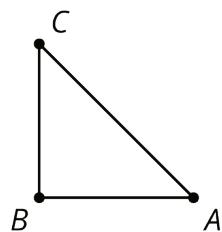


Lesson 8: Rotation Patterns

Let's rotate figures in a plane.

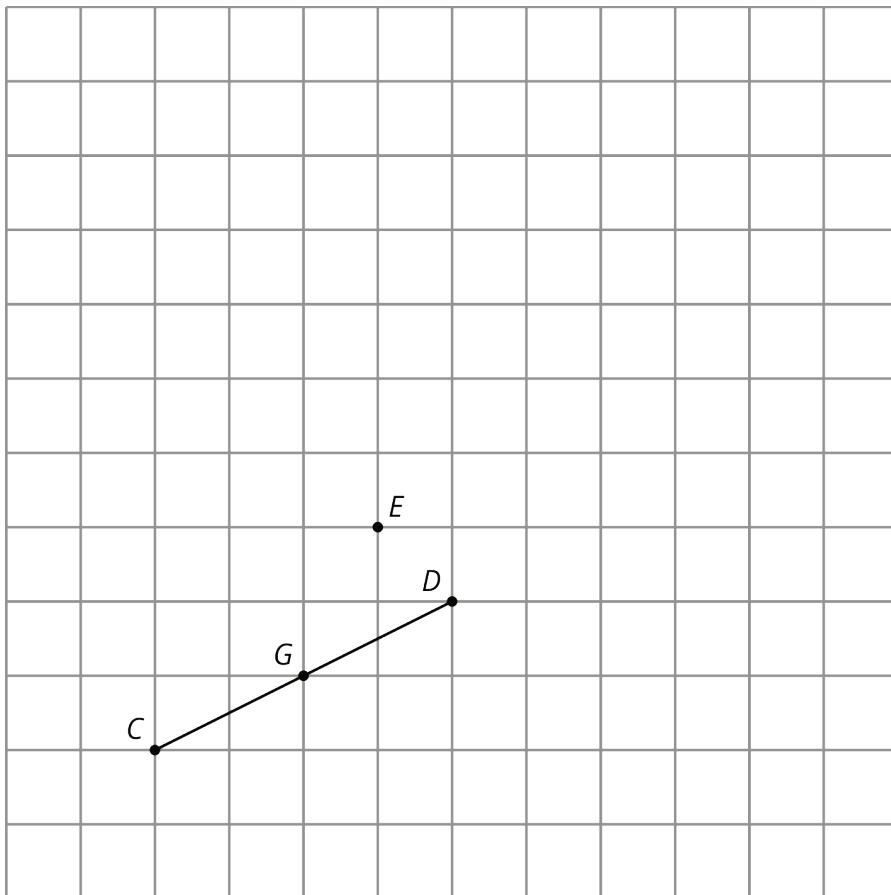
8.1: Building a Quadrilateral

Here is a right isosceles triangle:



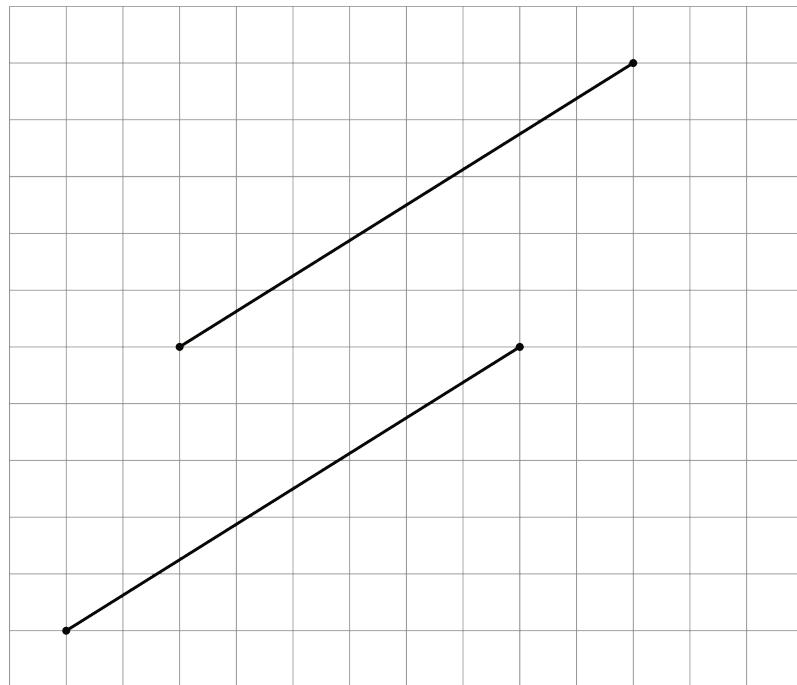
1. Rotate triangle ABC 90 degrees clockwise around B .
2. Rotate triangle ABC 180 degrees clockwise around B .
3. Rotate triangle ABC 270 degrees clockwise around B .
4. What would it look like when you rotate the four triangles 90 degrees clockwise around B ? 180 degrees? 270 degrees clockwise?

8.2: Rotating a Segment



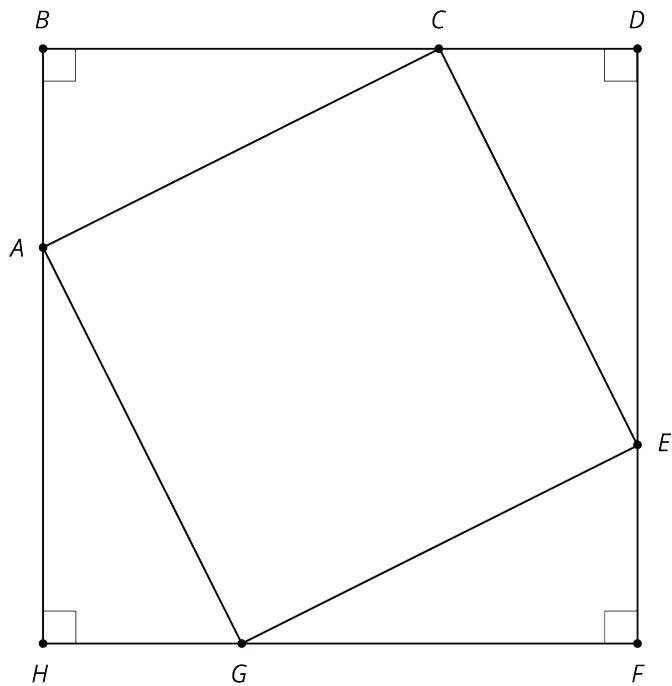
1. Rotate segment CD 180 degrees around point D . Draw its image and label the image of C as A .
2. Rotate segment CD 180 degrees around point E . Draw its image and label the image of C as B and the image of D as F .
3. Rotate segment CD 180 degrees around its midpoint, G . What is the image of C ?
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 ABC .

1. Describe a rigid transformation that takes triangle ABC to triangle CDE .
2. Describe a rigid transformation that takes triangle ABC to triangle EFG .
3. Describe a rigid transformation that takes triangle ABC to triangle GHA .
4. Do segments AC , CE , EG , and GA 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 ABC shown here has $m(\angle A) = 60$. If we rotate triangle ABC 60 degrees, 120 degrees, 180 degrees, 240 degrees, and 300 degrees clockwise, we can build a hexagon.

