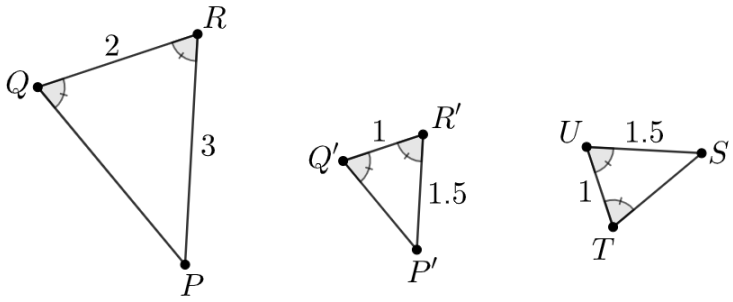
Name: _____

Lesson 3.05
AA Similarity

Geometry GT

Recall

How could you justify each statement?



Triangle $\Delta P'Q'R'$ is congruent to triangle ΔSTU.

Triangle ΔPQR is similar to triangle ΔSTU.

Explore

For parts **A** through **C**, draw two triangles that have the listed properties. Try to make them as different as possible.

A. One angle is 45°.

B. One angle is 45° and another angle is 30°.

C. One angle is 45° and another angle is 30°. The lengths of a pair of corresponding sides are 2 cm and 6 cm.

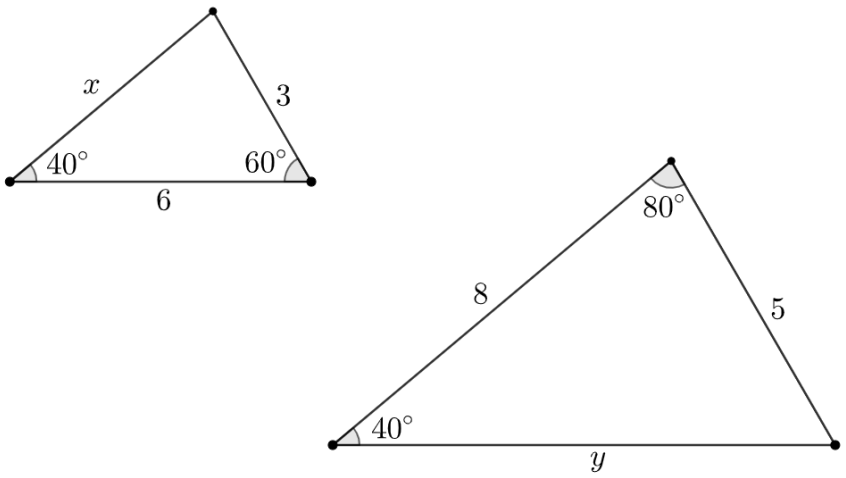
Compare your triangles with your neighbors' triangles. Which ones seem to be similar no matter what? Can you prove it?

Theorem

Angle-Angle Triangle Similarity Theorem: in two triangles, if two pairs of corresponding angles are congruent, then the triangles must be similar

Discuss

One triangle has a 60° angle and a 40° angle. Another triangle has a 40° angle and an 80° angle.



Explain how you know the triangles are similar.

How long are the sides labeled x and y?

Demonstrate

Vivian noticed in the previous activity that between the two triangles, you only need to know 4 angles to show that they are similar. She wondered which fourth angle would work to prove $\Delta RST \sim \Delta EFG$.

In ΔRST: $m\angle R = 90°$, $m\angle S = 25°$, $m\angle T = x°$

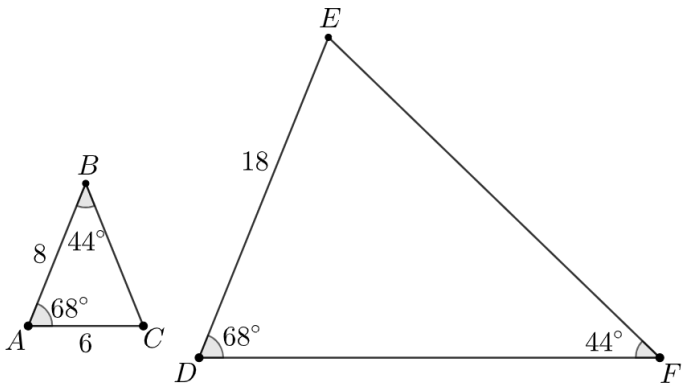
In ΔEFT: $m\angle E = 90°$, $m\angle F = y°$, $m\angle G = z°$

Draw a sketch of the triangles, then pick one angle measurement that would prove the triangles are similar.

Explain to Vivian why knowing that angle would be enough.

Practice

1. What is the length of $\overline{DF}$?



2. In ΔABC, $m\angle A = 35°$ and $m\angle B = 20°$. Select **all** triangles which are similar to ΔABC.

A. ΔDEF with $m\angle D = 35°$ and $m\angle E = 20°$

B. ΔGHI with $m\angle G = 35°$ and $m\angle I = 30°$

C. ΔJKL with $m\angle J = 35°$ and $m\angle L = 125°$

D. ΔMNO with $m\angle N = 20°$ and $m\angle O = 125°$

E. ΔPQR with $m\angle Q = 20°$ and $m\angle R = 30°$

3. Determine if each statement must be true, could possible be true, or definitely can't be true.

A. An equilateral triangle and a right triangle are similar

B. A right triangle and an isosceles triangle are similar

4. Determine if $\Delta ABC \sim \Delta DEC$. Explain or show your reasoning.