Extension 7.3 Angle Measures of Triangles

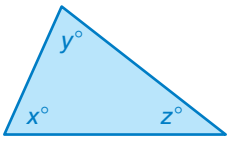
Check It Out
Lesson Tutorials
BigIdeasMath.com

Key Idea

Sum of the Angle Measures of a Triangle

Words The sum of the angle measures of a triangle is 180°.

Algebra $x + y + z = 180$



Geometry

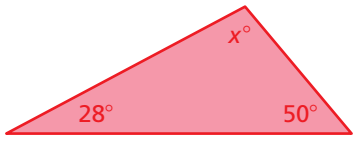
In this extension, you will

- understand that the sum of the angle measures of any triangle is 180°.
- find missing angle measures in triangles.

EXAMPLE 1 Finding Angle Measures

Find each value of x. Then classify each triangle.

a.



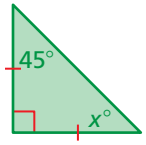
$x + 28 + 50 = 180$

$x + 78 = 180$

$x = 102$

∴ The value of x is 102. The triangle has one obtuse angle and no congruent sides. So, it is an obtuse scalene triangle.

b.



$x + 45 + 90 = 180$

$x + 135 = 180$

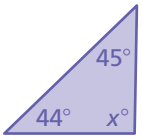
$x = 45$

∴ The value of x is 45. The triangle has a right angle and two congruent sides. So, it is a right isosceles triangle.

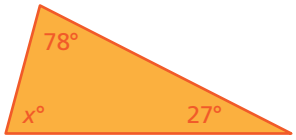
Practice

Find the value of x. Then classify the triangle.

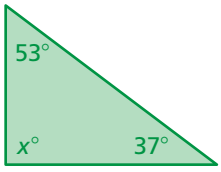
1.



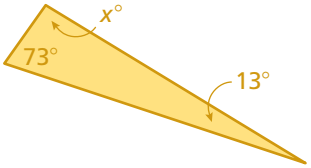
2.



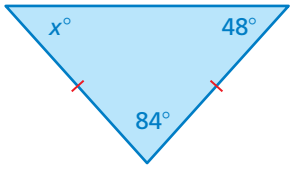
3.



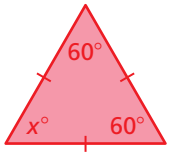
4.



5.



6.



Tell whether a triangle can have the given angle measures. If not, change the first angle measure so that the angle measures form a triangle.

7. 76.2°, 81.7°, 22.1°

8. 115.1°, 47.5°, 93°

9. $5\frac{2}{3}°$, $64\frac{1}{3}°$, 87°

10. $31\frac{3}{4}°$, $53\frac{1}{2}°$, $94\frac{3}{4}°$

EXAMPLE 2 Finding Angle Measures

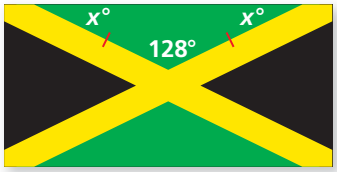
Math Practice

Analyze Givens

What information is given in the problem? How can you use this information to answer the question?

Find each value of x. Then classify each triangle.

a. Flag of Jamaica



$x + x + 128 = 180$

$2x + 128 = 180$

$2x = 52$

$x = 26$

The value of x is 26. The triangle has one obtuse angle and two congruent sides. So, it is an obtuse isosceles triangle.

b. Flag of Cuba

$x + x + 60 = 180$

$2x + 60 = 180$

$2x = 120$

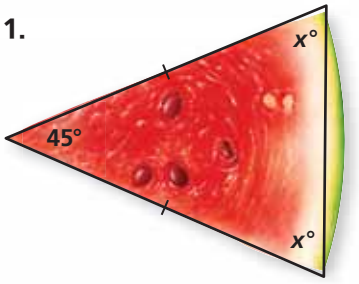
$x = 60$

The value of x is 60. All three angles are congruent. So, it is an equilateral and equiangular triangle.

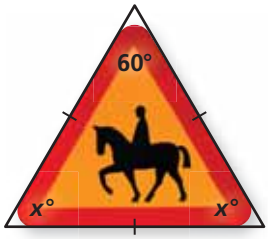
Practice

Find the value of x. Then classify the triangle.

11.

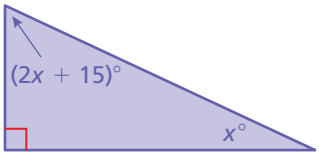


12.

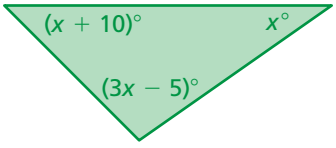


13.

14.

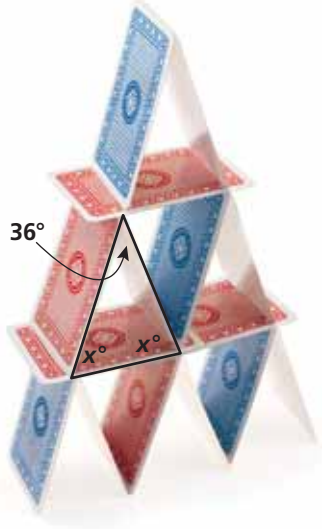


15.



16. **REASONING** Explain why all triangles have at least two acute angles.

17. **CARDS** One method of stacking cards is shown.



a. Find the value of x.

b. Describe how to stack the cards with different angles. Is the value of x limited? If so, what are the limitations? Explain your reasoning.