Similar Triangles

Lesson 8

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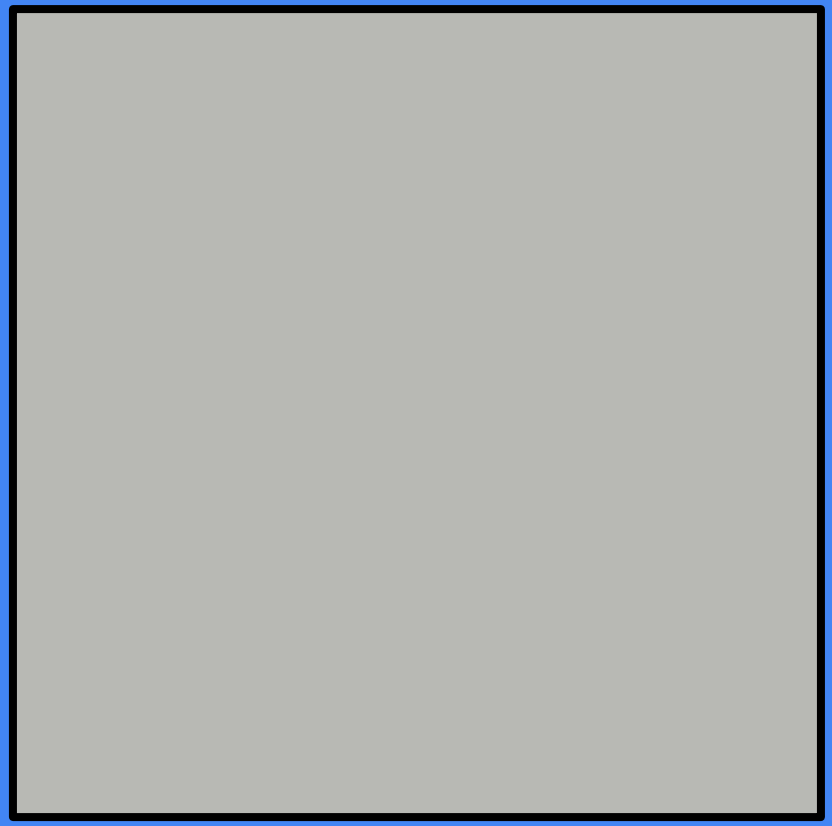
Building on	**7.NS.A** Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. **7.RP.A.2.a** Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. **8.G.A.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
Addressing	**8.G.A** Understand congruence and similarity using physical models, transparencies, or geometry software. **8.G.A.5** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

Let’s look at similar triangles!



Equivalent Expressions

Warm Up 8.1

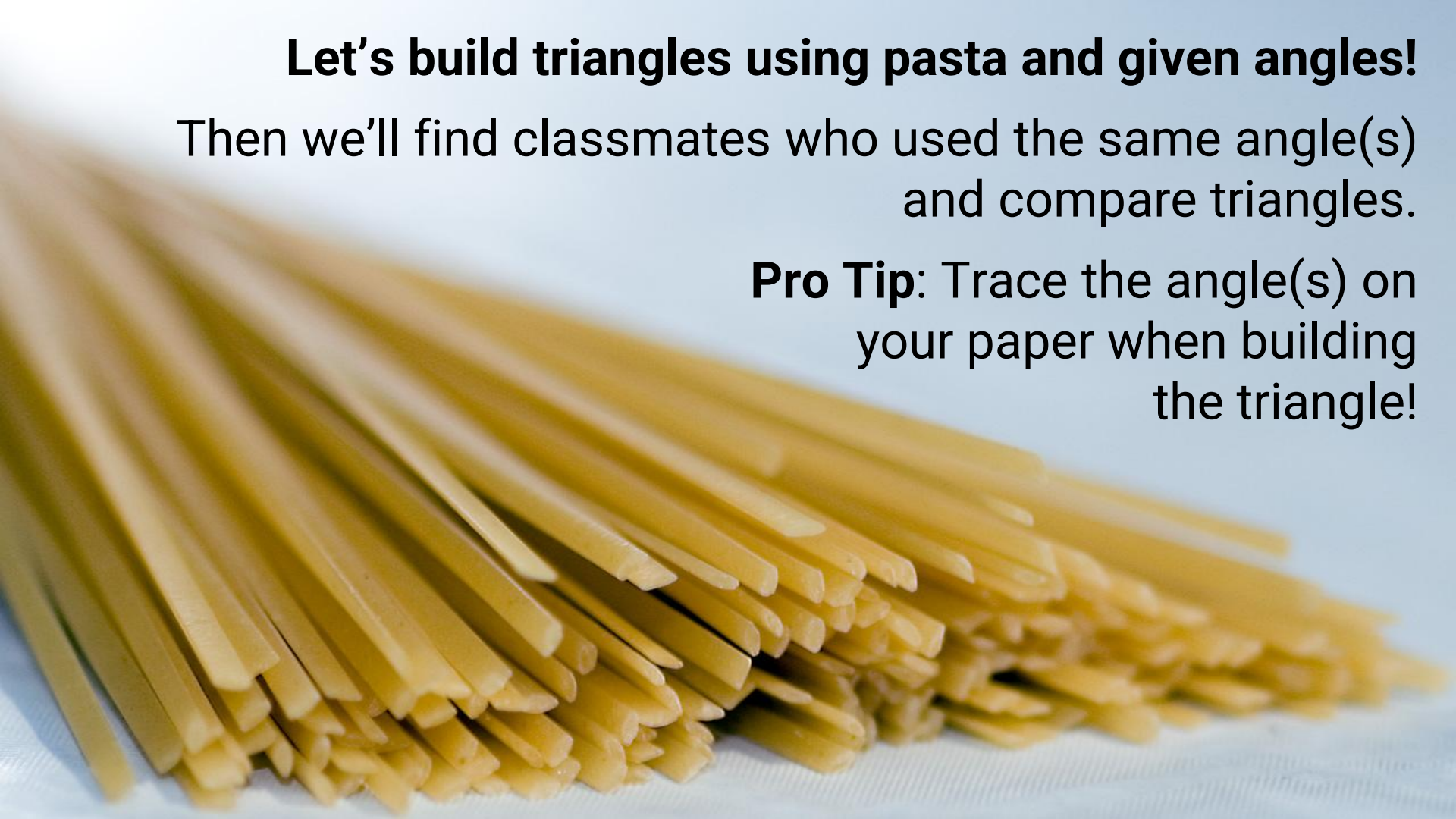
Create three different expressions that are each equal to 20. Each expression should include only these three numbers: **4**, **-2**, and **10**.

Begin with Quiet Think Time. (1 min)
Collaborate with your partner.

Making Pasta Angles and Triangles

Activity 8.2

- Group Presentations
- Collect and Display



Let’s build triangles using pasta and given angles!

Then we’ll find classmates who used the same angle(s) and compare triangles.

Pro Tip: Trace the angle(s) on your paper when building the triangle!

Complete all parts of Question 1.

Your triangle *must* include the angle *A* you were given, and make any triangle you'd like!

Complete all parts of Question 2.

Use more parts and angles *A*, *B*, and *C* to create another triangle.

Complete all parts of Question 3.

Break a new piece of pasta, different in length than segment *PQ*!

Did your angles in the triangle always add up to 180 degrees?

How did you decide whether or not the sides of your triangle were proportional to the other triangles?

How did you check whether or not your triangle was similar to another?

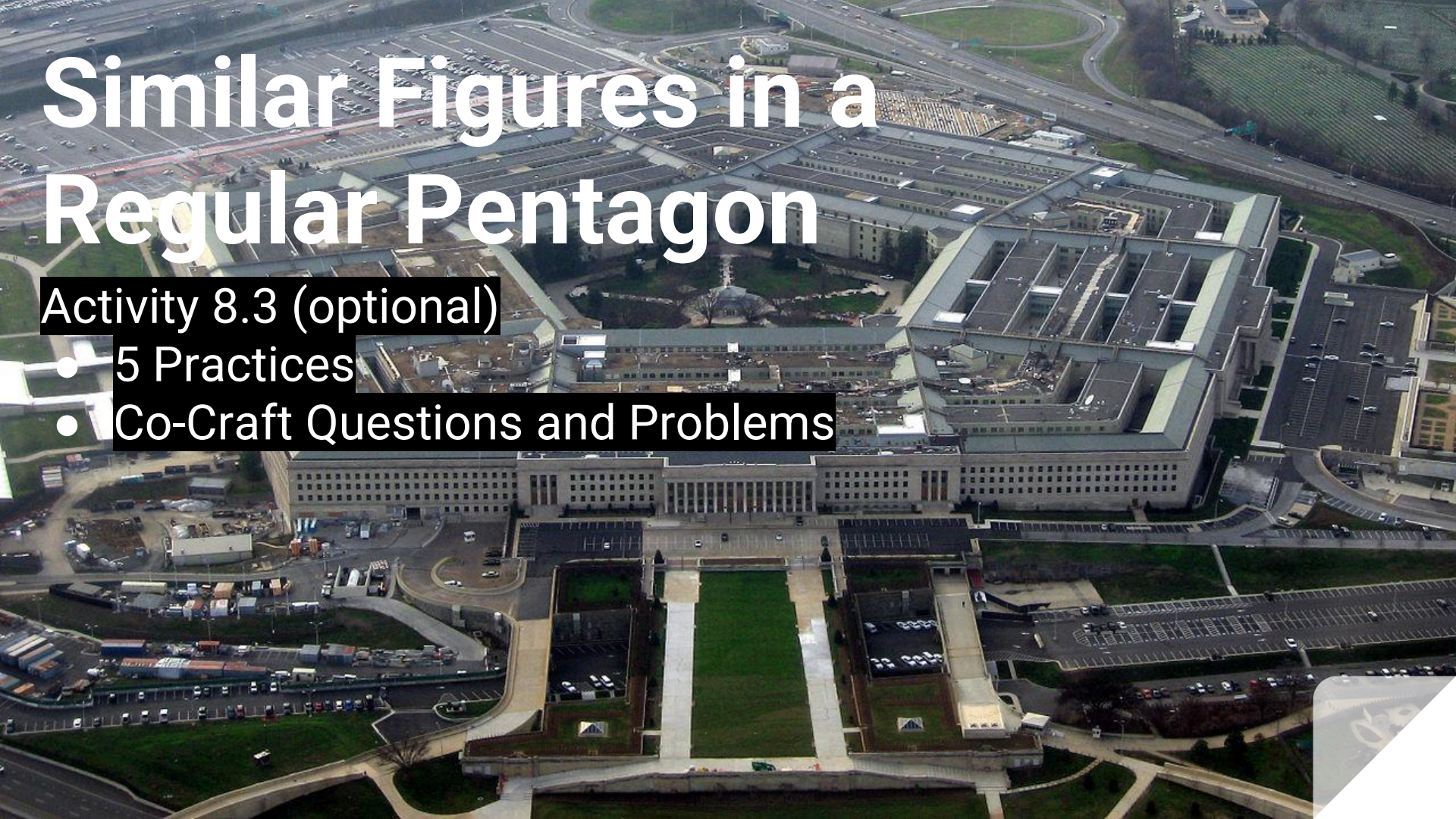
BIG IDEA:

If triangles share two pair of congruent angles, then they are similar.

“Are you ready for more?”

Quadrilaterals *ABCD* and *EFGH* have four angles measuring 240°, 40°, and 40°.

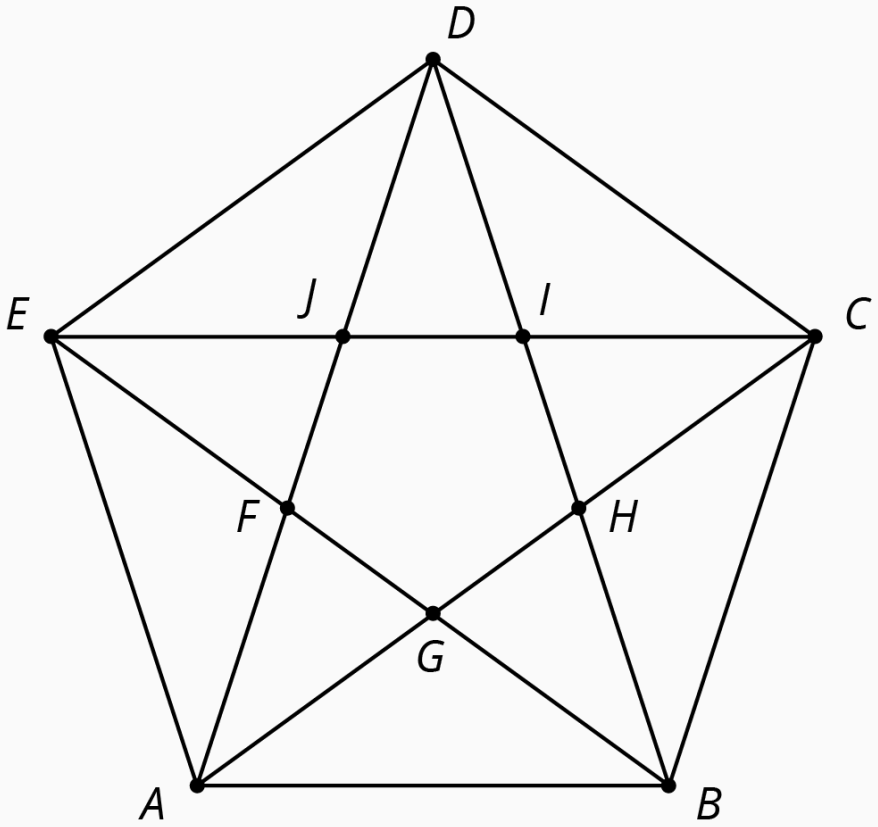
Do *ABCD* and *EFGH* have to be similar?



Similar Figures in a Regular Pentagon

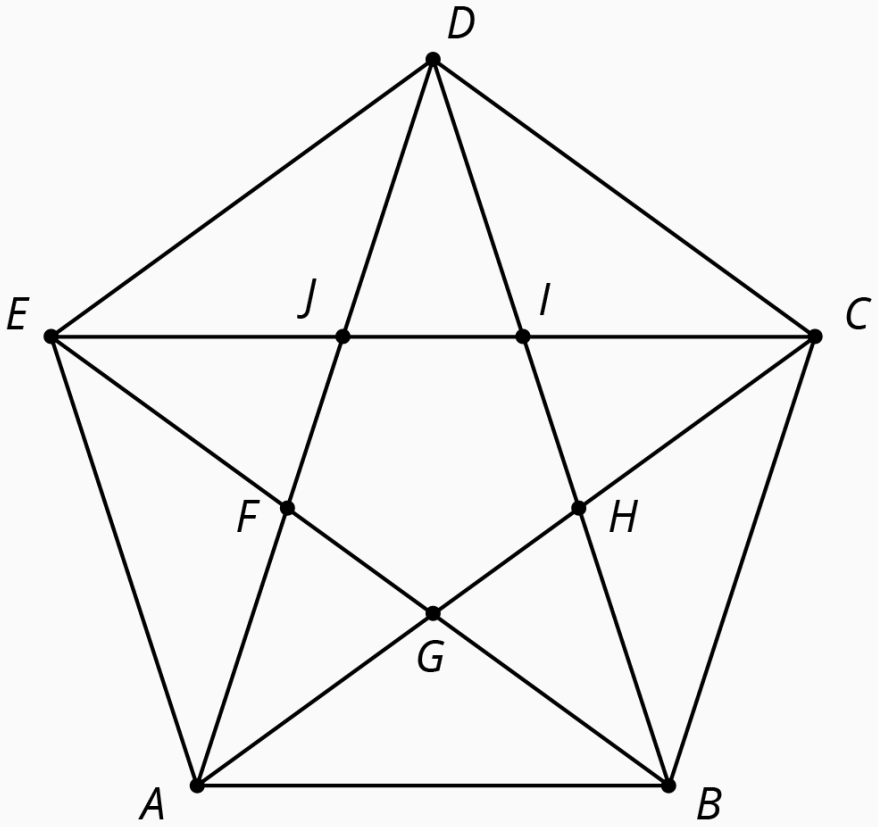
Activity 8.3 (optional)

- 5 Practices
- Co-Craft Questions and Problems



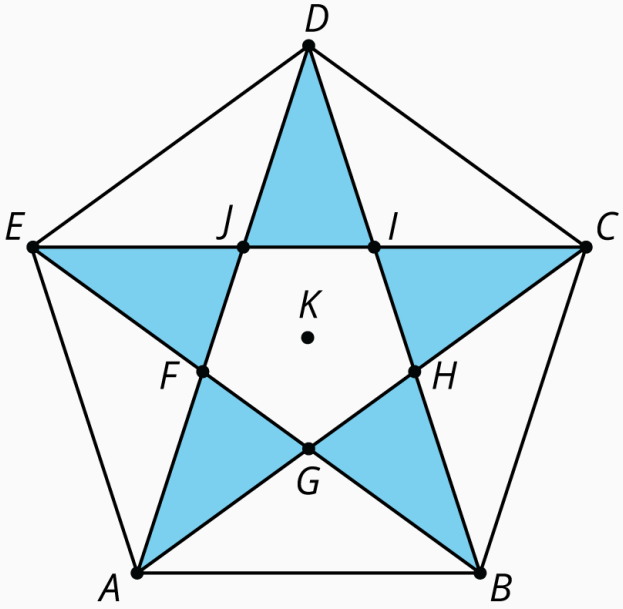
Use your math tools and a copy of triangle *DJI* to find triangles similar to it.

Begin by working on your own.



Which similar triangles did you find?

How did you determine they are similar?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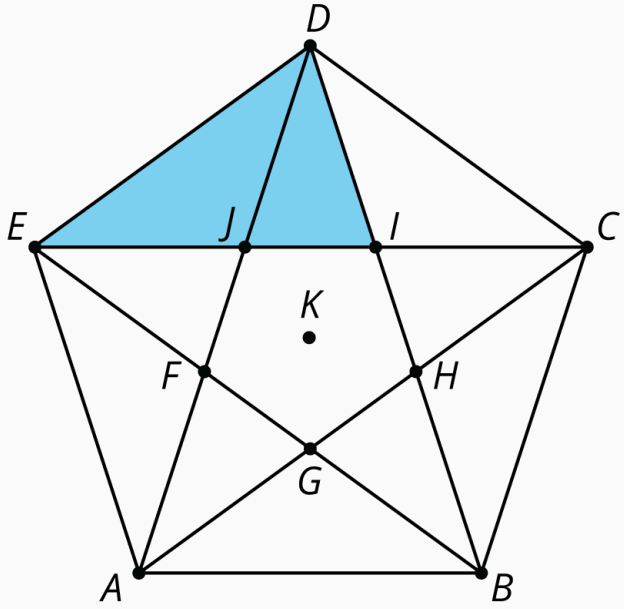
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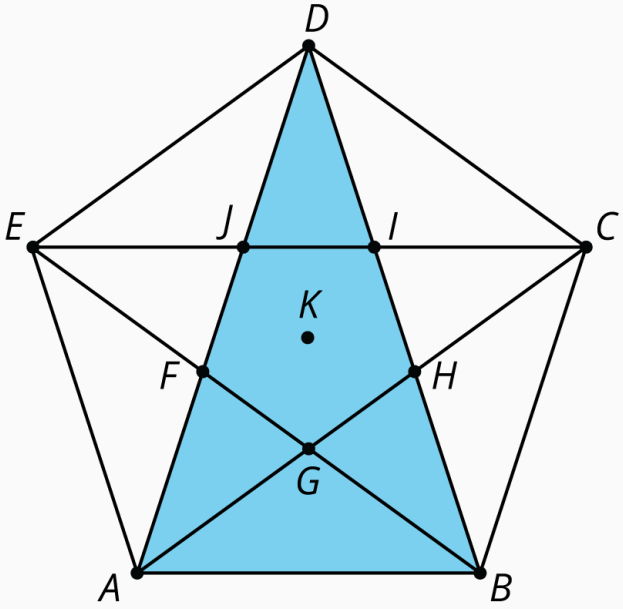
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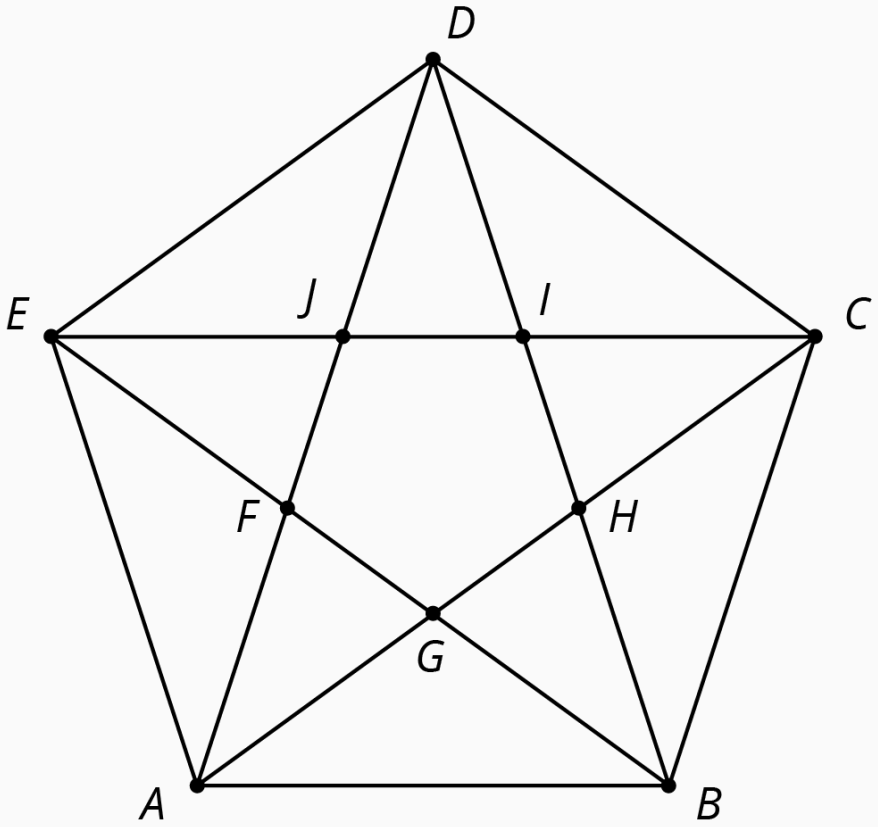
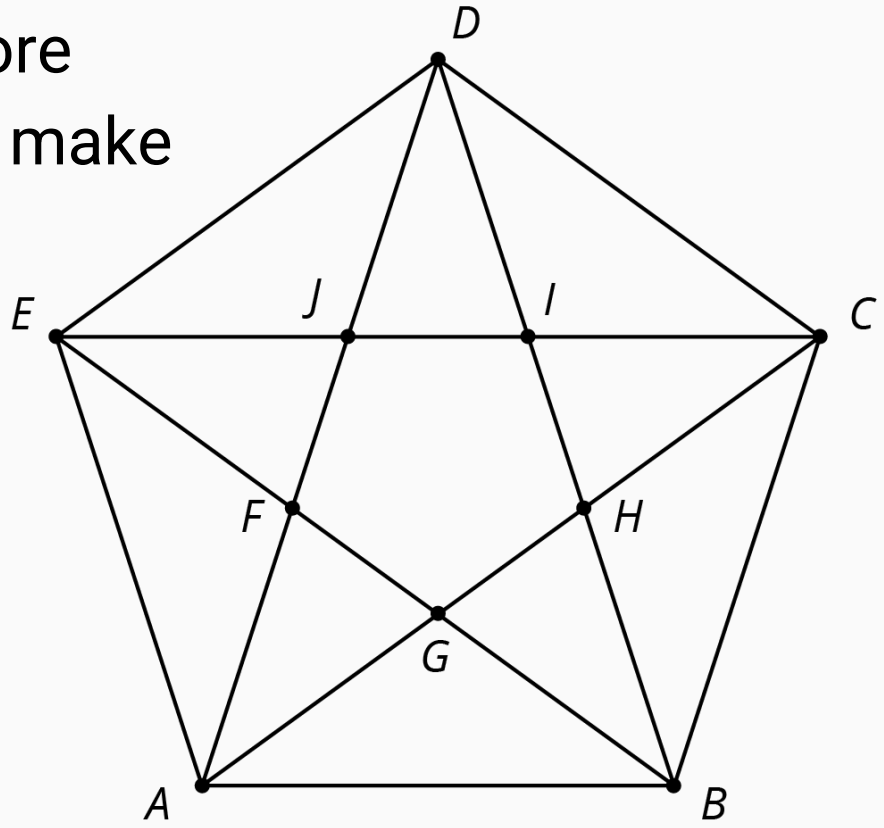


Among the triangles that are not similar to triangle *DJI*,

which might be similar to each other?

“Are you ready for more?”

Figure out how to draw some more lines in the pentagon diagram to make more triangles similar to *DJI*.

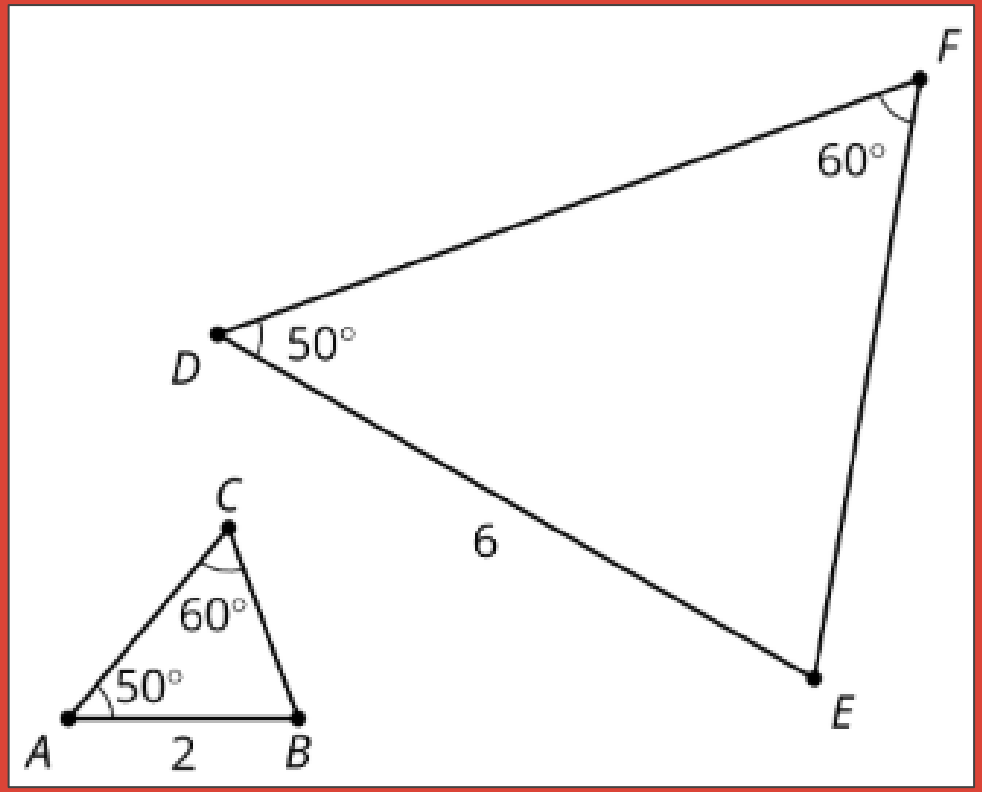


If a triangle has a 50 degree angle, what does that tell about its shape?

- **Could it be isosceles?**
- **Could it fail to be isosceles?**
- **Are all triangles with a 50 degree angle similar?**

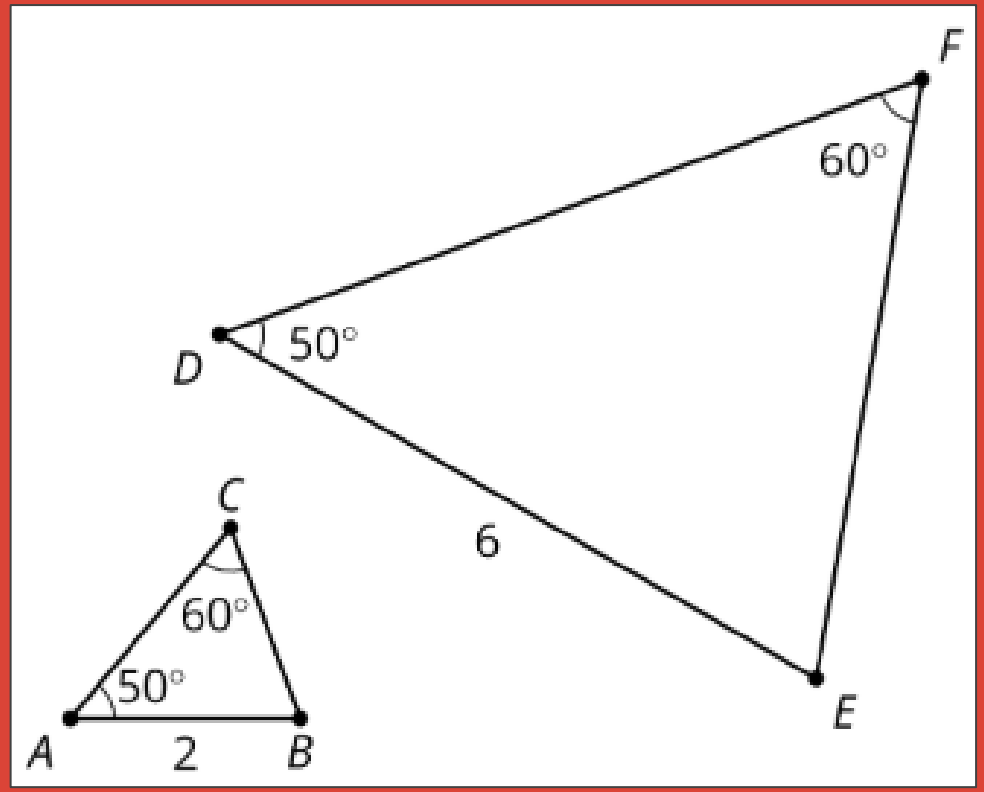
BIG IDEA

If triangles have two pairs of congruent angles, then they are similar.



BIG IDEA

If we dilate *ABC* and a scale factor 3, then *AB* is the same length as *DE*. we can apply rigid motions so that angle *A* matches up with angle *D* and angle *B* matches up with angle *E*. the vertices *C* and *F* also match up and *ABC* is similar to *DEF*.



Today's Goal

- ❏ I know how to decide if two triangles are **similar** just by looking at their angle measures.

Applying Angle-Angle Similarity

Cool Down 8.4