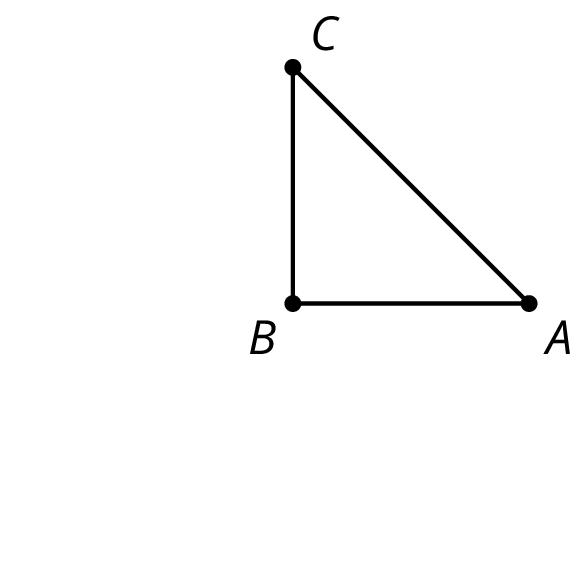
## Lesson 8: Rotation Patterns

Let’s rotate figures in a plane.

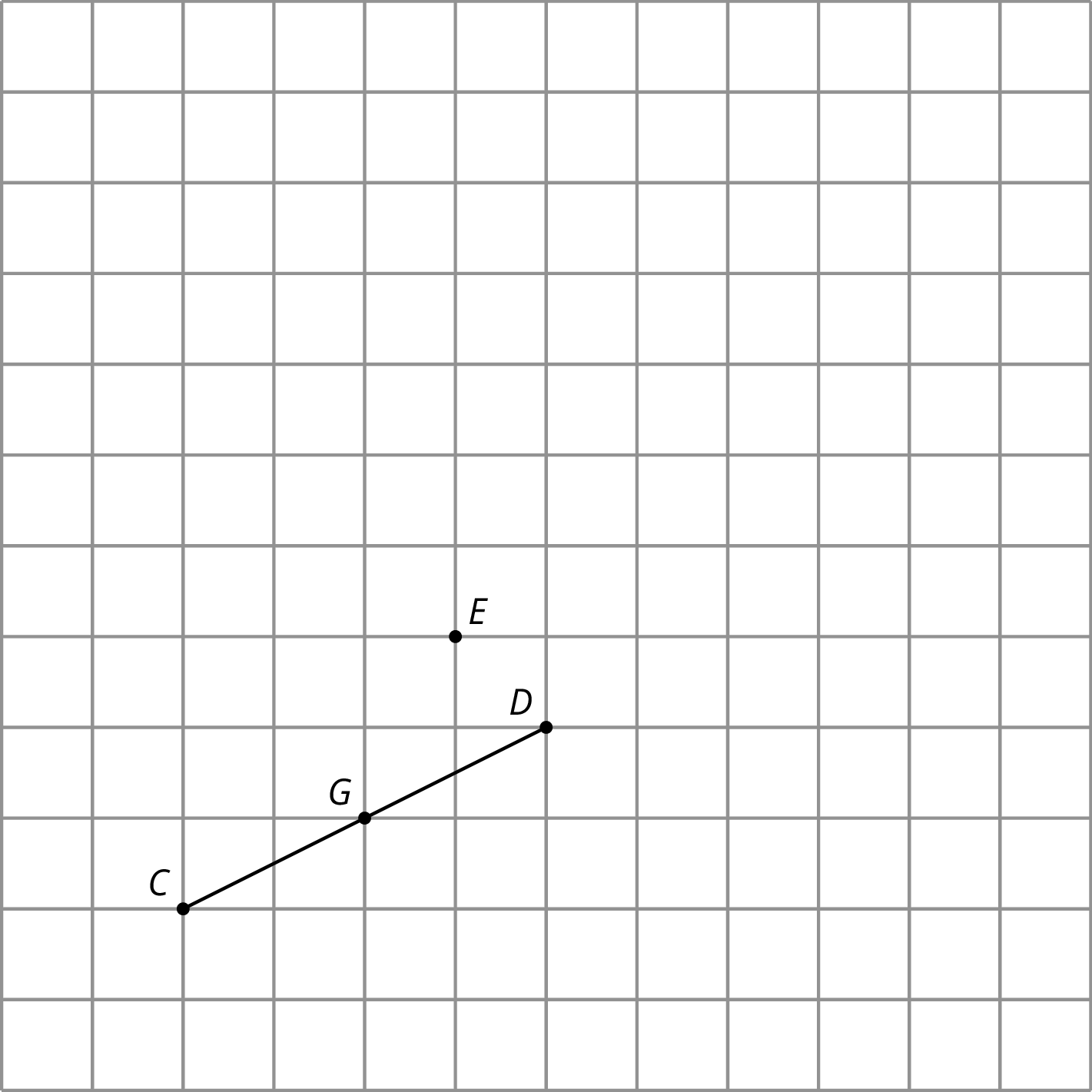
### 8.1: Building a Quadrilateral

Here is a right isosceles triangle:



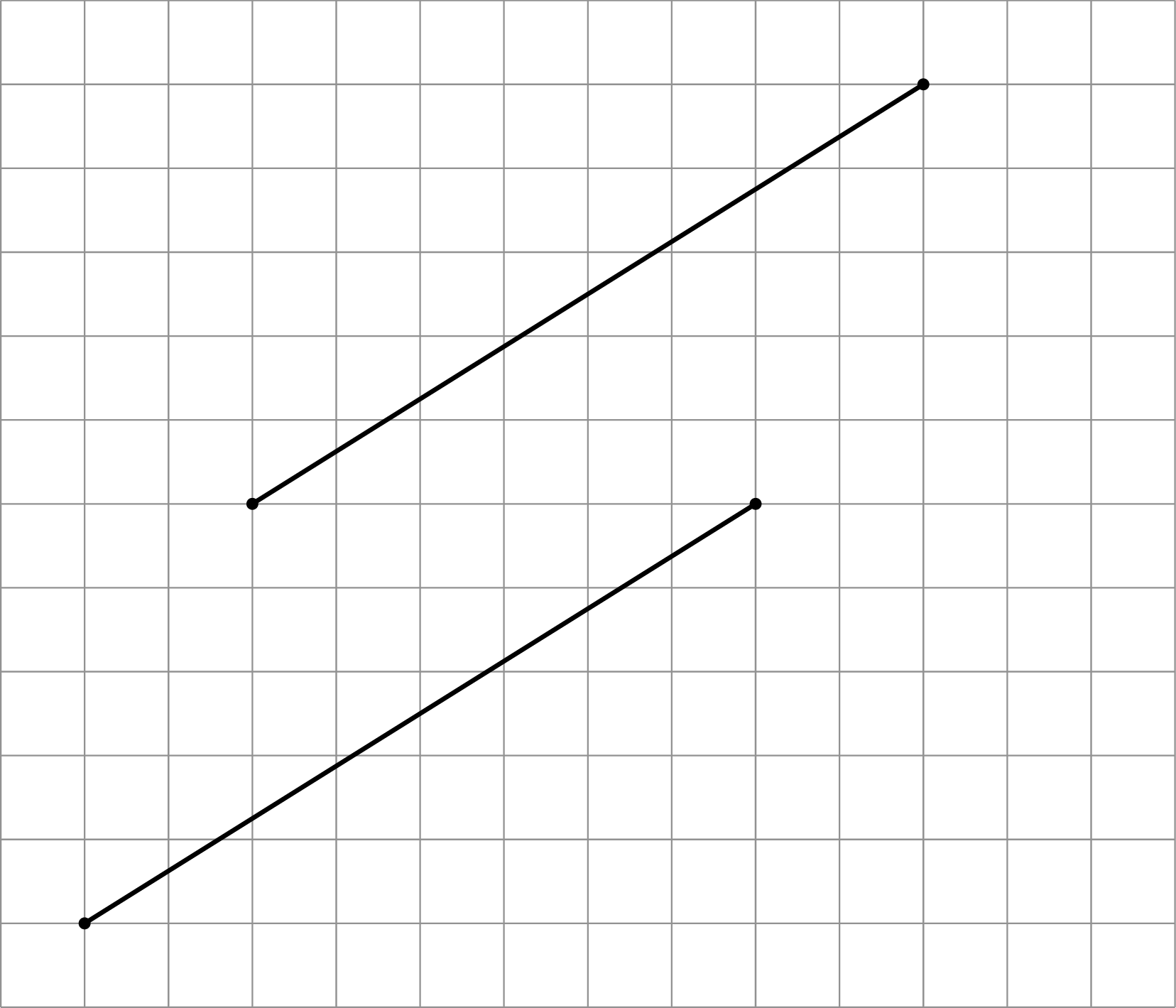
1. Rotate triangle 90 degrees clockwise around .
2. Rotate triangle 180 degrees clockwise round .
3. Rotate triangle 270 degrees clockwise around .
4. What would it look like when you rotate the four triangles 90 degrees clockwise around ? 180 degrees? 270 degrees clockwise?

### 8.2: Rotating a Segment



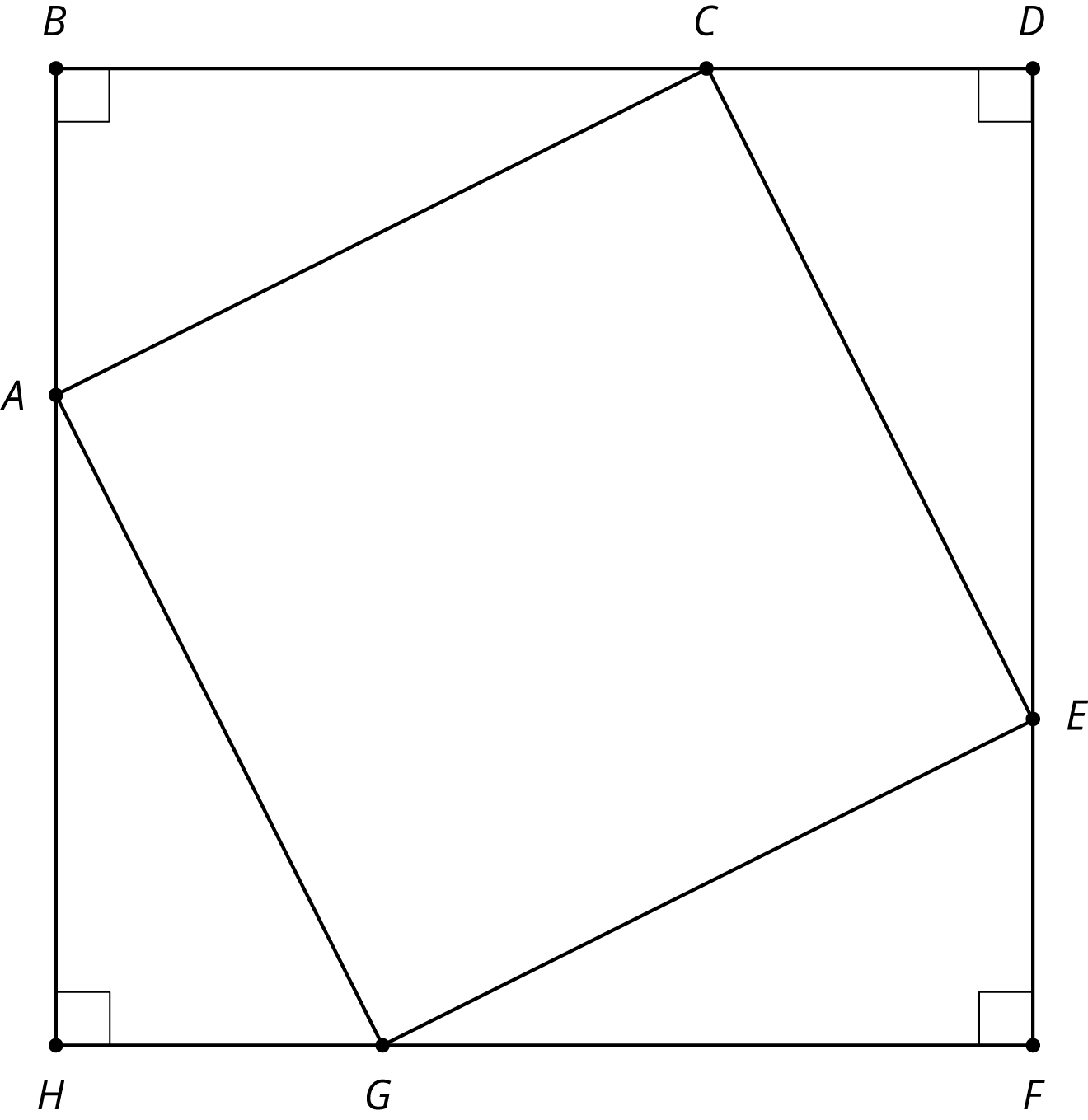
1. Rotate segment 180 degrees around point . Draw its image and label the image of as
2. Rotate segment 180 degrees around point . Draw its image and label the image of as and the image of as .
3. Rotate segment 180 degrees around its midpoint, What is the image of ?
4. What happens when you rotate a segment 180 degrees around a point?

#### Are you ready for more?



Here are two line segments. Is it possible to rotate one line segment to the other? If so, find the center of such a rotation. If not, explain why not.

### 8.3: A Pattern of Four Triangles



You can use rigid transformations of a figure to make patterns. Here is a diagram built with three different transformations of triangle .

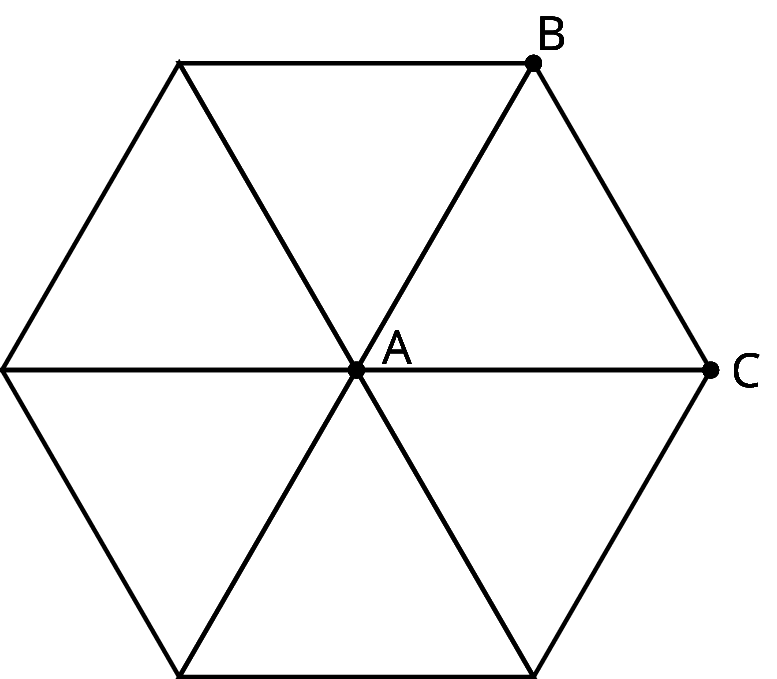
1. Describe a rigid transformation that takes triangle to triangle .
2. Describe a rigid transformation that takes triangle to triangle .
3. Describe a rigid transformation that takes triangle to triangle .
4. Do segments , , , and  all have the same length? Explain your reasoning.

### Lesson 8 Summary

When we apply a 180-degree rotation to a line segment, there are several possible outcomes:

* The segment maps to itself (if the center of rotation is the midpoint of the segment).
* The image of the segment overlaps with the segment and lies on the same line (if the center of rotation is a point on the segment).
* The image of the segment does not overlap with the segment (if the center of rotation is *not* on the segment).

We can also build patterns by rotating a shape. For example, triangle shown here has . If we rotate triangle 60 degrees, 120 degrees, 180 degrees, 240 degrees, and 300 degrees clockwise, we can build a hexagon.





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