

• Classifying Triangles

Power Up

facts

Power Up E

count aloud

Count up by 7s from 7 to 84.

mental math

- a. **Estimation:** Round 73 to the nearest ten.
- b. **Number Sense:** $70 + 80$
- c. **Number Sense:** 70×8
- d. **Number Sense:** A spider has 8 legs. How many legs do 73 spiders have? (*Think:* 8×73 .)
- e. **Fractional Parts:** One day is 24 hours. How many hours is $\frac{1}{2}$ of a day?
- f. **Percent:** 50% of \$12
- g. **Percent:** 25% of \$12
- h. **Time:** It took Derek 360 seconds to climb the hill. It took him 200 seconds to get back down. Altogether, how many seconds did it take Derek to climb the hill and then get back down?
- i. **Calculation:** $9 \times 6, + 2, \div 7, + 1, \times 4, \div 6$

problem solving

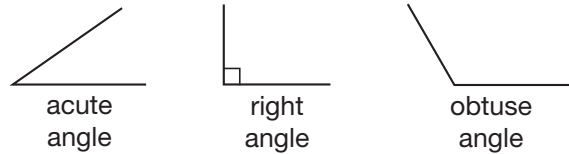
Choose an appropriate problem-solving strategy to solve this problem. There are three crosswalk signals between Simone's home and school. When Simone comes to a signal, she either walks through the crosswalk or waits for the signal to turn. List the eight possible patterns of signals for Simone's walk to school. Use the words "walk" and "wait."

New Concept

In this lesson we will learn the names of different kinds of triangles.

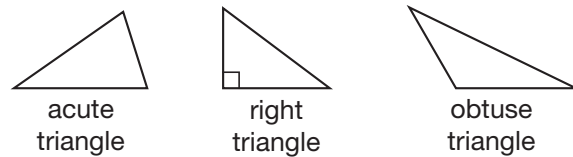
All **triangles** have three angles and three sides, but we can *classify*, or sort, triangles by the size of their angles and by the relative lengths of their sides.

Recall from Lesson 31 that three types of angles are acute angles, right angles, and obtuse angles.



Triangles that contain these angles can be classified as acute, right, or obtuse.

Triangles Classified by Angles



Every triangle has at least two acute angles. If all three angles are acute, the triangle is an **acute triangle**. If one of the angles is a right angle, the triangle is a **right triangle**. If one of the angles is obtuse, the triangle is an **obtuse triangle**.

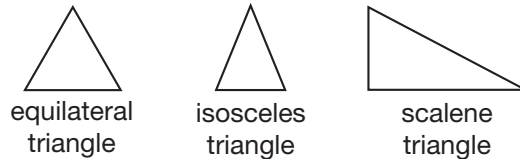
We can also classify triangles by the comparative lengths of their sides.

Thinking Skill

Classify

Can a right triangle also be an isosceles triangle? Why or why not?

Triangles Classified by Sides



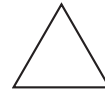
The three sides of an **equilateral triangle** have equal lengths. At least two sides of an **isosceles triangle** have equal lengths. All three sides of a **scalene triangle** have different lengths.

Every triangle can be classified both by angles *and* by sides. Notice that the scalene triangle illustrated above also appears to be a right triangle, while the isosceles and equilateral triangles are also acute triangles.

Discuss Can a triangle have parallel sides? Why or why not?

Example 1

All three sides of this triangle are congruent. Which of the following terms does *not* describe the triangle?



- A equilateral B acute C isosceles D right

The triangle is an equilateral triangle and an acute triangle. It is also an isosceles triangle, because *at least* two of the sides have equal lengths. Because none of the angles of the triangle are right angles, the correct answer is **D**.

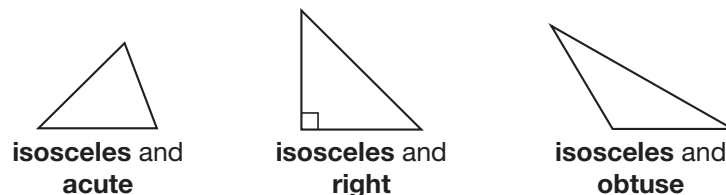
Example 2

Represent Draw three angles with sides that are segments of equal length. Make the first angle acute, the second right, and the third obtuse. Then, for each angle, draw a segment between the endpoints to form a triangle. Classify each triangle by sides and by angles.

We draw each angle with two segments that have a common endpoint.



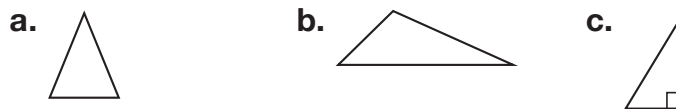
Then we draw segments to form three triangles. Since two sides of each triangle have equal length, all three triangles are isosceles. Here are the classifications for each triangle:



Verify Which triangle above has perpendicular sides? How do you know?

Lesson Practice

Conclude Classify each triangle by angles:



Conclude Classify each triangle by sides:





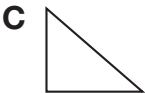
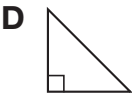
- g. **Represent** Draw a right triangle.
- h. **Represent** Draw an equilateral triangle.
- i. **Represent** Draw a right angle with sides that are segments of equal length. Then draw a segment between the endpoints to form a triangle. What type of right triangle did you draw?
- j. **Model** Draw a diagonal segment on a sheet of paper between opposite corners (vertices), dividing the rectangular paper into two congruent triangles. Classify the triangles that are formed by sides and by angles.

Written Practice

Distributed and Integrated

1. **Represent** Draw a pair of horizontal parallel line segments. Make both segments the same length.

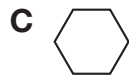
Formulate For problems 2–4, write an equation and find the answer.

- *2. ^(9, 35) The Aerial Drawbridge in Minnesota is 386 feet long. The Roosevelt Island Drawbridge in New York is 418 feet long. How many feet longer is the Roosevelt Island Drawbridge?
- *3. ⁽²¹⁾ For a field trip, 336 students at an elementary school will be transported by 7 school buses. Each bus will carry the same number of students. How many students will ride on each bus?
- *4. ⁽²¹⁾ A fortnight is 2 weeks. How many days is a fortnight? Use a multiplication pattern.
5. ⁽³³⁾ Round 780 to the nearest hundred.
6. **Multiple Choice** ⁽³⁶⁾ Which triangle has one obtuse angle?
- A  B  C  D 
7. ⁽³⁵⁾ How many years were there from 1776 to 1976?

8. ^(9, 35) When the students voted for president, Tendai received 119 votes and Juanita received 142 votes. Juanita won by how many votes?

9. ^(Inv. 2) What is the name for the top number of a fraction?

* 10. ⁽³²⁾ a. **Multiple Choice** Which of these shapes is *not* a polygon?



b. **Verify** Explain your choice in part a.

* 11. ^(Inv. 2) **Analyze** Cindy has two fourths of a circle and three tenths of a circle. What does she need to make a whole circle?

12. ⁽²⁹⁾
$$\begin{array}{r} 763 \\ \times 800 \\ \hline \end{array}$$

13. ⁽¹⁷⁾
$$\begin{array}{r} \$24.08 \\ \times 6 \\ \hline \end{array}$$

14. ⁽²⁹⁾
$$\begin{array}{r} 976 \\ \times 40 \\ \hline \end{array}$$

15. ⁽²⁹⁾
$$\begin{array}{r} 400 \\ \times 50 \\ \hline \end{array}$$

16. ⁽¹⁴⁾
$$\begin{array}{r} 5818 \\ - m \\ \hline 4747 \end{array}$$

17. ⁽¹³⁾
$$\begin{array}{r} \$98.98 \\ \$36.25 \\ \$ 4.97 \\ + \$87.64 \\ \hline \end{array}$$

18. ⁽⁹⁾
$$\begin{array}{r} 1010 \\ - 918 \\ \hline \end{array}$$

19. ^(18, 34) $7w = \$7.63$

20. ⁽³⁴⁾ $368 \div 9$

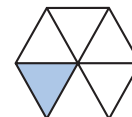
21. ⁽³⁴⁾ $6 \overline{)4248}$

22. ⁽²⁶⁾ $8 \overline{)\$10.00}$

23. ⁽¹⁾ **Conclude** What are the next three terms in this counting sequence?

..., 2700, 2800, 2900, _____, _____, _____, ...

* 24. ⁽³⁰⁾ **Analyze** What fraction of this hexagon is shaded? Is more than or less than 25% of the hexagon shaded? Is more than or less than 10% of the hexagon shaded?



25. ⁽¹²⁾ **Connect** To what number is the arrow pointing?

