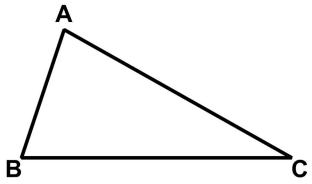
Name: _____ Date: _____

THE ANGLE-ANGLE CRITERION FOR SIMILAR TRIANGLES
N-GEN MATH® 8

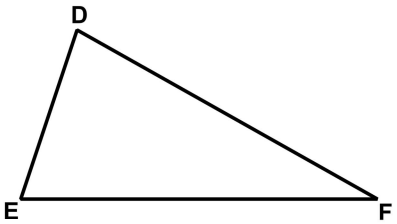
We now know that when one figure is transformed using a **dilation** it produces an image figure that is **similar to the first**. Similar figures have two extremely important properties.

***Exercise* #1:** Fill in the following blanks for two figures that are similar, like ΔABC and ΔDEF shown below.



(a) Two similar figures have **corresponding sides** that

are _____

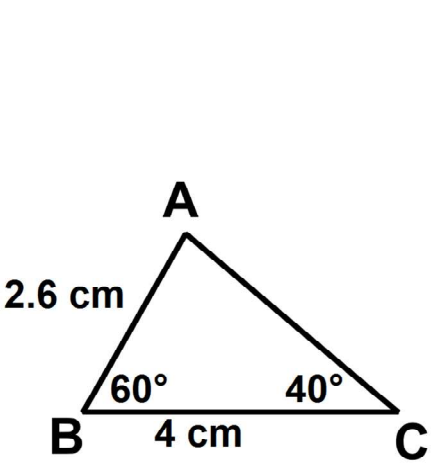


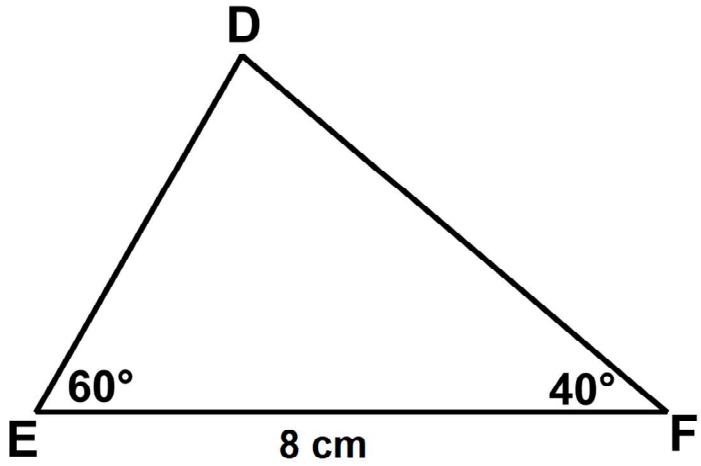
(b) Two similar figures have corresponding angles that

are _____

If two figures **satisfy** the **two criteria** above, then they must be similar. But we can actually know far less information and still be able to say that two triangles are similar. In fact, if **two angles of one triangle** are **congruent** to **two angles of another triangle**, that is enough to know they are **similar**. This is known as the **angle-angle criterion** for **similarity**. We will see why this is true in the next exercise.

***Exercise* #2:** In the diagram below, ΔABC and ΔDEF both have angles of $60°$ and $40°$.



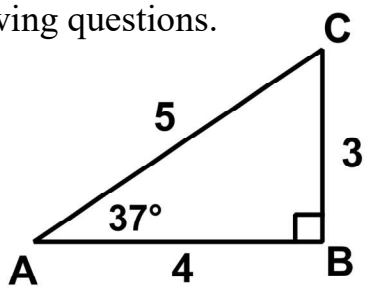


(a) Using a ruler, dilate ΔABC by a scale factor of 2 using point B as a center.

(b) Is the image triangle, $\Delta A'B'C'$ now congruent to ΔDEF? Use tracing paper to check.

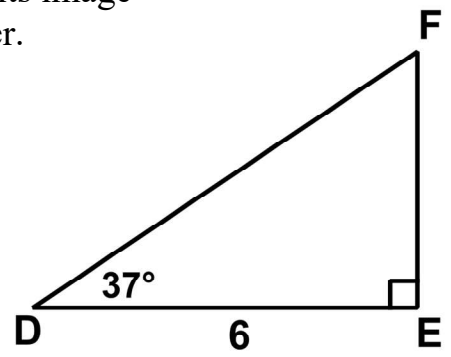
When two angles of one triangle are congruent (equal in measure) to two angles of another triangle, we can always scale one triangle to be congruent to the other, meaning the two triangles must be similar.

***Exercise* #3:** Given ΔABC and ΔDEF shown below, answer the following questions.



(a) How can we tell that the two triangles are similar?

(b) What scaling constant could be used to dilate ΔABC so that its image is congruent to ΔDEF? Show how you arrived at your answer.

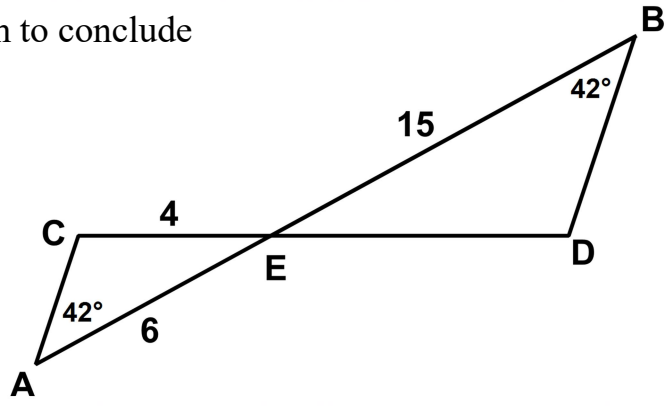


(c) What is the length of side $\overline{DF}$?

Sometimes it can be tricky to see why two triangles must be similar. Let's look at another example.

***Exercise* #4:** In the diagram below, segments $\overline{AB}$ and $\overline{CD}$ intersect at E. Answer the following.

(a) Why is there enough information in the diagram to conclude that ΔACE is similar to ΔBDE?

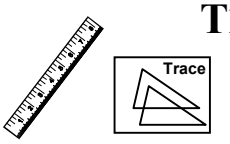


(b) Redraw ΔACE below the main diagram so that it is oriented in the same way as ΔBDE.

(c) Find the length of segment $\overline{DE}$.

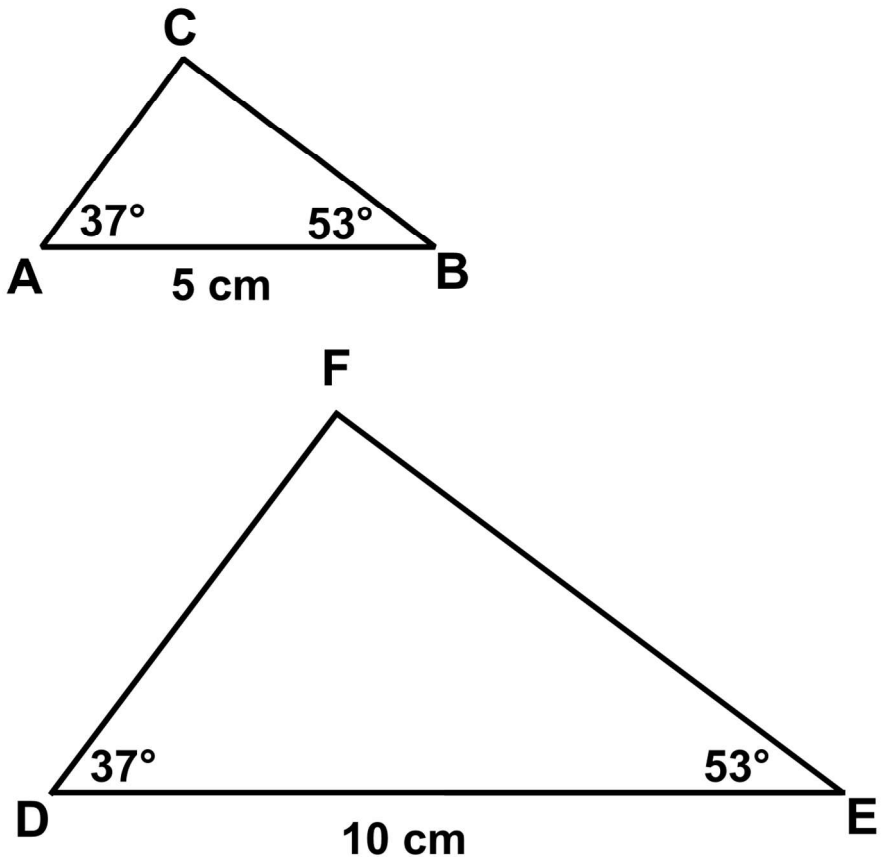
Name: _____ Date: _____

THE ANGLE-ANGLE CRITERION FOR SIMILAR TRIANGLES
N-GEN MATH® 8 HOMEWORK



FLUENCY

1. Below two triangles, ΔABC and ΔDEF, both have angles of $37°$ and $53°$ (to the nearest degree). Using a ruler, dilate ΔABC using a center at point A and a scale factor of 2. Label the image $\Delta A'B'C'$.



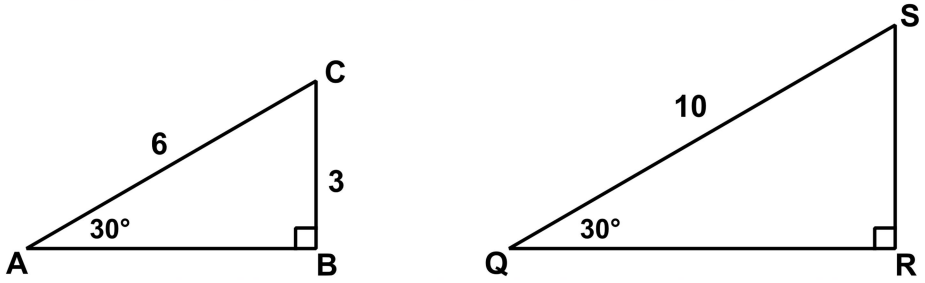
   Use tracing paper to verify that $\Delta A'B'C'$ is congruent to ΔEFG.

2. On the initial diagram, find the measures of $\angle C$ and $\angle F$. Label on the diagram.

   Why does it make sense that the measure of $\angle C$ and $\angle F$ are equal?

REASONING

3. In the diagram below, two right triangles are shown with various measurements.

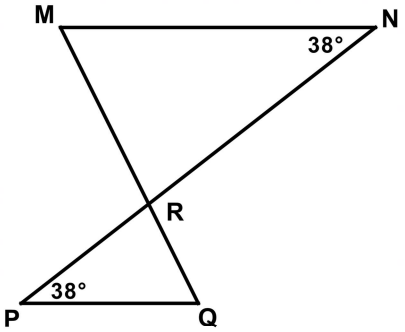


(a) Explain how we know that ΔABC and ΔQRS are similar.

(b) What is the length of side $\overline{RS}$ in ΔQRS? Show or explain how you found your answer.

4. In the diagram shown, segments $\overline{NP}$ and $\overline{MQ}$ intersect at point R. The measures of $\angle N$ and $\angle P$ are both $38°$ as shown.

Why must ΔMNR be similar to ΔQPR?



5. Two isosceles triangles are shown below with the noted measurements.

(a) Explain why these two triangles must be similar.

(b) What is the length of side $\overline{WX}$? Justify.