Module 10b: Reflections

Math Practice(s):

-Model with mathematics.

-Use appropriate tools strategically.

Learning Target(s):

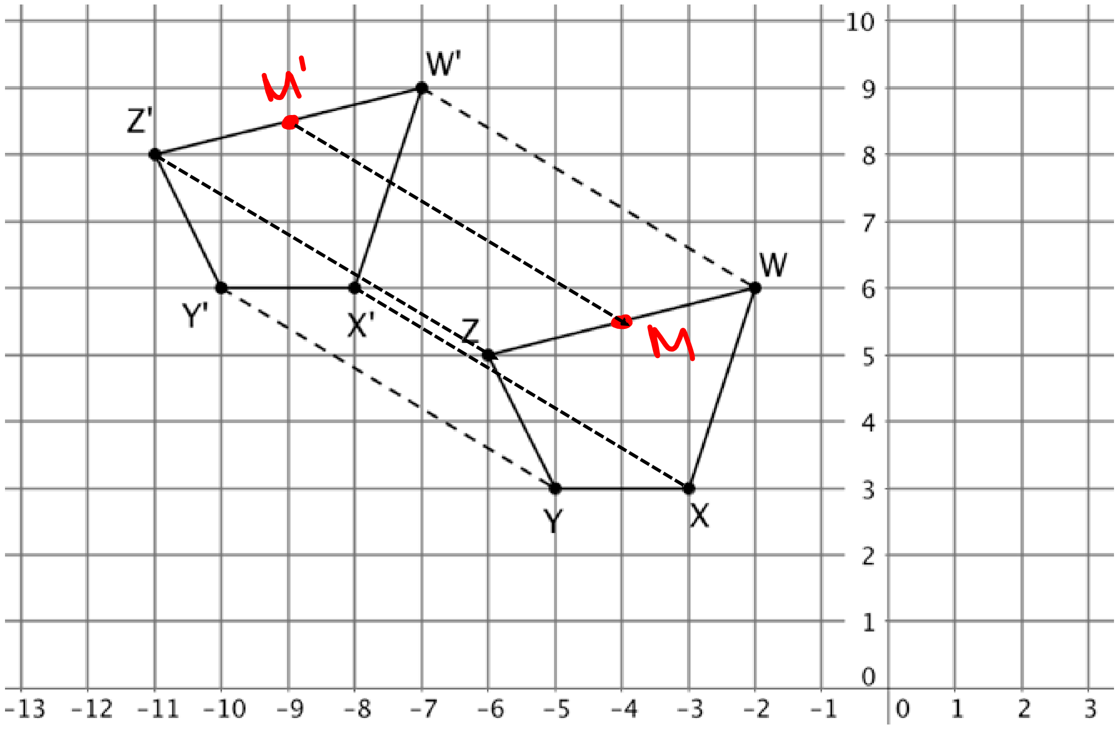
- Develop a definition of a reflection through investigation.
- Perform a reflection about a specified line using various tools; given a pre-image, draw an image.

Homework:

HW#5: 10b #1-5

Warm-up

1. In the coordinate plane below, a translation, T, was performed on quadrilateral WXYZ are the quadrilateral graphs of a pre-image and image of a translation T.



A. T is defined by T(x, y) = (x-5 , y+3)

B. The dashed line segments in the graph connect two of the pre-image vertices with their images. Draw dashed line segments for the remaining two vertices.

C. Locate the midpoint of line segment WZ and label it M. Locate the midpoint of line segment W'Z' and label it M'. Locate T(M) and connect M and T(M) with a dashed line segment.

D. List at least two properties that the five dashed line segments share.

All the lines are parallel.

All the lines are congruent (the same length).

All the lines have the same slope.

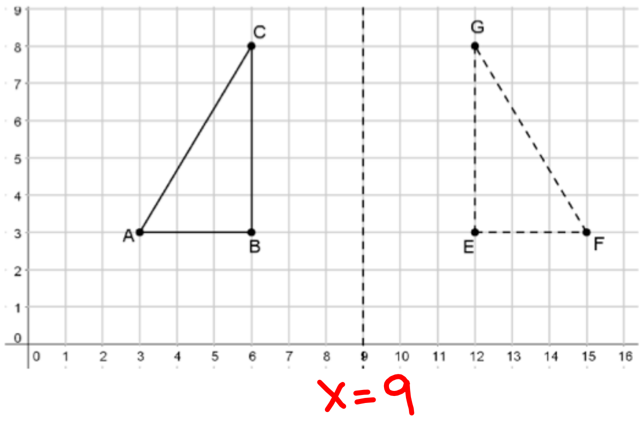
Jan 18-7:22 AM

Congruence

(Definition #1)

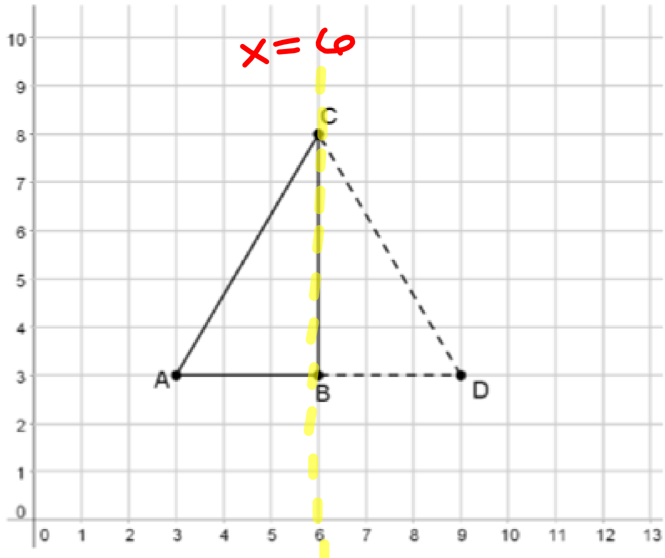
ΔABC is said to be **congruent** to ΔDEF if and only if the measures of corresponding angles and side lengths are equal.

We express a congruence statement as $\Delta ABC \cong \Delta DEF$.



ΔABC is reflected over the line, x=9, to form ΔFEG, such that $\Delta ABC \cong \Delta FEG$.

ΔABC is **reflected** over the line x=6 to form ΔDBC.

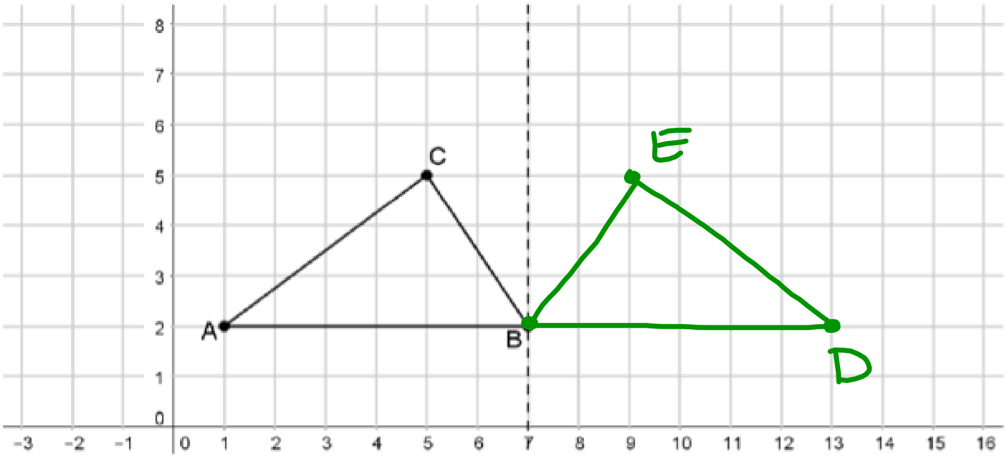


Jan 18-8:20 AM

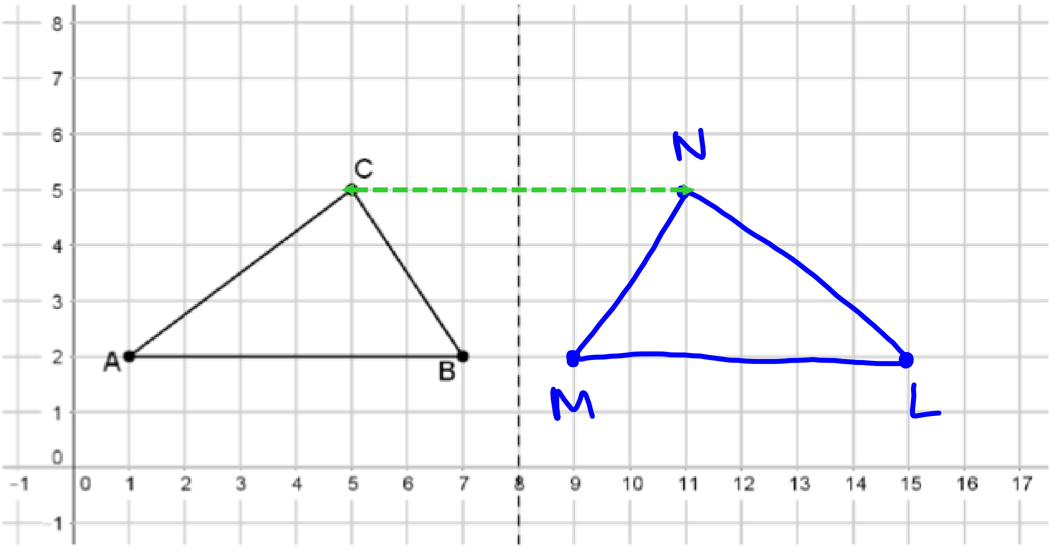
Reflection

A reflection over line L is a function that moves each point P to the point Q such that line L is the *perpendicular bisector* of $\overline{PQ}$.

Example 1:
Reflect the pre-image ΔABC over the line $x = 7$. Label the image vertices B, D, and E so that ΔABC ≅ ΔDBE.



Example 2:
Reflect the pre-image ΔABC over the line $x = 8$. Label the image vertices L, M, and N so that ΔABC ≅ ΔLMN.



Now, use the coordinates of C and N to verify that the line of reflection is the perpendicular bisector of $\overline{CN}$.

- Since the line of reflection is vertical, & $\overline{CN}$ is horizontal, we know they are ⊥.
- From both points C & N to the line of reflection are 3 units, we know $\overline{CN}$ is bisected.

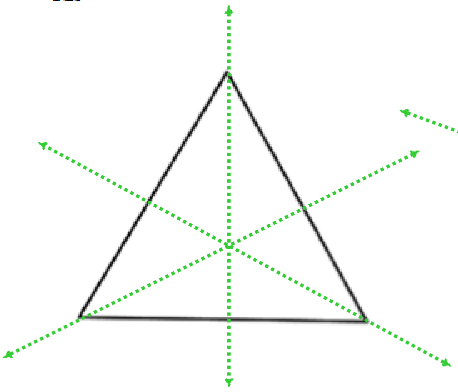
An object is said to possess **reflective symmetry** if there is a line L such that the reflective image of the object over L is the original object. In this case, L is referred to as a *line of symmetry*.

In the box below, explain what reflective symmetry means (how you might explain it to your younger sibling to make sense of it):

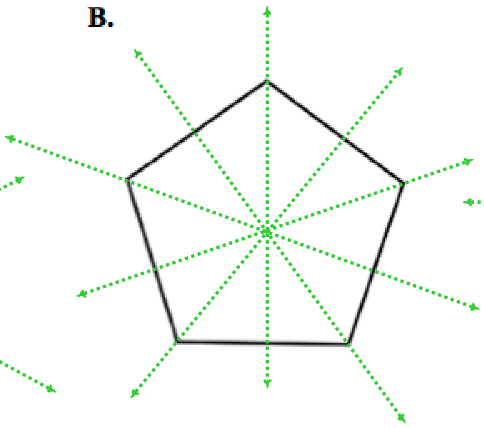
Reflective Symmetry
(In my own words)

Patty Paper Exercise
Below are three regular polygons. Use patty paper to trace each. Fold each figure along a line of symmetry (i.e. so that the pre-image and image of the reflection over the line of symmetry lie directly over each other). Try to find as many lines of symmetry as you can for each. Draw each in on patty paper using a dotted line.

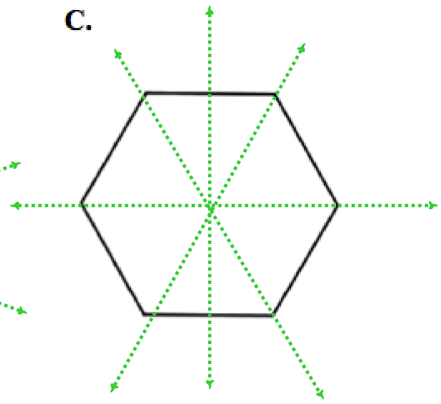
A.



B.



C.



What geometric shape has infinitely many lines of symmetry?

A circle!!