

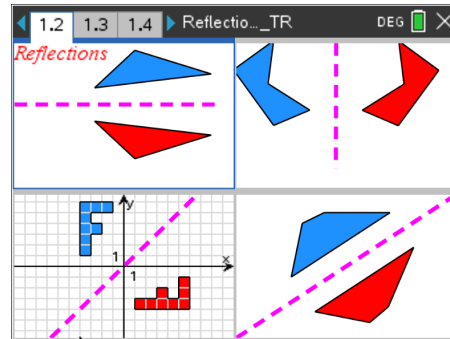


Reflections Lesson

Transformational Geometry is a way to study geometry by focusing on geometric “movements” or “transformations” and observing/studying properties about these figures.

There are four geometric transformations:

< **Reflections** < Translations < Rotations < Dilations



Play - Investigate - Explore - Discover

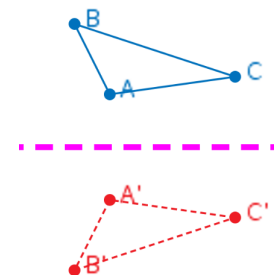
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In the figure to the right, $\triangle ABC$ is reflected about the dashed line.

$\triangle ABC$ is called the pre-image while $\triangle A'B'C'$ is called the image (of reflection).

$\triangle A'B'C'$ is read “triangle A prime, B prime, C prime.”

The dashed line is called the line of reflection, or the reflection line.



Download and install the red TI-Nspire student software and the Reflections TNS file from the website where you obtained this document.

Then you can interact with these figures, too. If you decide not to download the software, or if you cannot, you can still do this activity along with the [video](#).

A **conjecture** is an opinion or conclusion based on what is observed.

1. What conjecture(s) can you make based upon what you observed about a triangle and its image after being reflected?

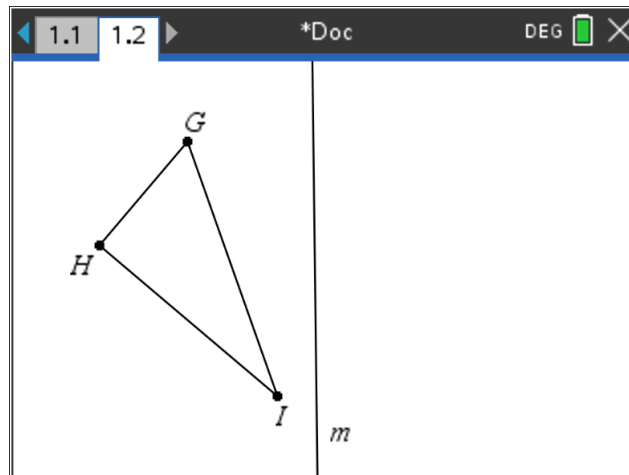
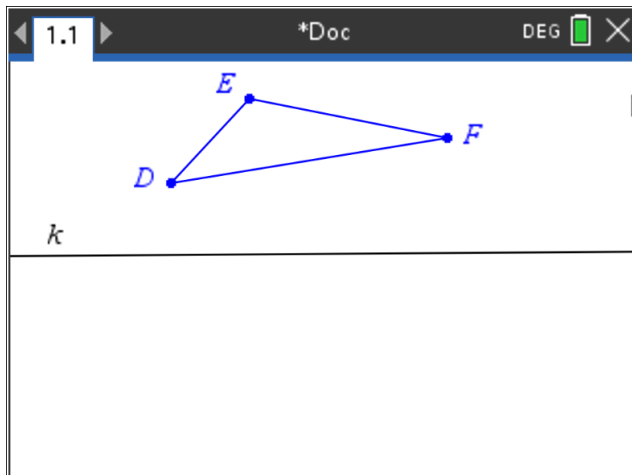
2. Using your conjectures,

a. reflect $\triangle DEF$ about line k .

Use a ruler or straightedge.

b. reflect $\triangle GHI$ about line m .

Use a ruler or straightedge.





3. a) After observing the angle measures being shown, what conjecture can you make?

b) After observing the side measures being shown, what conjecture can you make?

c) Note: do not say all the angles are equal, or do not say all the sides are equal. They aren't. The sides and angles that correspond to one another have equal lengths and measures, respectively.

4. a) After observing the perimeters being shown, what conjecture can you make? Why should this be true?

b) After observing the areas being shown, what conjecture can you make? Why should this be true?

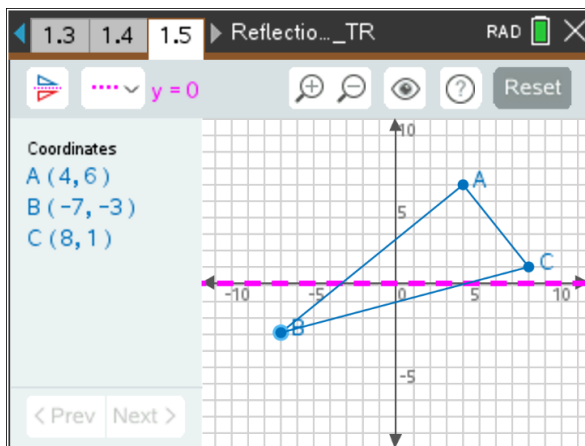
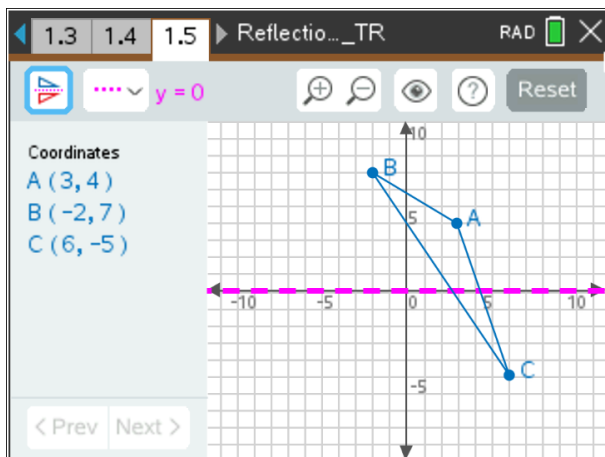
5. Grids and Coordinates Reflecting about the x-axis.

a) Reflect $\triangle ABC$ about the x-axis

Draw your answer on the grid below.

b) Reflect $\triangle ABC$ about the x-axis

Draw your answer on the grid below.



Write the ordered pair for each point:

A _____ B _____ C _____

A' _____ B' _____ C' _____

Write the ordered pair for each point:

A _____ B _____ C _____

A' _____ B' _____ C' _____

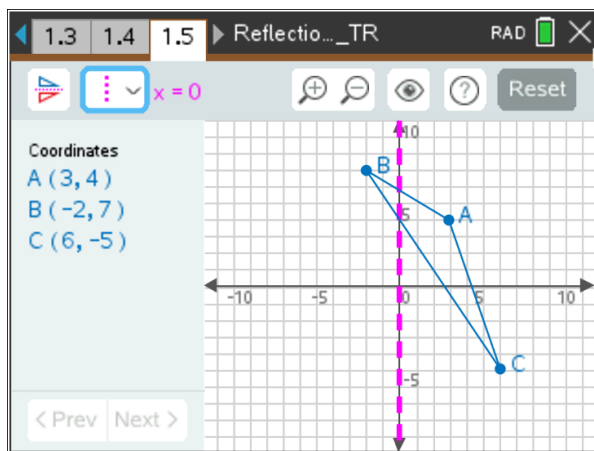


- c) Based on your observations, complete the following: When a triangle is reflected about the x-axis, the _____ remain the same and the _____ are opposites of each other.
- d) Rewrite the result from part c above with symbols. When a triangle is reflected about the x-axis, and a point on the pre-image has coordinates (x, y) , then the coordinates on the image will be _____.

6. Grids and Coordinates Reflecting about the y-axis.

a) Reflect $\triangle ABC$ about the y-axis

Draw your answer on the grid below.



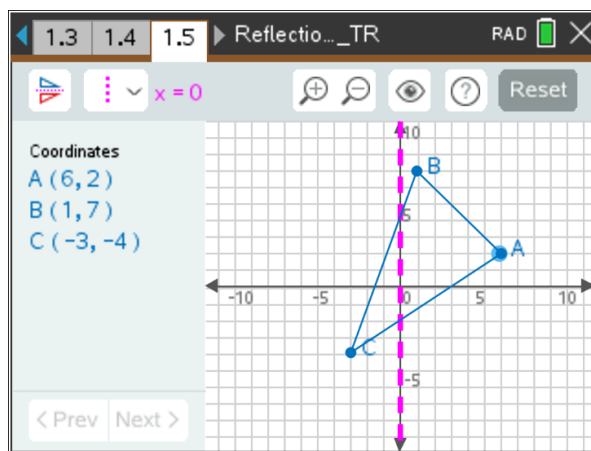
Write the ordered pair for each point:

A _____ B _____ C _____

A' _____ B' _____ C' _____

b) Reflect $\triangle ABC$ about the y-axis

Draw your answer on the grid below.



Write the ordered pair for each point:

A _____ B _____ C _____

A' _____ B' _____ C' _____

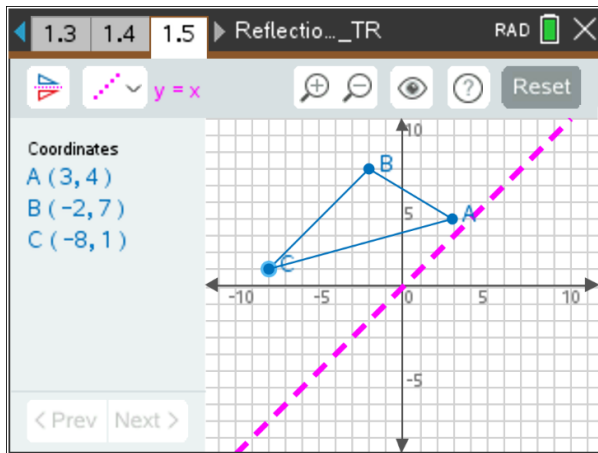
- c) Based on your observations, complete the following: When a triangle is reflected about the y-axis, the _____ remain the same and the _____ are opposites of each other.
- d) Rewrite the result from part c above with symbols. When a triangle is reflected about the y-axis, and a point on the pre-image has coordinates (x, y) , then the coordinates on the image will be _____.



7. Grids and Coordinates Reflecting about the line $y = x$.

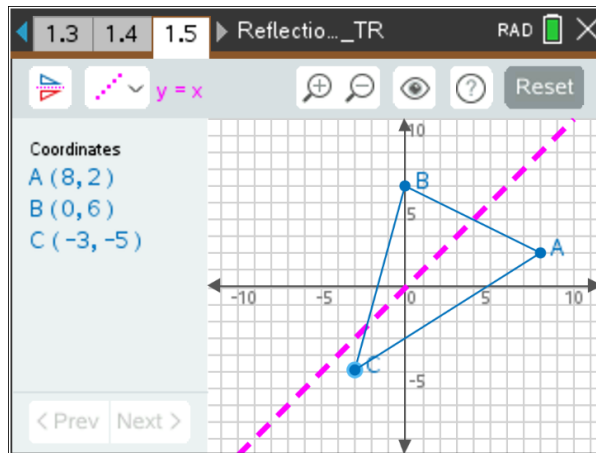
a) Reflect $\triangle ABC$ about the line $y = x$

Draw your answer on the grid below.



b) Reflect $\triangle ABC$ about the line $y = x$

Draw your answer on the grid below.



Write the ordered pair for each point:

A _____ B _____ C _____

A' _____ B' _____ C' _____

Write the ordered pair for each point:

A _____ B _____ C _____

A' _____ B' _____ C' _____

c) Based on your observations, complete the following: When a triangle is reflected about $y = x$, the

_____.

d) Rewrite the result from part c above with symbols. When a triangle is reflected about $y = x$, and a

point on the pre-image has coordinates (x, y) , then the coordinates on the image will be _____.

8. Summary about Reflections

a – c. When a geometric figure (like a triangle, quadrilateral, ...) is reflected about any line:

a) Corresponding angles have _____.

b) _____ sides have _____.

c) The two figures are _____ to each other.

d) The original figure (the one we start with) is called the _____

while the reflected figure is called the _____.

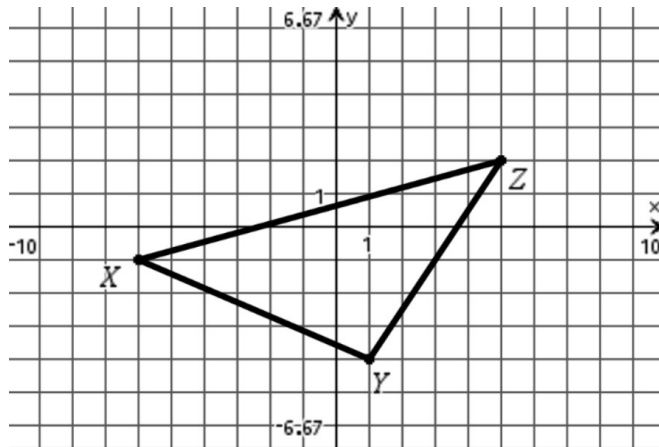


9. Exercises

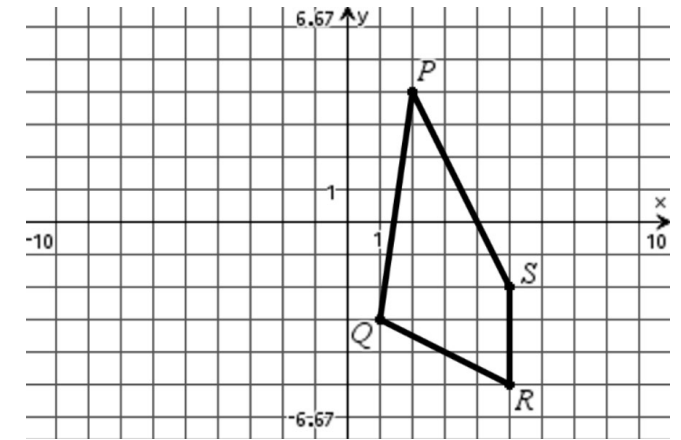
a) The perimeter of a triangle is 36 cm. What is the perimeter of the image triangle if it is reflected about the y-axis? _____

b) The area of a quadrilateral is 45 sq in. What is the area of the image quadrilateral if it is reflected about the line $y = x$? _____

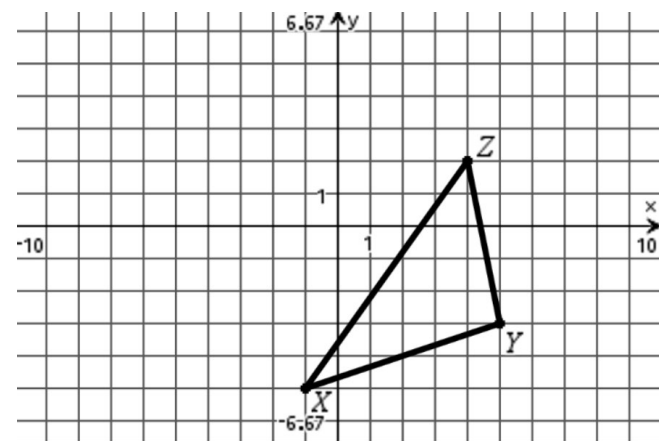
c) Reflect $\triangle ABC$ about the x-axis.



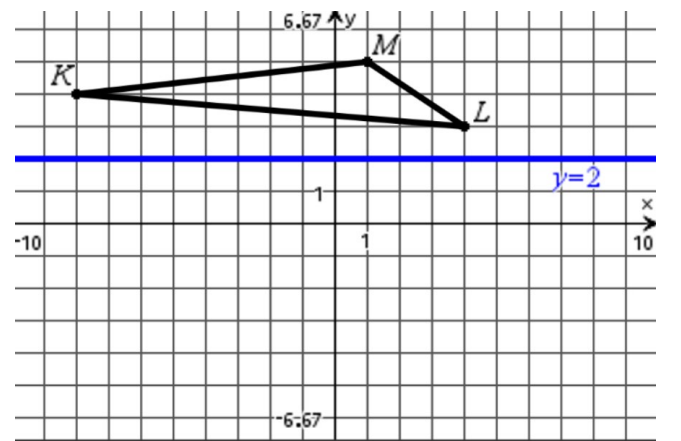
d) Reflect PQRS about the y-axis.



e) Reflect $\triangle XYZ$ about $y = x$.



f) Reflect $\triangle KLM$ about the line $y = 2$.



10. A point on a triangle has coordinates (a, b) , what are the coordinates of the corresponding point on its image, if the triangle is reflected about:

a) the y-axis?

b) the line $y = x$?

c) the x-axis?
