Triangle Classification

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CHAPTER 1

Triangle Classification

Here you’ll learn how to classify triangles based on their angle and side measures.

Classifying Triangles

A triangle is any closed figure made by three line segments intersecting at their endpoints. Every triangle has three vertices (the points where the segments meet), three sides (the segments), and three interior angles (formed at each vertex). All of the following shapes are triangles.

The sum of the interior angles in a triangle is 180°. This is called the Triangle Sum Theorem and is discussed further in the "Triangle Sum Theorem" concept.

Angles can be classified by their size as acute, obtuse or right. In any triangle, two of the angles will always be acute. The third angle can be acute, obtuse, or right. **We classify each triangle by this angle.**

**Right Triangle:** A triangle with one right angle.

**Obtuse Triangle:** A triangle with one obtuse angle.

**Acute Triangle:** A triangle where all three angles are acute.

**Equiangular Triangle:** A triangle where all the angles are congruent.
You can also classify a triangle by its sides.

**Scalene Triangle:** A triangle where all three sides are different lengths.

![Scalene Triangle Example](image1.png)

**Isosceles Triangle:** A triangle with at least two congruent sides.

![Isosceles Triangle Example](image2.png)

**Equilateral Triangle:** A triangle with three congruent sides.

![Equilateral Triangle Example](image3.png)

Note that from the definitions, an equilateral triangle is also an isosceles triangle.

What if you were given the angle measures and/or side lengths of a triangle? How would you describe the triangle based on that information?

**Examples**

**Example 1**

Which of the figures below are not triangles?
$B$ is not a triangle because it has one curved side. $D$ is not closed, so it is not a triangle either.

**Example 2**

How many triangles are in the diagram below?

Start by counting the smallest triangles, 16.
Now count the triangles that are formed by 4 of the smaller triangles, 7.

Next, count the triangles that are formed by 9 of the smaller triangles, 3.

Finally, there is the one triangle formed by all 16 smaller triangles. Adding these numbers together, we get $16 + 7 + 3 + 1 = 27$. 
Example 3
True or false: An equilateral triangle is equiangular.
True. Equilateral triangles have interior angles that are all congruent so they are equiangular.

Example 4
Which term best describes \( \triangle RST \) below?

This triangle has one labeled obtuse angle of 92°. Triangles can have only one obtuse angle, so it is an obtuse triangle.

Example 5
Classify the triangle by its sides and angles.

We see that there are two congruent sides, so it is isosceles. By the angles, they all look acute. We say this is an acute isosceles triangle.

Review
For questions 1-6, classify each triangle by its sides and by its angles.
7. Can you draw a triangle with a right angle and an obtuse angle? Why or why not?
8. In an isosceles triangle, can the angles opposite the congruent sides be obtuse?

For 9-10, determine if the statement is true or false.

9. Obtuse triangles can be isosceles.
10. A right triangle is acute.

**Review (Answers)**

To see the Review answers, open this [PDF file](#) and look for section 1.11.

**Resources**

[Click image](#) or use the URL below.

**URL:** [https://www.ck12.org/flx/render/embeddedobject/1276](https://www.ck12.org/flx/render/embeddedobject/1276)