Composing Figures

Lesson 10

CCSS Standards: Addressing	• 8.G.A.1.a • 8.G.A.1.b

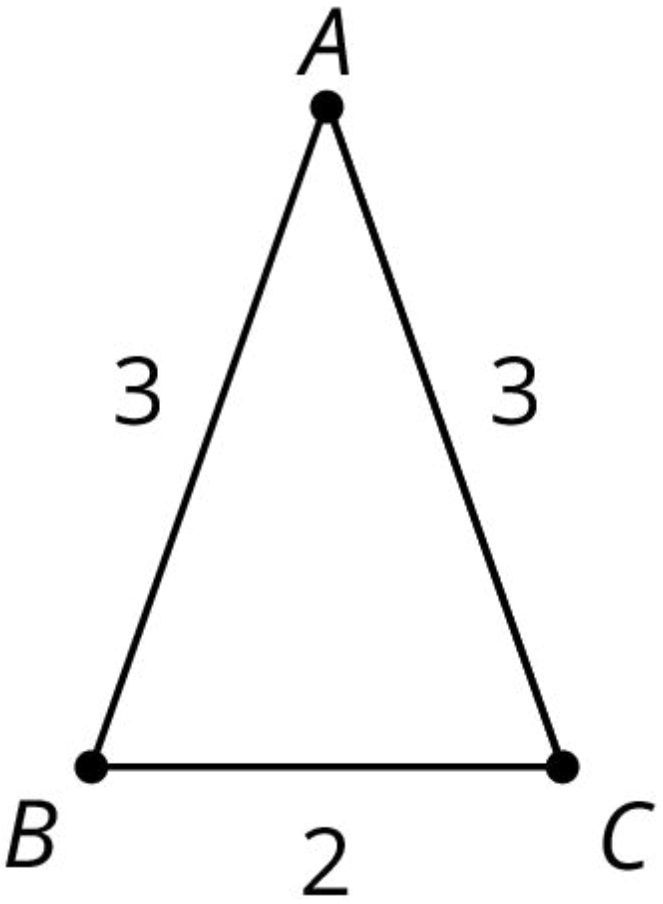
Let’s use reasoning about rigid transformations to find measurements without measuring!

Today's Goals

- ❑ I can find missing side lengths or angle measures using properties of rigid transformations.

Angles of an Isosceles Triangle

Warm-Up 10.1

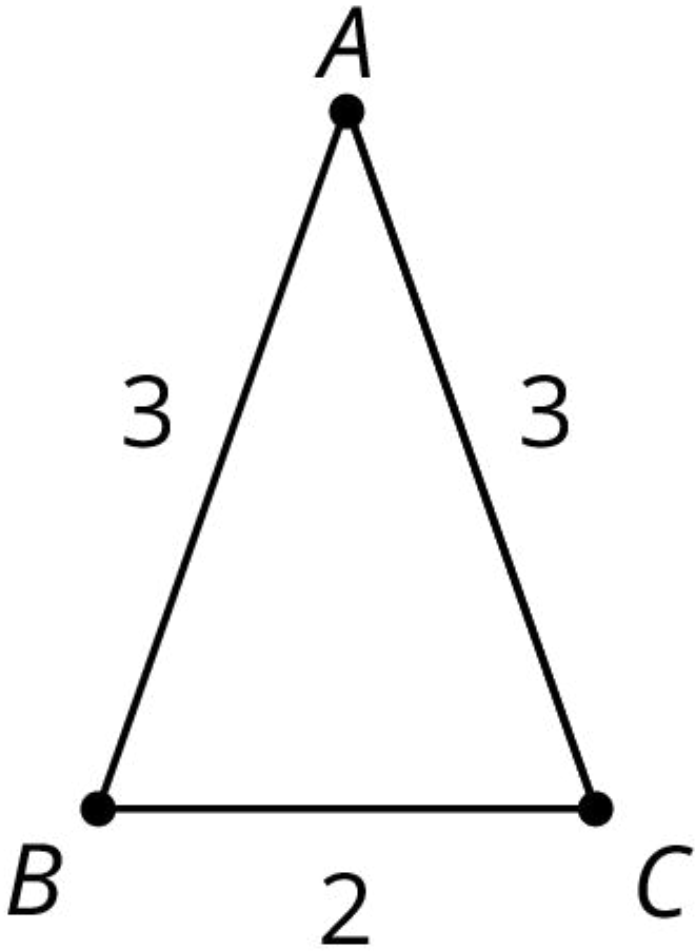


Begin with Quiet Work Time. (3 min)

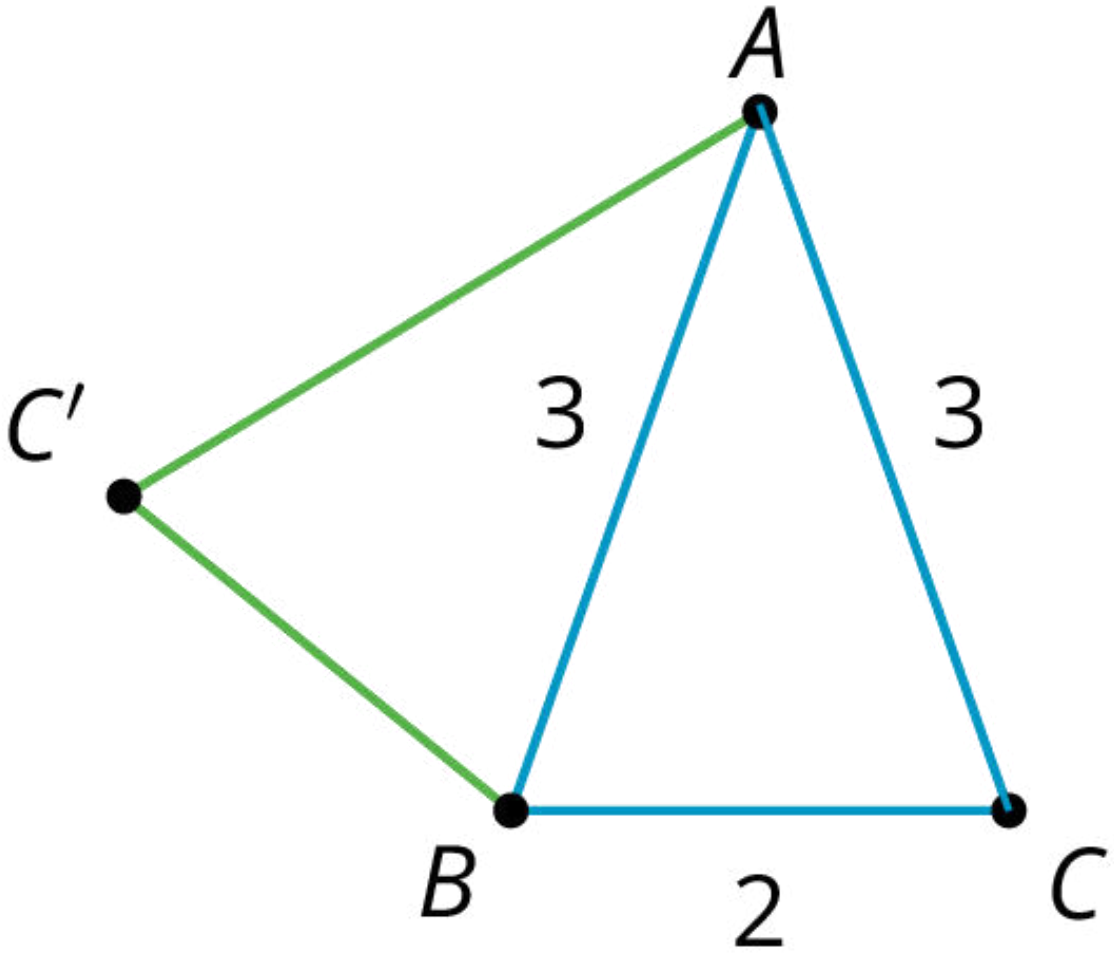
Be ready for a whole class discussion.

Reflect triangle *ABC* over line *AB*.

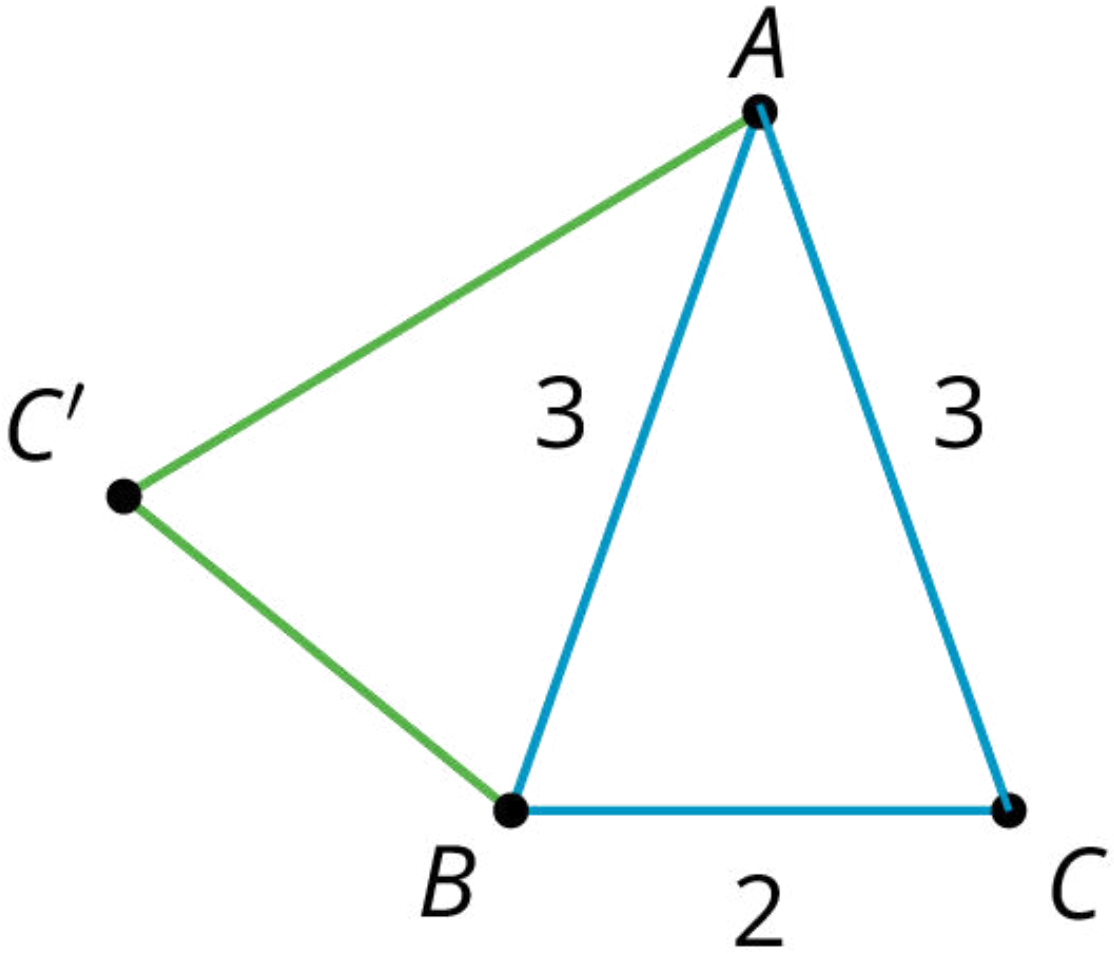
Label the image of *C* as *C'*.



Rotate triangle *ABC'* around *A* so that *C'* matches up with *B*.



What can you say about the measures of angles *B* and *C*?

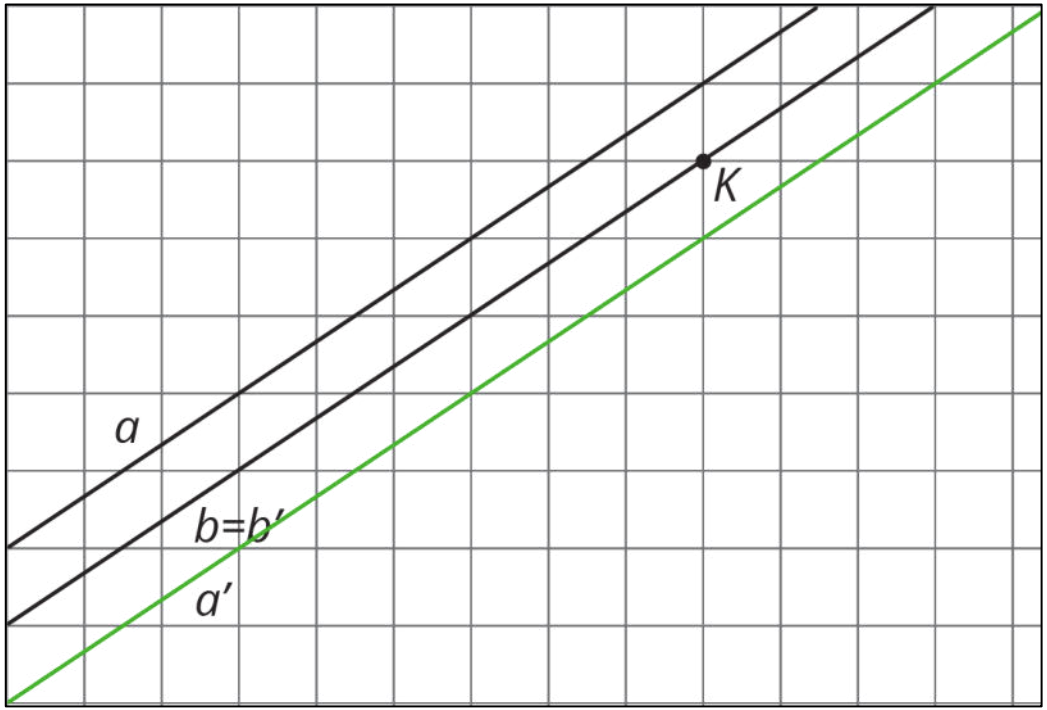


Triangle Plus One

Activity 10.2

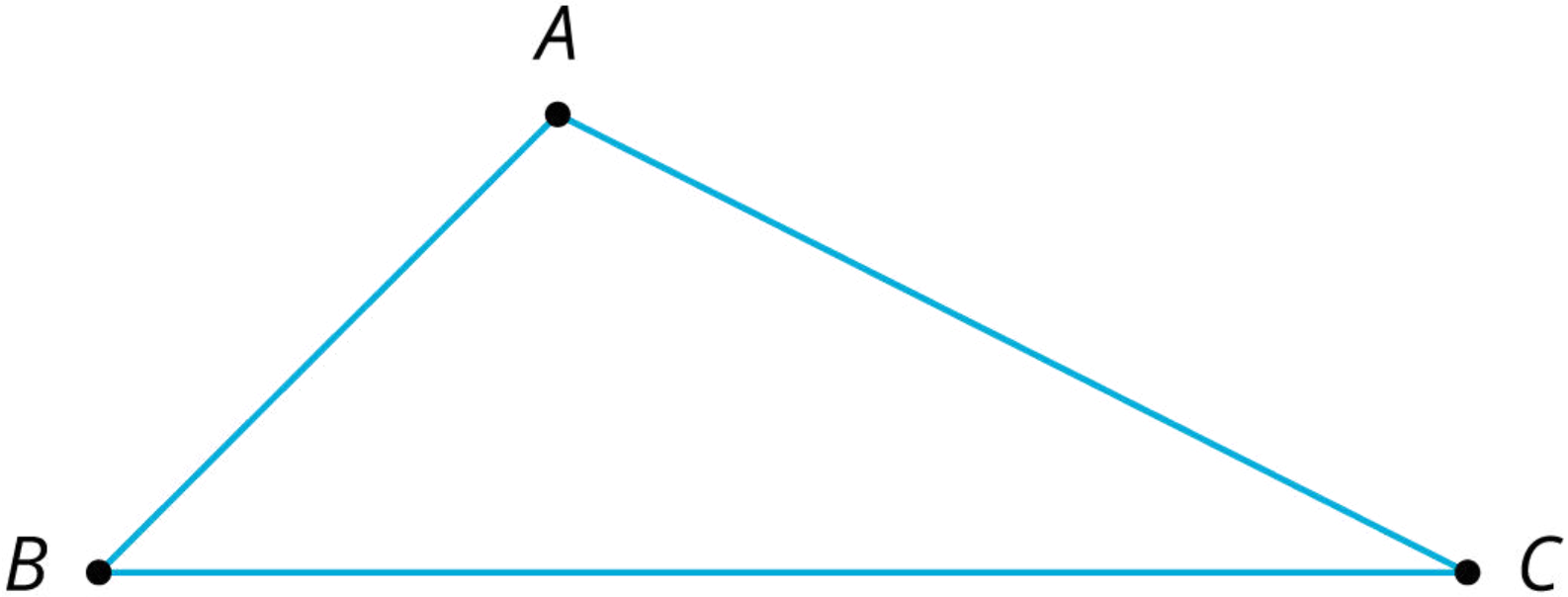
- Think Pair Share

Remember that the image of a line after a 180 degree rotation is parallel to that line.

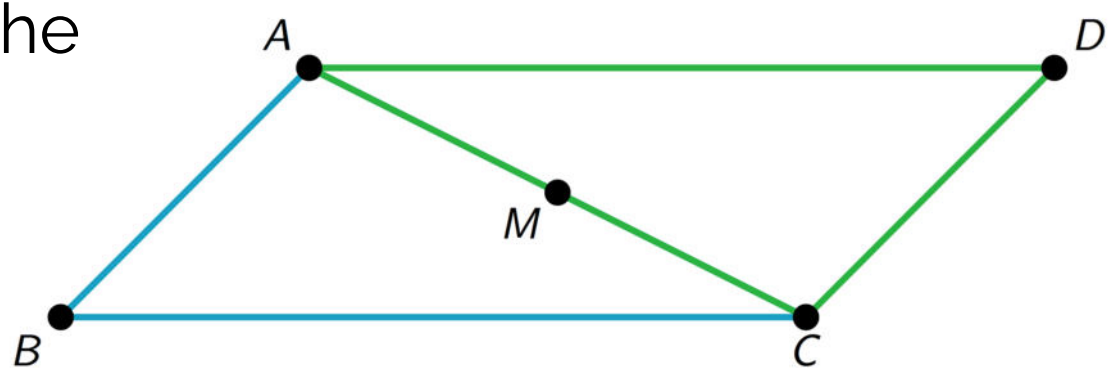


Begin with Quiet Work Time. (2-3 min)

Be ready to share with your partner.



- What happens to points *A* and *C* under the rotation?
- How do you know the the lines containing opposite sides of *ABCD* are parallel?
- How is the area of parallelogram *ABCD* related to the area of triangle *ABC*?



“Are you ready for more?”

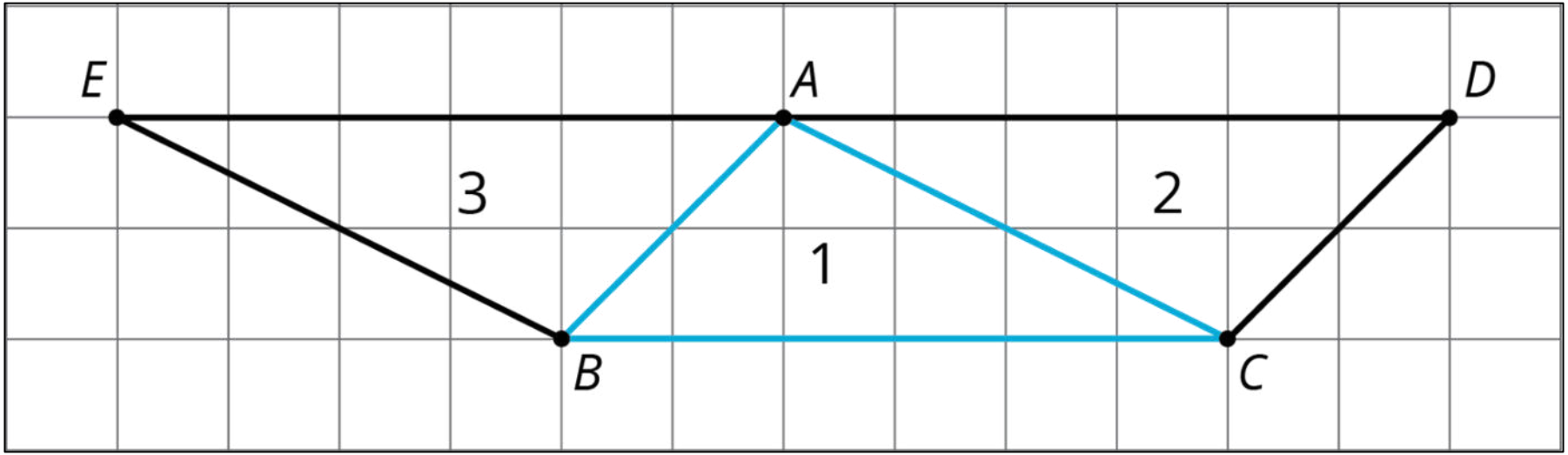
In the activity, we made a parallelogram by taking a triangle and its image under a 180-degree rotation around the midpoint of a side. This picture helps you justify a well-known formula of a triangle.

What is the formula and how does the figure help justify it?

Triangle Plus Two

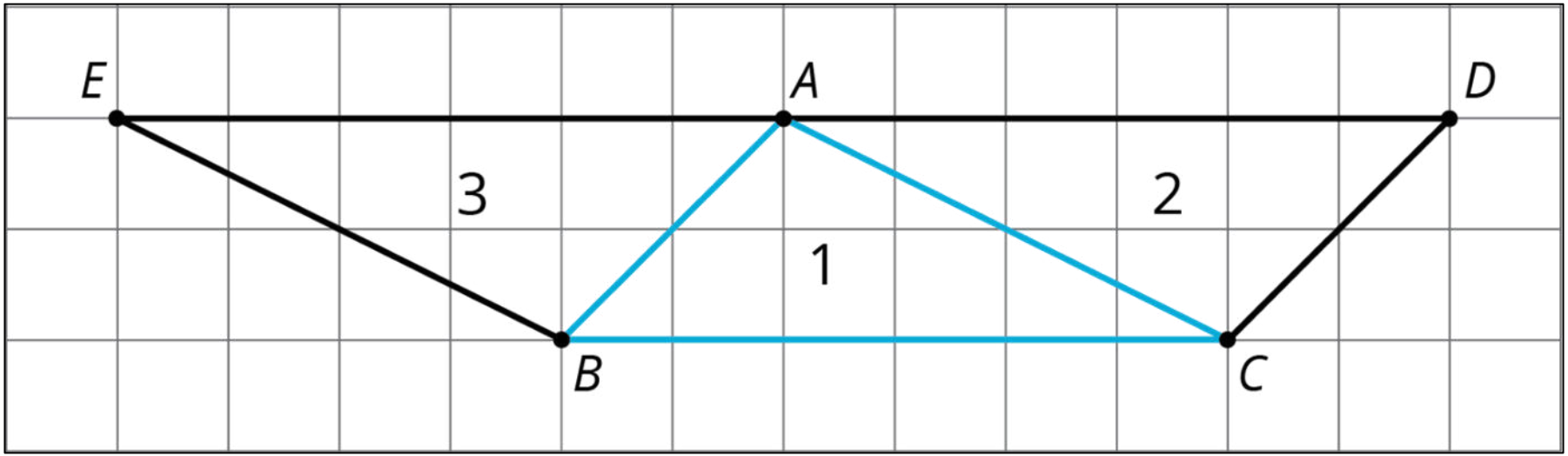
Activity 10.3

The picture shows 3 triangles. Triangle 2 and Triangle 3 are images of Triangle 1 under rigid transformations.

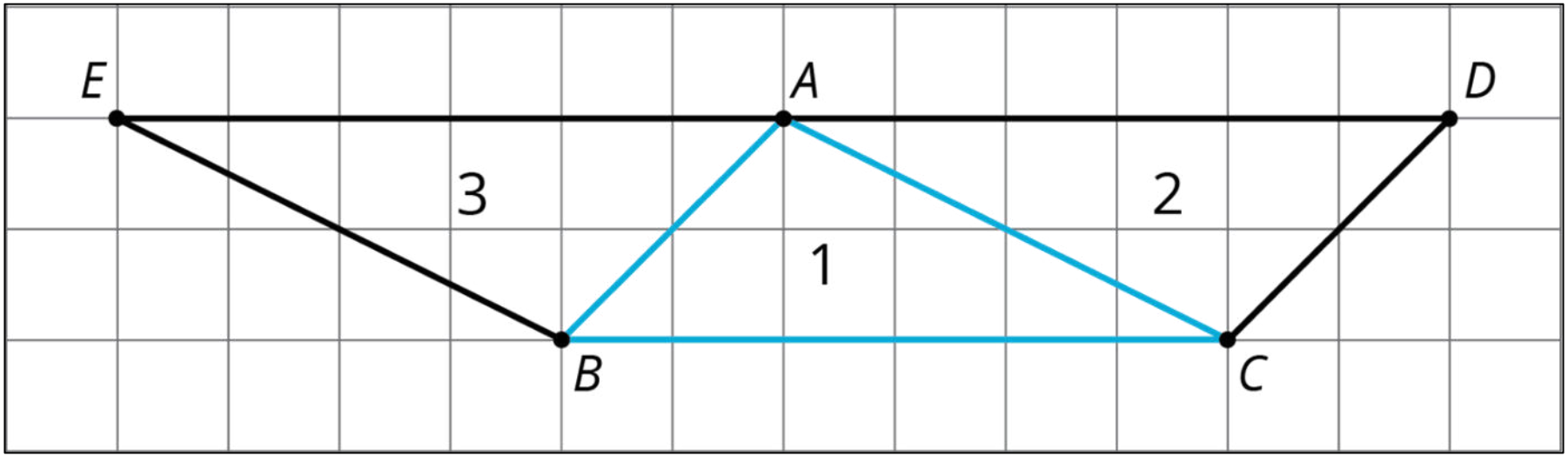


Begin with Quiet Work Time. (5 min)
Share your thinking as a team!

List as many different pairs of matching line segments as you can find:

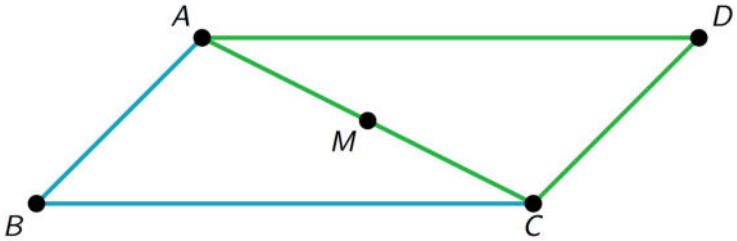


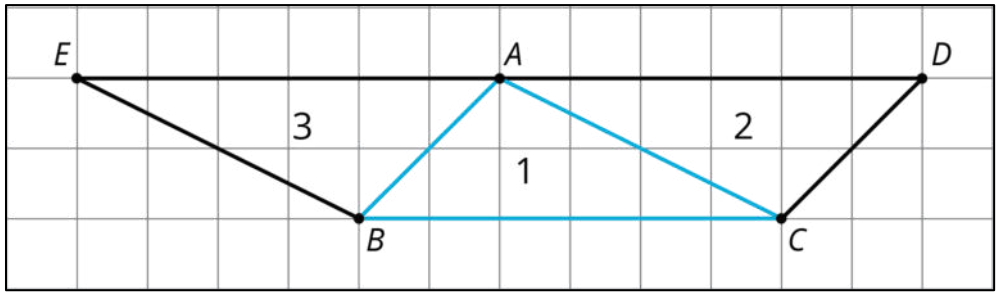
List as many different pairs of matching angles as you can find:



With your team...

summarize your understanding about lengths and angle measures under rigid transformations.

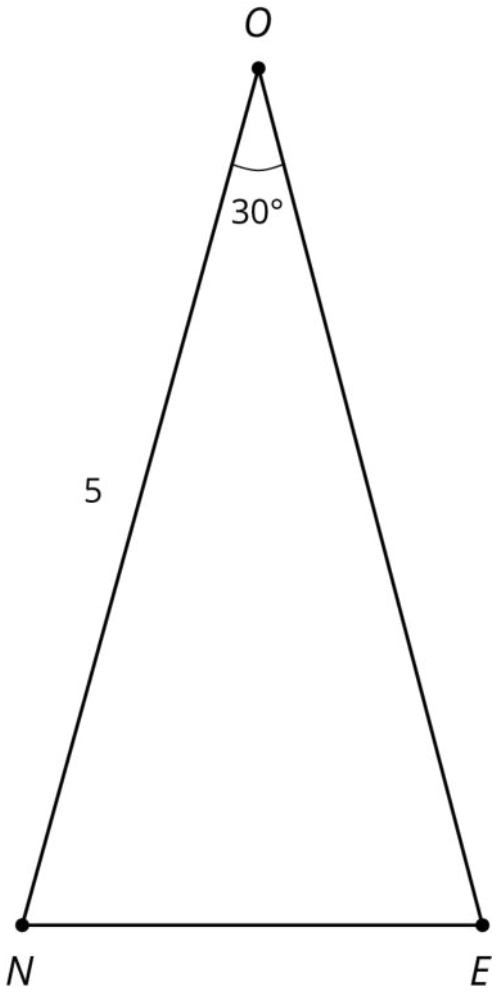




Under any rigid transformation, lengths and angle measures are preserved!

Triangle ONE Plus

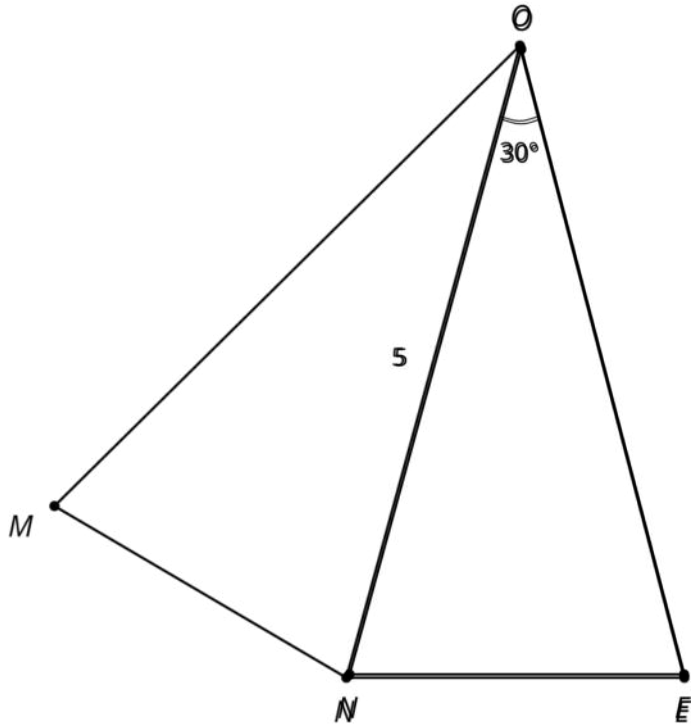
Activity 10.4 (optional)



Begin with Quiet Work Time.

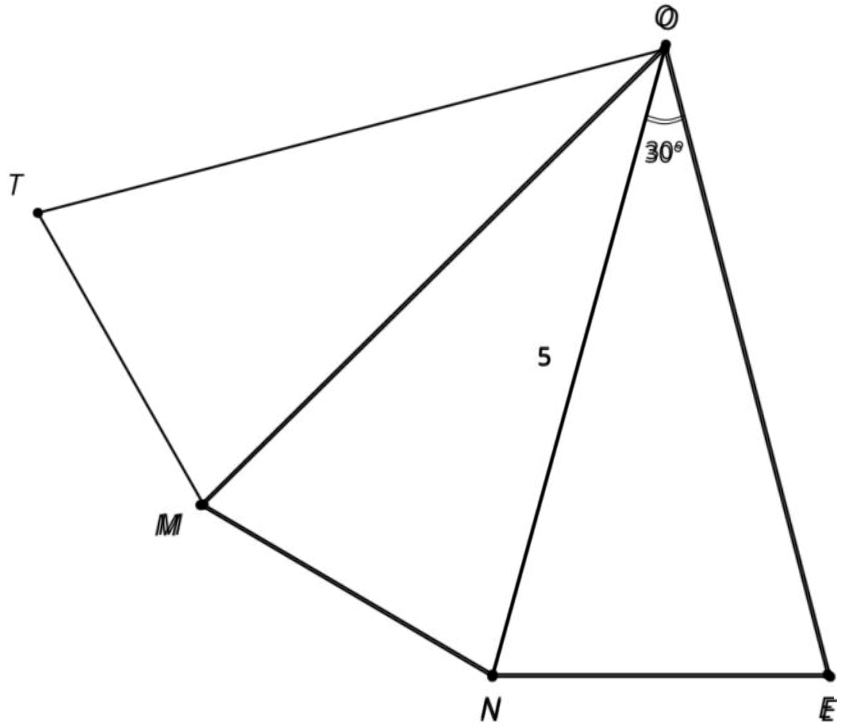
(8 min)

Reflect triangle *ONE* across segment *ON*. Label the new vertex *M*.



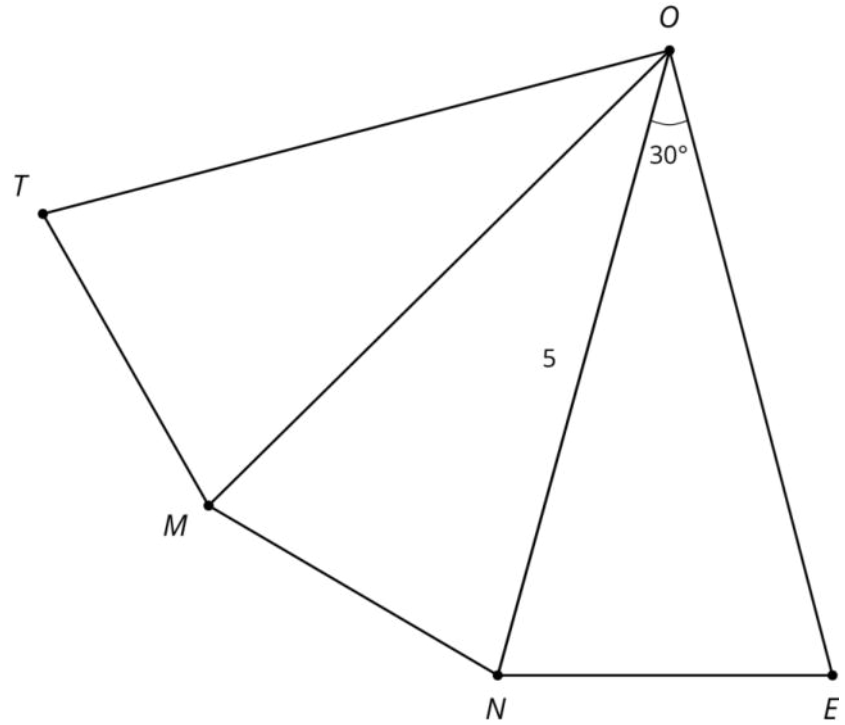
- What is the measure of angle *MON*?
- What is the measure of angle *MOE*?

Reflect triangle *MON* across segment *OM*. Label the point that corresponds to *N* as *T*.

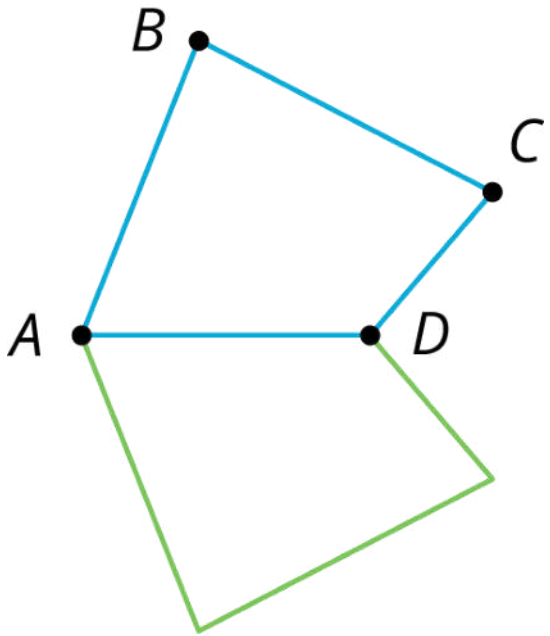


- **How long is *OT*? How do you know?**
- **What is the measure of angle *TOE*?**

If you continue to reflect each new triangle this way to make a pattern, what will the pattern look like?



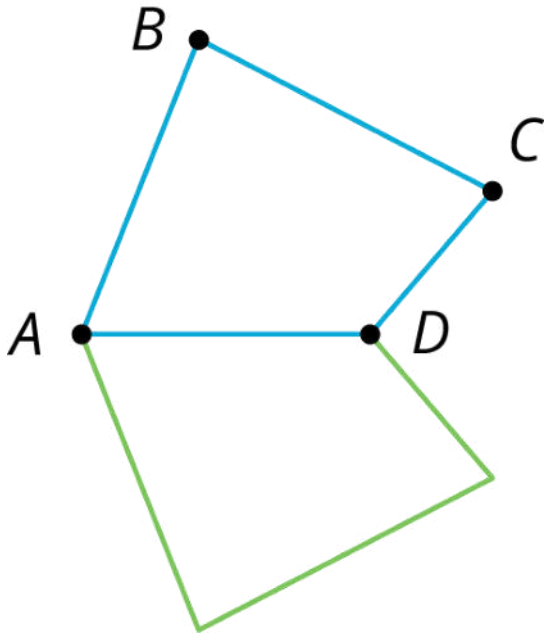
rigid transformation



transformation where all pairs of corresponding distances and angle measures in the figure and its image are equal

★ Translations, reflections, and rotations are all **rigid transformations**.

rigid transformation



Which sides and angles correspond if this image is found by reflecting *ABCD* across line *AD*?

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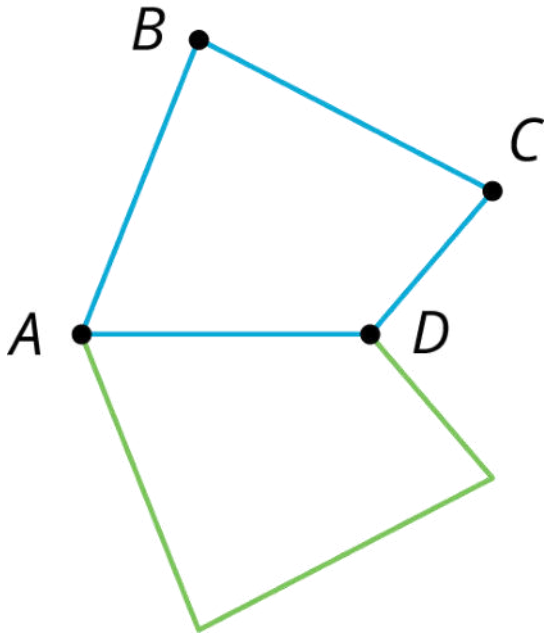
rigid transformation



- Sides on a reflection line do not move, so they are their own image when we **reflect** across a side.
- The center of rotation does not move, so it is its own image when we **rotate** around it.
- All points move with a ~~—~~**translation**.

Today's Goals

- ❑ I can find missing side lengths or angle measures using properties of rigid transformations.

Identifying Side Lengths and Angle Measures

Cool Down 10.5