Name: _____

Date: _____

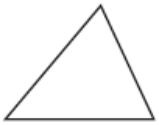
Period: _____

Geometry Lesson 13

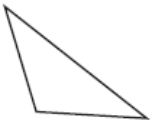
Objective: TSW classify triangles by their angles or sides.

A triangle is a three-sided polygon. A triangle can be classified by its angles or by its sides. The following are three ways to classify a triangle according to its angles.

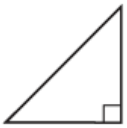
_____ Triangle - Any triangle that has three acute angles is an acute triangle.



_____ Triangle - Any triangle that has one obtuse angle is an obtuse triangle.



_____ Triangle -Any triangle that has one right angle is a right triangle.



_____ triangle - A special kind of acute triangle which has three congruent angles.

Math Reasoning

Model An obtuse triangle has exactly one obtuse angle. Try to draw a triangle with two obtuse angles. What do you notice?

Example 1 Classifying Triangles by Angles

a. In the diagram, which triangle is obtuse?

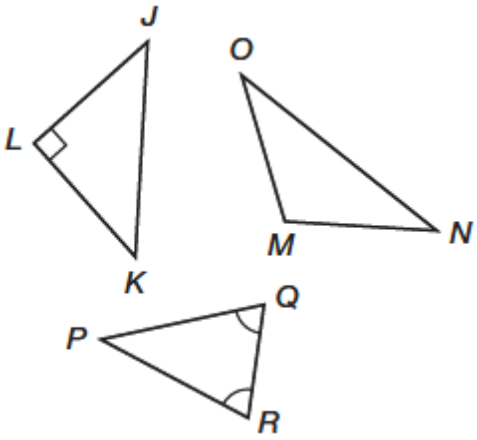
SOLUTION

b. Which triangle is a right triangle?

SOLUTION

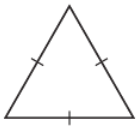
c. Are any of the triangles equiangular?

SOLUTION

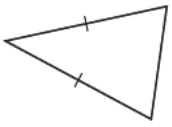


Triangles may also be classified by the lengths of their sides. The following are three ways to classify a triangle by its sides.

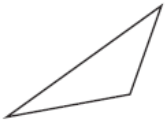
_____ Triangle - Any triangle that has three congruent sides is an equilateral triangle.



_____ Triangle - Any triangle with at least two congruent sides is an isosceles triangle.



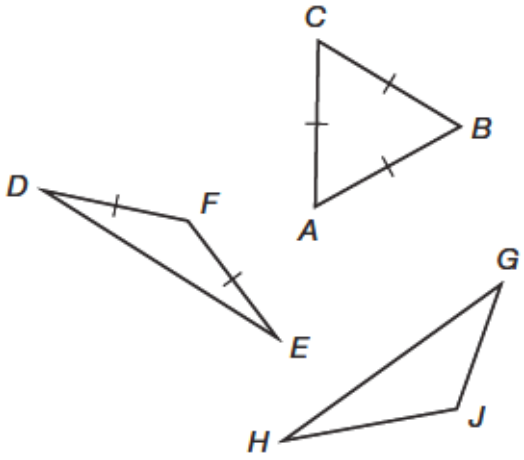
_____ Triangle - Any triangle that does not have any congruent sides is a scalene triangle.



Math Reasoning

Write Explain why an equilateral triangle is always isosceles, but not vice versa.

Example 2 Classifying Triangles by Sides



a. In the diagram, which triangle is scalene?
SOLUTION

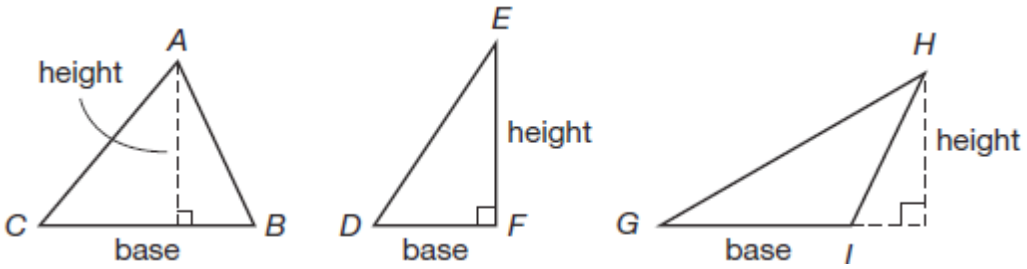
b. Which triangle is equilateral?
SOLUTION

c. Are any of the triangles isosceles but not equilateral?
SOLUTION

_____ of a triangle - One of the points where two sides of the triangle intersect.

_____ of a Triangle - Any one of the triangle's sides.

_____ of a Triangle - The perpendicular segment from a vertex to the line containing the opposite side. The length of that segment is also called the height.

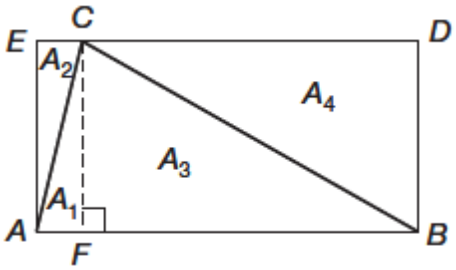


In ΔGHI, the perpendicular segment from *H* does not intersect the base. The base is extended so a perpendicular segment can be drawn to show the height. To find the area of a triangle, both the base and the height must be known.

Area of a Triangle - The area of a triangle is given by the formula below, where *b* is the length of the triangle's base and *h* is the height.

_____

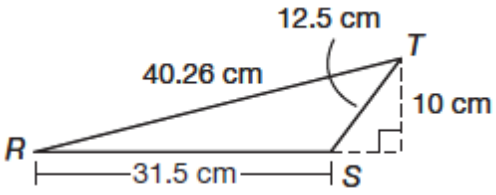
The diagram shows ΔABC enclosed in rectangle *ABDE*. Notice that ΔAFC and ΔCEA have the same base and height, so areas A_1 and A_2 are equal. Similarly, $A_3 = A_4$. The area of rectangle *ABDE* is *b* × *h*. Therefore,
Area of $ABCD =$



Example 3 Finding Perimeter and Area of a Triangle

a. Determine the perimeter of ΔRST.

SOLUTION



b. Determine the area of _*RST*.

SOLUTION

Example 4 Application: Farming

A triangular plot of land has a northwestern boundary measuring 64.6 yards, a southern boundary measuring 138.0 yards, and a northeastern boundary measuring 114.1 yards. The perpendicular distance from the southern boundary to the northern corner of the plot is 53.0 yards.

a. How much fencing is required to surround the plot?

SOLUTION The perimeter is

b. It takes 100 pounds of barley seed to seed 2400 square yards of land.
How much seed is needed for the whole plot, to the nearest pound?

SOLUTION The area of the plot is

100 pound of barley covers 2400 square yards

Use a proportion:

You Try!!!!

e. A right isosceles triangle has legs measuring 13.2 centimeters and a hypotenuse measuring 18.7 centimeters. What is its perimeter?

f. What is the area of the triangle in part e?