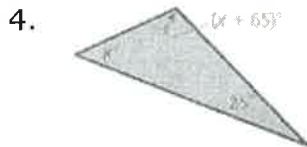
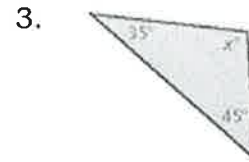
NAME: \_\_\_\_\_  
TRIANGLES

DATE: \_\_\_\_\_  
PERIOD: \_\_\_\_\_

### HOMEWORK #3

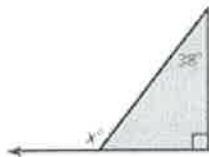
1. You know the measures of two interior angles of a triangle. How can you find the measure of the third interior angle?

**Find the value of  $x$ . Then classify the triangle.**

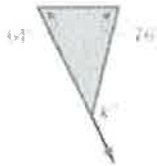


**Find the measure of the exterior angle.**

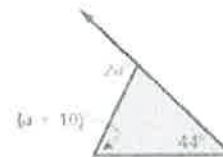
7.



8.



9.



10. Describe and correct the error in finding the measure of the exterior angle.

$$(2x - 12) + x + 30 = 180$$

$$3x + 18 = 180$$

$$x = 54$$

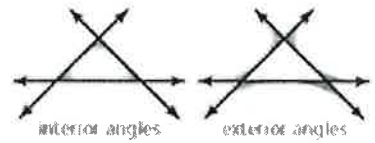
The exterior angle is  $(2(54) - 12)^\circ = 96^\circ$ .

11. The ratio of the interior angle measures of a triangle is 2:3:5. What are the angle measures?

KEY

## How Can You Write and Solve Simple Equations For an Unknown Angle in a Figure? (Topic #3)

The angles inside a polygon are called **interior angles**.  
 When the sides of a polygon are extended, other angles are formed. The angles outside the polygon that are adjacent to the interior angles are called **exterior angles**.

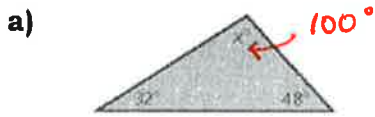


Interior Angle Measures of a Triangle	
Words	The sum of the interior angle measures of a triangle is $180^\circ$ .
Algebra	$x + y + z = 180$



**EXAMPLE 1: Finding Angle Measures**

Find each value of  $x$ . Then classify each triangle according to its angles and sides.



$$x + 48 + 32 = 180$$

$$x + 80 = 180$$

$$\begin{array}{r} -80 \quad -80 \\ \hline \end{array}$$

$x = 100$

Obtuse  
Scalene



$$x + 28 + x + 90 = 180$$

$$2x + 118 = 180$$

$$\begin{array}{r} -118 \quad -118 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{62}{2}$$

$$x = 31$$

right  
Scalene

**PRACTICE: Find the value of  $x$ . Then classify each triangle according to its angles and sides.**



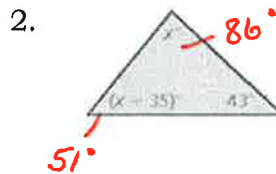
$$x + 81 + 25 = 180$$

$$x + 106 = 180$$

$$\begin{array}{r} -106 \quad -106 \\ \hline \end{array}$$

$$x = 74$$

Acute  
Scalene



$$x + 43 + x - 35 = 180$$

$$2x + 8 = 180$$

$$\begin{array}{r} -8 \quad -8 \\ \hline \end{array}$$

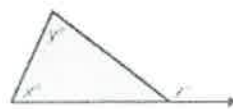
$$\frac{2x}{2} = \frac{172}{2}$$

$$x = 86$$

acute  
Scalene

## Exterior Angle Measures of a Triangle

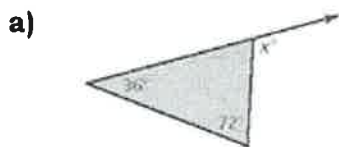
**Words**      The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.



**Algebra**       $z = x + y$

### EXAMPLE 2: Finding Exterior Angle Measures

Find the measure of the exterior angle.



$$X = 36 + 72$$

$$X = 108^\circ$$



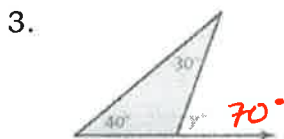
$$2a = 80 + a - 5$$

$$2a = 75 + a$$

$$\begin{array}{r} -a \qquad -a \\ \hline \end{array}$$

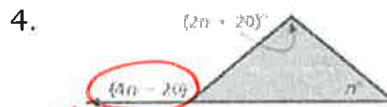
$$a = 75^\circ$$

### PRACTICE: Find the measure of each exterior angle.



$$y = 40 + 30$$

$$y = 70^\circ$$



Ext. Angle

$$4n - 20$$

$$4(40) - 20$$

$$160 - 20$$

$$140^\circ$$

$$4n - 20 = 2n + 20 + n$$

$$4n - 20 = 3n + 20$$

$$\begin{array}{r} -3n \qquad -3n \\ \hline \end{array}$$

$$n - 20 = 20$$

$$\begin{array}{r} +20 \qquad +20 \\ \hline \end{array}$$

$$n = 40$$

NAME: KEY  
 TRIANGLES

DATE: \_\_\_\_\_  
 PERIOD: \_\_\_\_\_

### HOMWORK #3

1. You know the measures of two interior angles of a triangle. How can you find the measure of the third interior angle?

The sum of the interior angle measures of a  $\Delta$  is 180. Find the sum of the 2 given interior angles of a  $\Delta$  and subtract it from 180:

Find the value of  $x$ . Then classify the triangle.



$$30 + x + 90 = 180$$

$$\begin{array}{r} x + 120 = 180 \\ -120 \quad -120 \\ \hline \end{array}$$

$$x = 60^\circ$$

right  
scalene

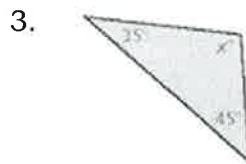


$$65 + x + 40 = 180$$

$$\begin{array}{r} x + 105 = 180 \\ -105 \quad -105 \\ \hline \end{array}$$

$$x = 75^\circ$$

acute  
scalene

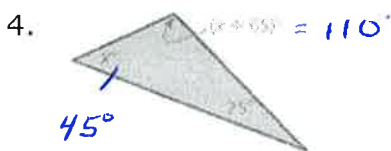


$$35 + x + 45 = 180$$

$$\begin{array}{r} x + 80 = 180 \\ -80 \quad -80 \\ \hline \end{array}$$

$$x = 100^\circ$$

obtuse  
scalene



$$x + x + 65 + 25 = 180$$

$$\begin{array}{r} 2x + 90 = 180 \\ -90 \quad -90 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{90}{2}$$

$$x = 45^\circ$$

obtuse  
scalene



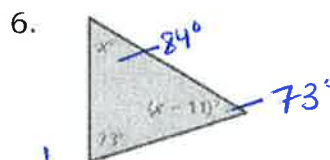
$$x + 48 + x - 44 = 180$$

$$\begin{array}{r} 2x + 4 = 180 \\ -4 \quad -4 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{176}{2}$$

$$x = 88^\circ$$

acute  
scalene



$$x + x - 11 + 23 = 180$$

$$\begin{array}{r} 2x + 12 = 180 \\ -12 \quad -12 \\ \hline \end{array}$$

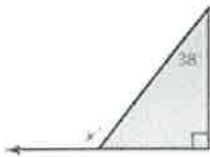
$$\frac{2x}{2} = \frac{168}{2}$$

$$x = 84^\circ$$

acute  
isosceles

**Find the measure of the exterior angle.**

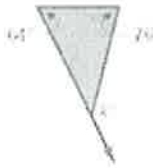
7.



$$x = 90 + 38$$

$$x = 128^\circ$$

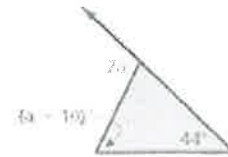
8.



$$x = 64 + 76$$

$$x = 140^\circ$$

9.



$$2a = 44 + a + 10$$

$$2a = 54 + a$$

$$-a \quad -a$$

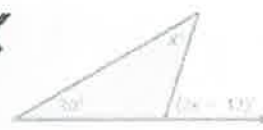

---


$$a = 54^\circ$$

10. Describe and correct the error in finding the measure of the exterior angle.

The measure of the exterior angle of a  $\Delta$  is equal to the sum of the measures of the 2 nonadjacent interior angles

~~X~~



$$(2x - 12) + x + 30 = 180$$

$$3x + 18 = 180$$

$$x = 54$$

The exterior angle is  $(2(54) - 12)^\circ = 96^\circ$ .

$$2x - 12 = 30 + x$$

$$-x \quad -x$$


---


$$x - 12 = 30$$

$$+12 \quad +12$$


---


$$x = 42^\circ$$

Exterior Angle

$$2x - 12$$

$$2(42) - 12$$

$$84 - 12$$

$$72^\circ$$

11. The ratio of the interior angle measures of a triangle is 2:3:5. What are the angle measures?

$$2x + 3x + 5x = 180$$

$$\frac{10x}{10} = \frac{180}{10}$$

$$x = 18$$

$$2x = 2(18) = 36^\circ$$

$$3x = 3(18) = 54^\circ$$

$$5x = 5(18) = 90^\circ$$