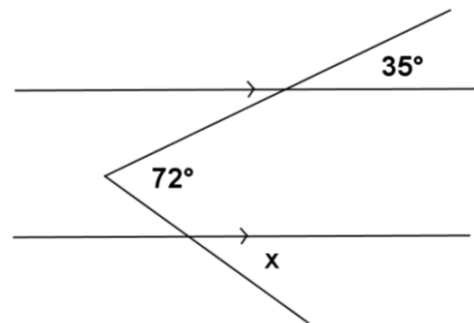# Lesson 8: Solve for Unknown Angles—Angles in a Triangle

Classwork

Opening Exercise

Find the measure of angle x in the figure to the right. Explain your calculations. (Hint: Draw an auxiliary line segment.)

Discussion

The sum of the 3 angle measures of any triangle is _____.

Interior of a Triangle: A point lies in the *interior of a triangle* if it lies in the interior of each of the angles of the triangle.

In any triangle, the measure of the exterior angle is equal to the sum of the measures of the _____ angles.

These are sometimes also known as _____ angles.

Base angles of an _____ triangle are equal in measure.

Each angle of an _____ triangle has a measure equal to 60°.

Relevant Vocabulary

Isosceles Triangle: An *isosceles triangle* is a triangle with at least two sides of equal length.

Angles of a Triangle: Every triangle △ ABC determines three angles, namely, ∠BAC, ∠ABC, and ∠ACB. These are called the *angles of △ ABC.*

Exterior Angle of a Triangle: Let ∠ABC be an interior angle of a triangle △ ABC, and let D be a point on $\overleftrightarrow{AB}$ such that B is between A and D. Then ∠CBD is an *exterior angle of the triangle △ ABC.*
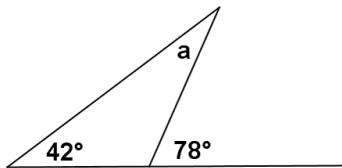
Exercises

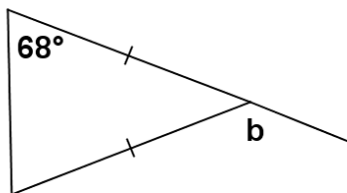1. Find the measures of a and b in the figure to the right. Justify your results.
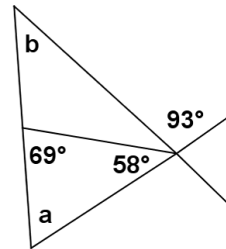
In each figure, determine the measures of the unknown (labeled) angles. Give reasons for your calculations.
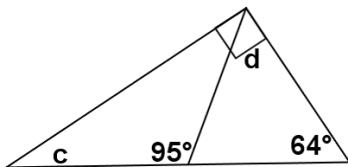
2.

$m\angle a =$ _____
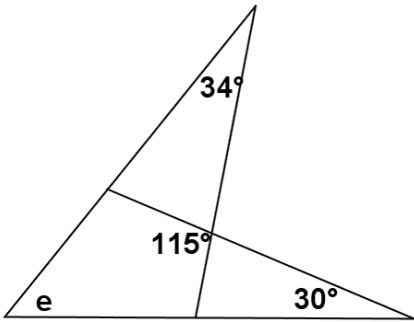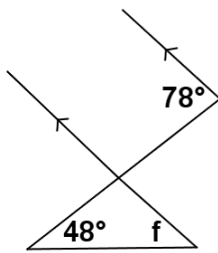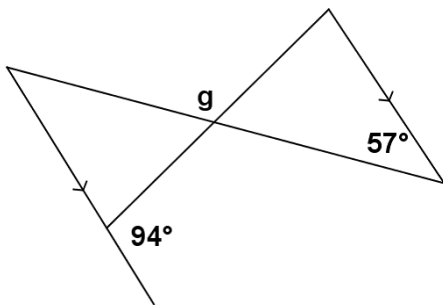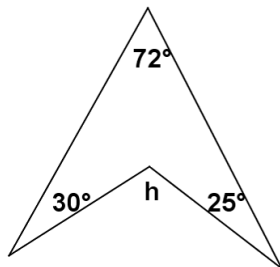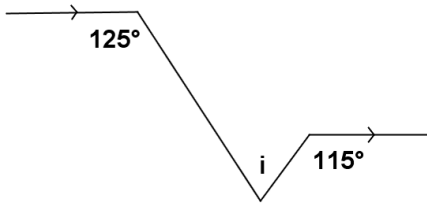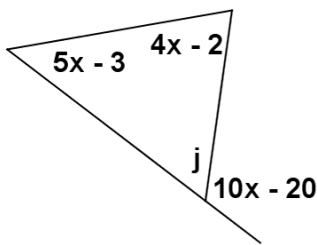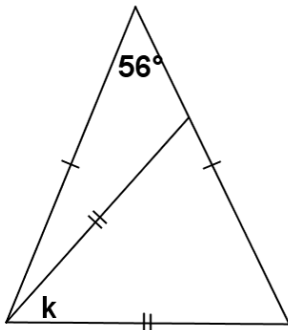
3.

$m\angle b =$ _____

4.

$m\angle c =$ _____

$m\angle d =$ _____

5.

34°

115°

e

30°

m∠*e* = _____

6.

78°

48°   f

m∠*f* = _____

7.

g

57°

94°

m∠*g* = _____

8.

72°

30°   h   25°

m∠*h* = _____

9.

m∠*i* = _____

10.

m∠*j* = _____

11.

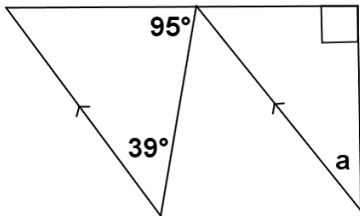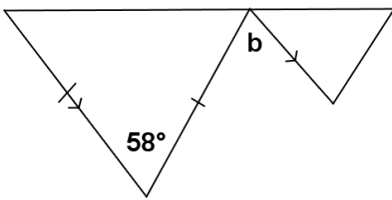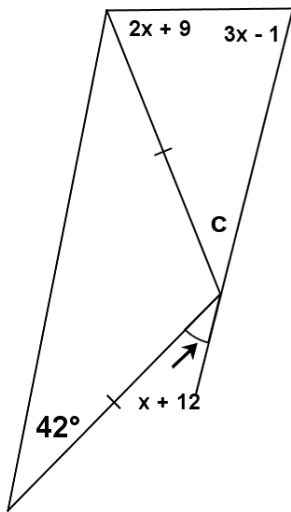m∠*k* = _____

Problem Set

Find the unknown (labeled) angle in each figure. Justify your calculations.

1.

m∠*k* = _____

2.

m∠*k* = _____

3.

m∠*k* = _____