Incorporating Rotations

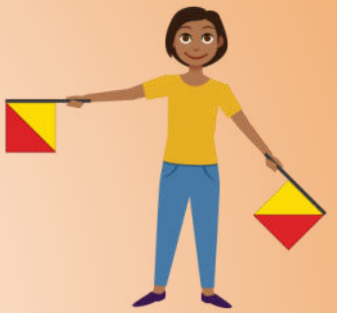
Illustrative Mathematics®

Learning Goal

- Given a figure and the description of a transformation, I can draw the figure's image after the transformation
- I can describe the sequence of transformations necessary to take a figure onto another figure.
- I know that rigid transformations result in congruent figures.

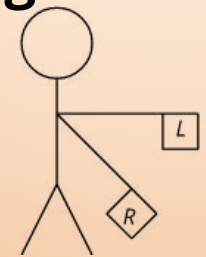
13.1 Left to Right

People use flags to signal messages with the semaphore alphabet.

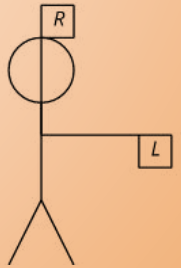


The semaphore alphabet is a way to use flags to signal messages. Here's how to signal the letters Z and J. **For each, precisely describe a rotation that would take the left hand flag to the right hand flag.**

Z



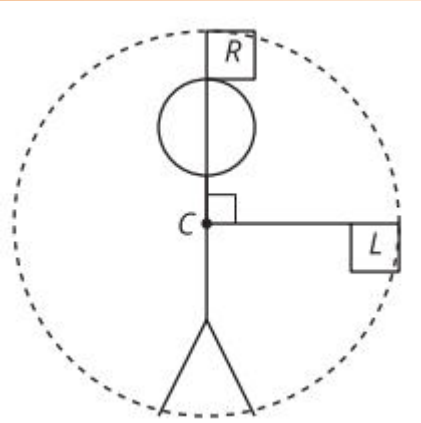
J



Activity Synthesis

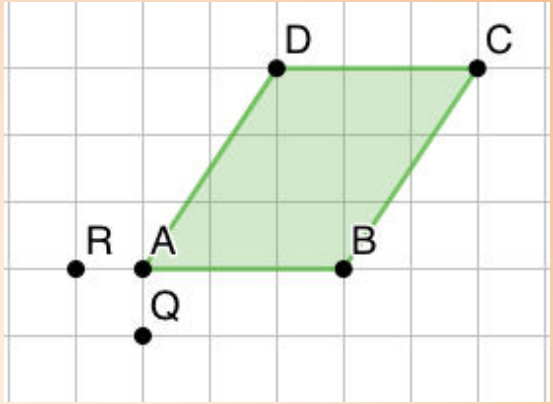
- Share your responses
- Let's look at how to measure angles using a protractor

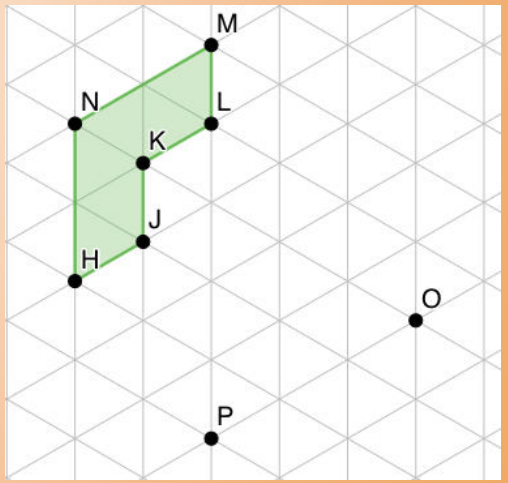
Create your definitio



13.2 Turning on a Grid

1. Rotate *ABCD* 90 degrees clockwise around *Q*.
2. Rotate *ABCD* 180 degrees around *R*.
3. Rotate *HJKLMN* 120 degrees clockwise around *O*.
4. Rotate *HJKLMN* 60 degrees counterclockwise around *P*.

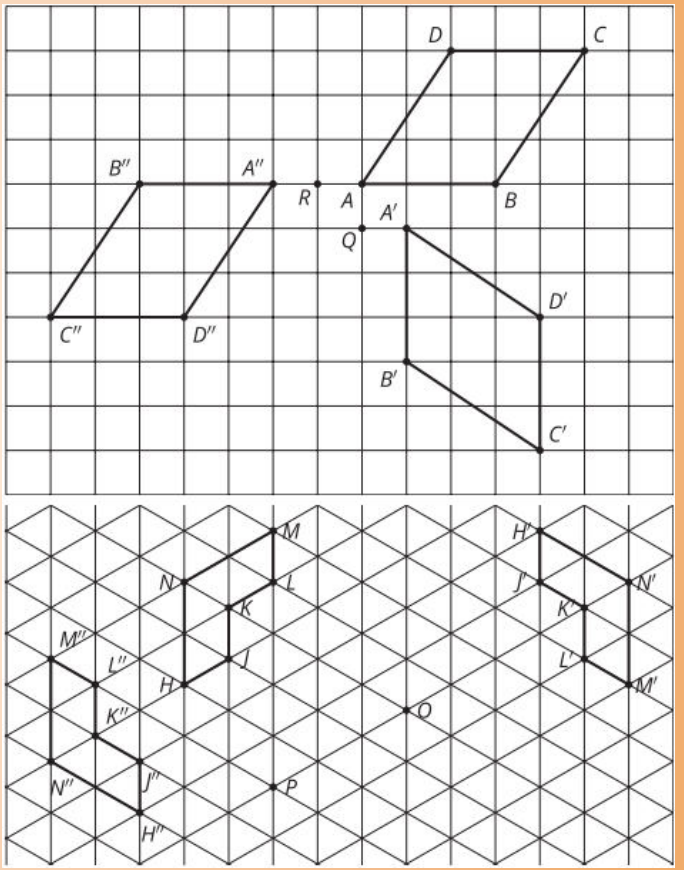




Work quietly and then share with your partner

Activity Synthesis

- What information do you need to do a rotation?
- Why don't you need to know the direction of rotation when the angle of rotation is 180 degrees?

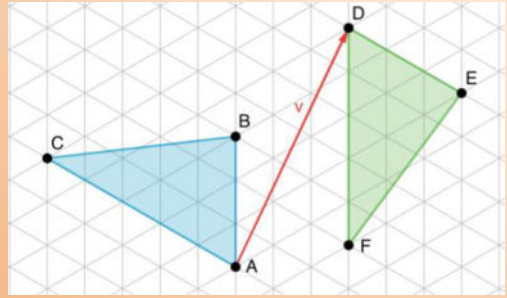


13.3 Translate, Rotate, Reflect

Mai suspects triangle *ABC* is congruent to triangle *DEF*. She thinks these steps will work to show there is a rigid transformation from *ABC* to *DEF*.

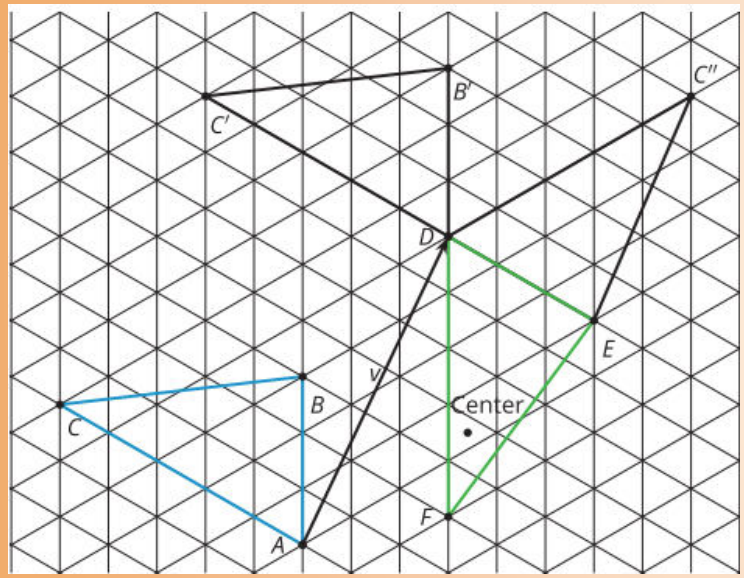
- Translate by directed line segment *v*.
- Rotate the image ____ degrees counterclockwise around point *D*.
- Reflect that image over line *DE*.

Draw each image and determine the angle of rotation needed for these steps to take *ABC* to *DEF*.



Work quietly, then compare with your partner.

Activity Synthesis

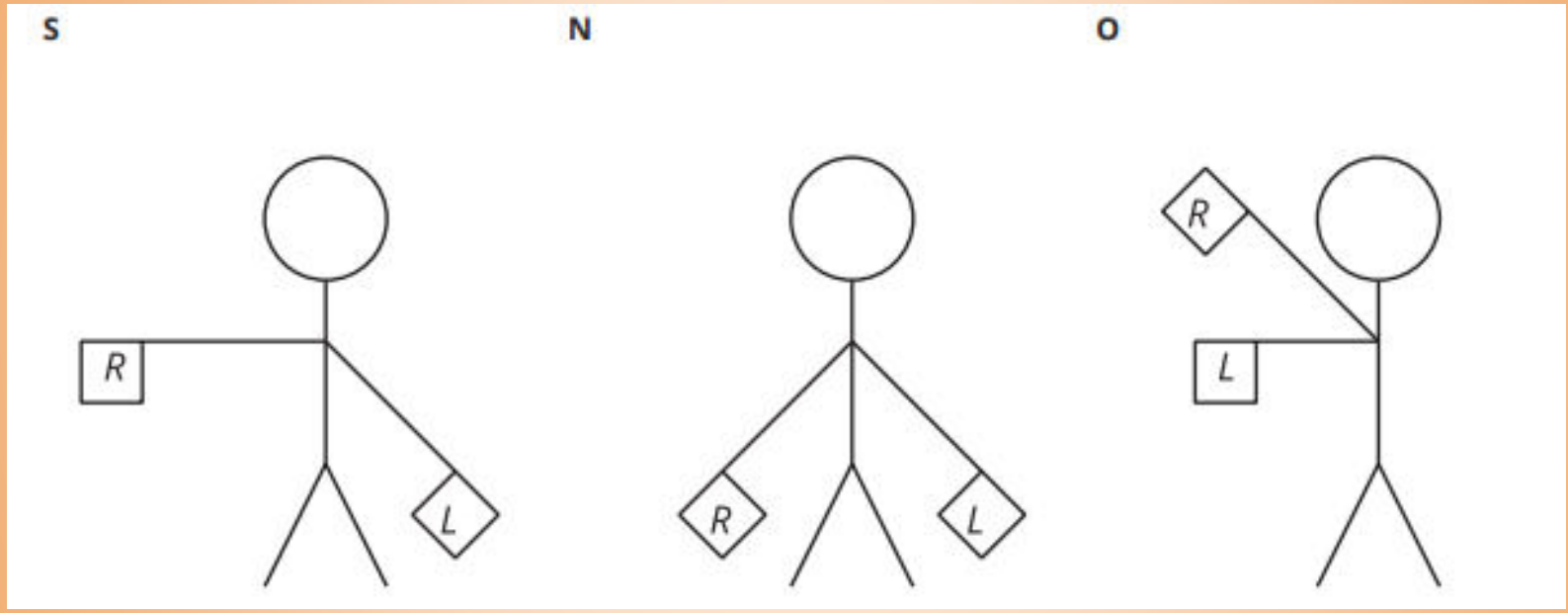


- What is the definition of congruent?
- We have a transformation that takes triangle ABC to triangle DEF . What does that tell us?

Lesson Synthesis

Draw or act out the following transformations:

- Rotate 135 degrees clockwise.
- Reflect over a vertical line.
- Translate to the left, then rotate 45 degrees clockwise.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