Classifying Triangles

Lesson 1

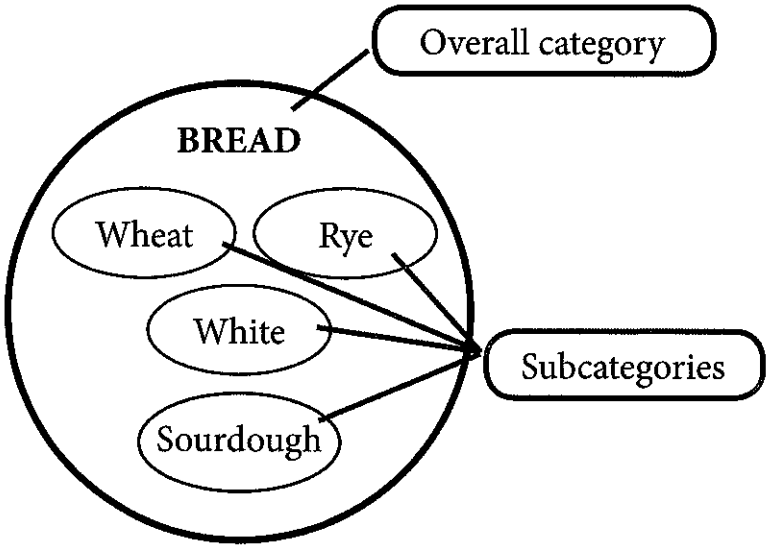
VOCABULARY

acute angle
right angle
obtuse angle
congruent
isosceles
scalene
equilateral
Venn diagram

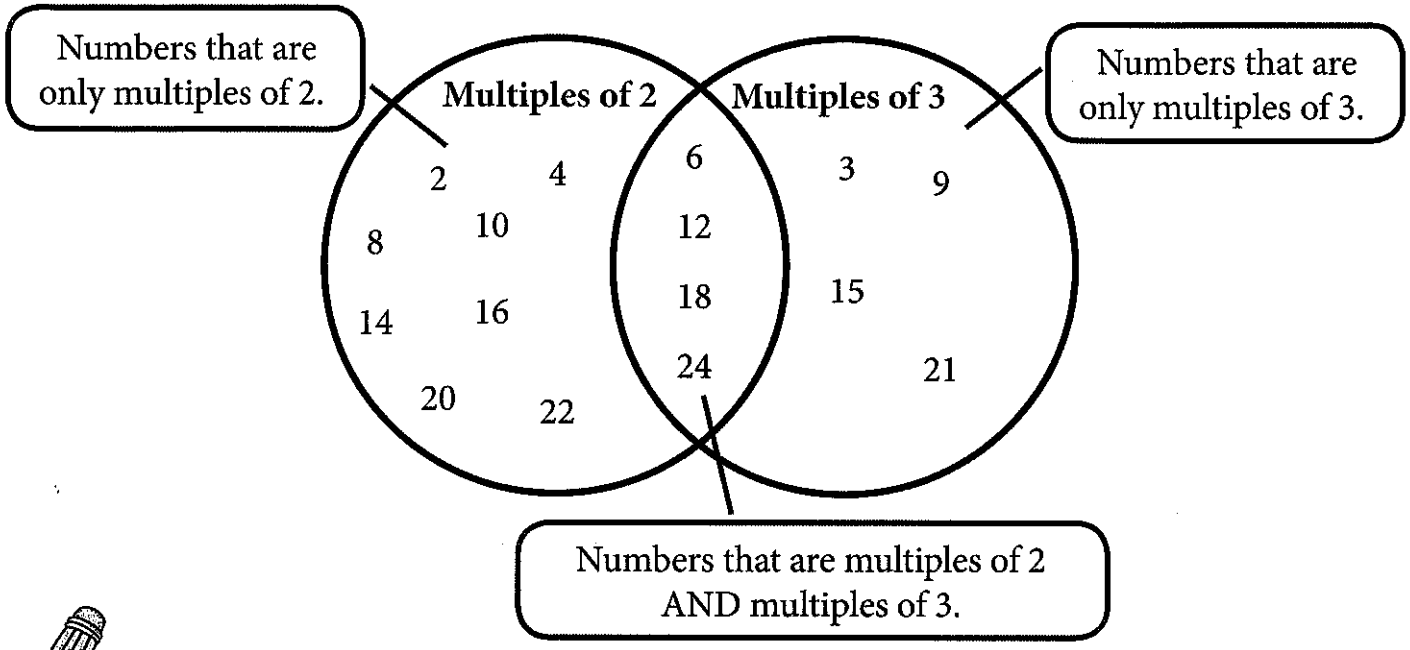
TARGET

I can classify triangles.

You classify many things around you. For example, you might choose to make a sandwich and you have to pick a type of bread. Your choices might be wheat, white, sourdough or rye. These types each have the properties of bread, but have different flavors. The connection between them can be shown in a Venn diagram. A **Venn diagram** shows relationships between things.



Sometimes the relationships shown on a Venn diagram do not all fit into one category like bread. Suppose a Venn diagram is used to show multiples of 2 and multiples of 3 within the numbers 1–25. A Venn diagram like the one below might be used.

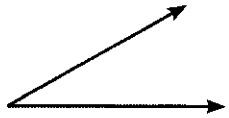


Why do the two circles in the Venn diagram overlap?

If the Venn Diagram showed multiples of 2 and multiples of 3 within the numbers 1–36, what other numbers would be in the overlap of the two circles?

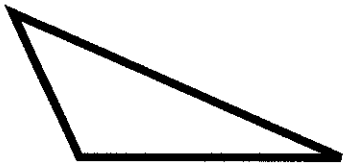
In this lesson you will use attributes of two-dimensional shapes to classify triangles. One way to show the relationships between types of triangles will be with a Venn diagram.

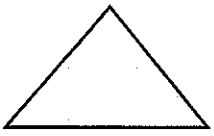
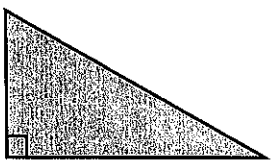
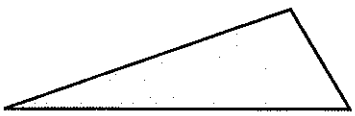
A triangle is a polygon with three sides. There are many types of triangles. Each triangle can be classified by its angle types and its number of sides with equal lengths. Angles in a triangle can be acute, right or obtuse. When the sides of a triangle are equal in length, they are **congruent**. Congruent figures are the exact same size and shape.

Acute Angle	Right Angle	Obtuse Angle
		
An **acute angle** measures between 0° and 90°. It is smaller than a right angle.	A **right angle** measures 90°.	An **obtuse angle** measures between 90° and 180°. It is larger than a right angle.

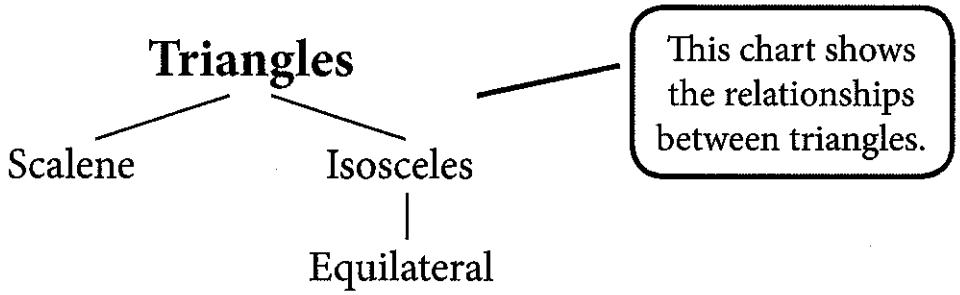
The charts below show how to classify a triangle by its angles and sides.

The short lines on the sides of a triangle show that these sides are congruent (equal in length).

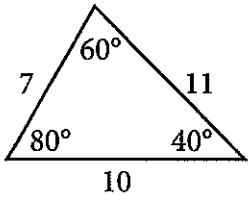
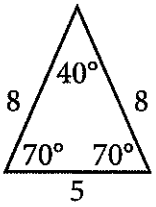
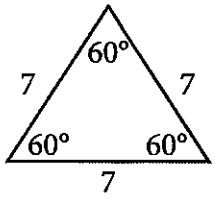
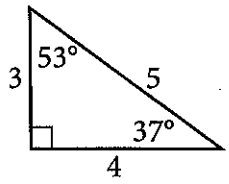
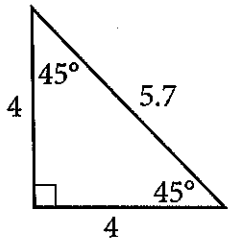
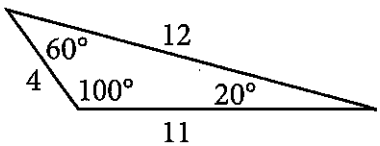
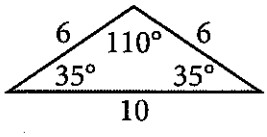
Classify Triangles Using Sides		
		
Scalene Triangle: no congruent sides	**Isosceles Triangle:** at least 2 congruent sides	**Equilateral Triangle:** 3 congruent sides

Classify Triangles Using Angles		
		
Acute Triangle: 3 acute angles	**Right Triangle:** 1 right angle	**Obtuse Triangle:** 1 obtuse angle

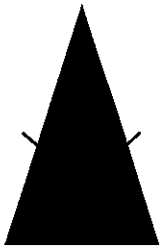
An equilateral triangle is also a special isosceles triangle. It has at least two congruent sides.



Use both the angle and side names when classifying a triangle. The chart below shows an example of each type of triangle when it is classified by its sides and angles.

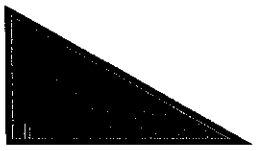
	Scalene	Isosceles	Equilateral
Acute	 acute scalene triangle	 acute isosceles triangle	 equilateral triangle
Right	 right scalene triangle	 right isosceles triangle	Not possible
Obtuse	 obtuse scalene triangle	 obtuse isosceles triangle	Not possible

Classify the triangles below using angles and sides. Circle the angle name and the side name.



acute right obtuse

scalene isosceles equilateral

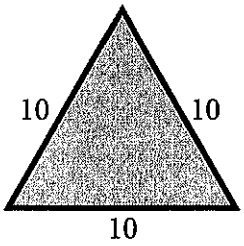


acute right obtuse

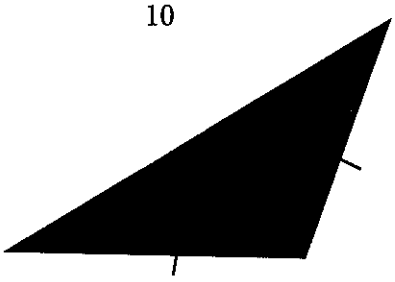
scalene isosceles equilateral

The names for the triangles below show how to classify triangles.

This is a **right scalene triangle**.



This is an **equilateral triangle**.
An equilateral triangle always has 3 acute angles. Each angle is 60°. The word acute is not included in its name.

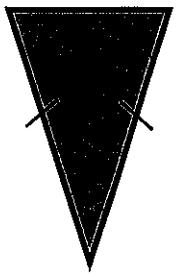


Angle name

This is a(n) _____

Side name

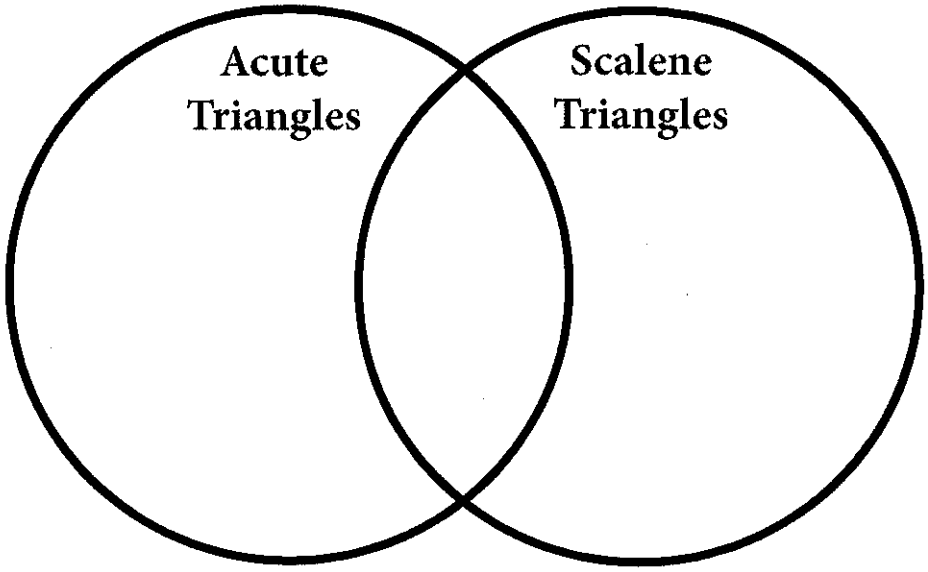
_____ **triangle**.



This is a(n) _____

_____ **triangle**.

Draw two triangles that fit each part of the Venn diagram below.



Match each description to part of the Venn diagram above by drawing a line from the rectangle to the correct section of the Venn diagram.

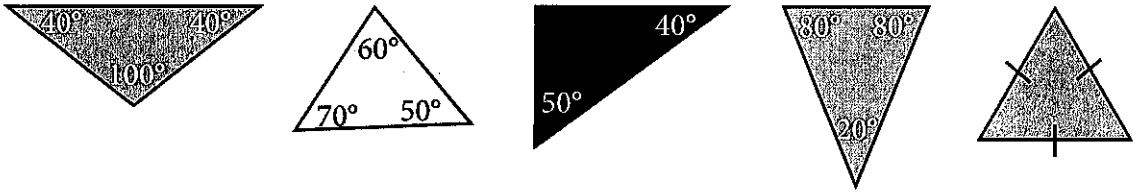
Triangles that are acute and scalene.	Triangles that are acute and not scalene.	Triangles that are scalene and not acute.

Valerie says an equilateral triangle can also be called an isosceles triangle. Is she correct? Explain your reasoning.

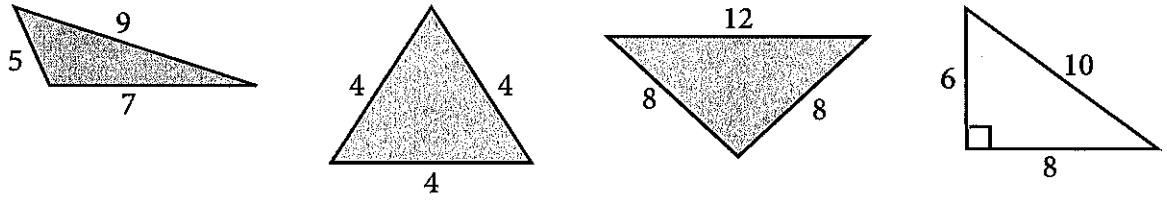
Name:

Practice

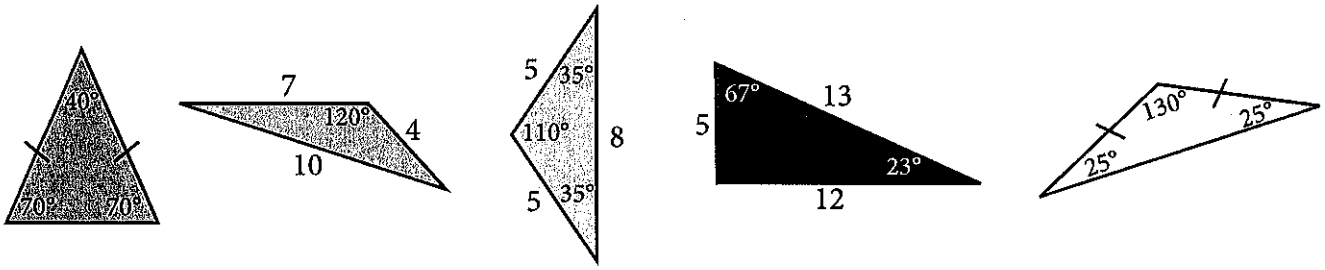
1. Circle the acute triangles.



2. Circle the scalene triangles.



3. Circle the obtuse isosceles triangles.



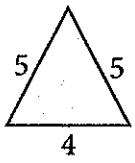
4. Classify each triangle by its angles and sides.

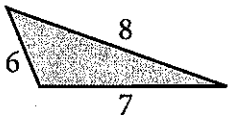
_____ _____ _____ _____

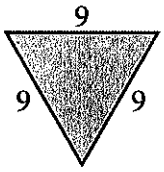
5. Can you draw an obtuse right triangle? _____ If so, draw it. If not, explain why not.

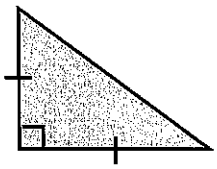
6. Can you draw a right isosceles triangle? _____ If so, draw it. If not, explain why not.

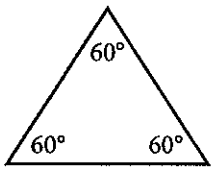
7. Circle the equilateral triangles.







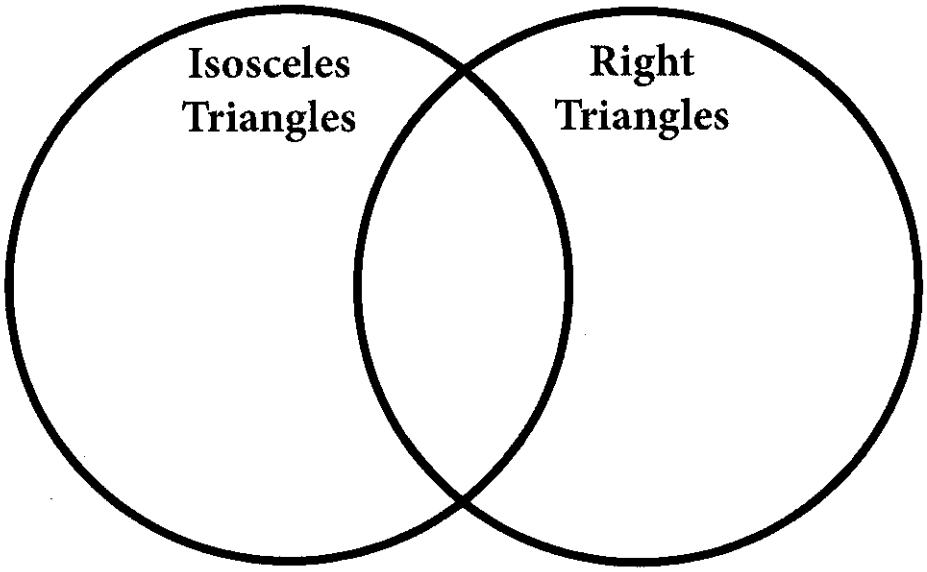




8. For each statement, circle ALWAYS, SOMETIMES or NEVER.

a. A right triangle is isosceles.	**ALWAYS**	**SOMETIMES**	**NEVER**
b. An obtuse triangle has three obtuse angles.	**ALWAYS**	**SOMETIMES**	**NEVER**
c. An equilateral triangle is isosceles.	**ALWAYS**	**SOMETIMES**	**NEVER**

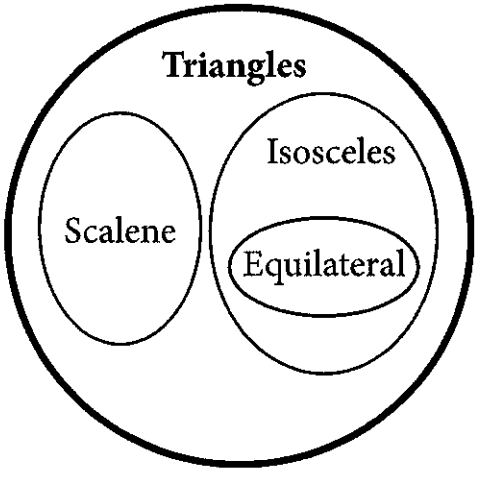
9. Draw two triangles that fit each part of the Venn diagram below.



10. Two sides of a triangle have lengths of 10 inches. The third side has a length of 8 inches. What is the best name for the triangle? Use a picture and/or words to explain your answer.

11. Lyle drew the Venn diagram to the right.

a. Why is the circle with the name "Equilateral" inside the circle named "Isosceles"?



b. Why don't the circles named "Scalene" and "Isosceles" overlap?