Reflections on a Coordinate Plane (Optional)

1. a. Select **Show Axes** from the **Draw** toolbox to turn on the coordinate axes.
   b. Select **Define Grid** from the **Draw** toolbox then click on the axes to turn on the coordinate grid.
   c. Select Triangle tool from the **Lines** toolbox. Construct a triangle with vertices on grid points. Label the vertices A, B and C.
   d. Select **Equation & Coordinates** in the **Measure** toolbox, then click once on each vertex to show the coordinates of the vertex.
   e. Now reflect the triangle.
      Select the **Reflection** tool from the **Transformations** toolbox.
      Select the triangle (the object to reflect).
      Select the y-axis as the line over which to reflect the triangle.
   f. Label the corresponding image vertices A', B', and C' and display the coordinates of each point.

2. a. Record the coordinates of the vertices when the pre-image is reflected over the y-axis.

Original Vertex	Pre-image	Image
A		
B		
C		

   b. How are the coordinates of A and A' related?

   c. How are the other corresponding vertices related?

3. a. Reflect the original triangle over the x-axis. Label the vertices as A", B" and C". Record the coordinates in the table below.

Original Vertex	Pre-image	Image
A		
B		
C		

   b. How are the corresponding vertices related (A to A", B to B", and C to C")?

4. a. Construct a line through the origin and through the point (1, 1). What is the equation of this line?

   b. Reflect the original triangle over the line in part a. Label the coordinates of the vertices.

   c. Record the coordinates in the table on the next page.

Reflections on a Coordinate Plane (Optional) (Continued)

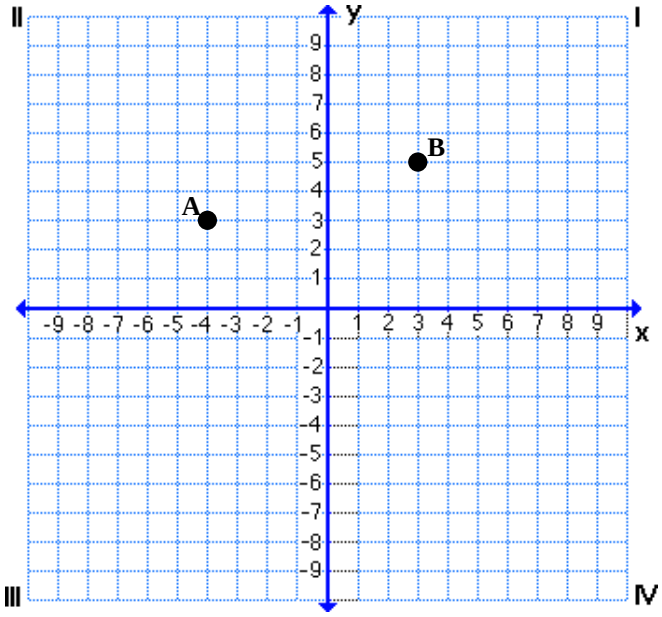
c. Complete the table.

Original Vertex	Pre-image	Image
A		
B		
C		

d. How are the corresponding vertices related?

5. To summarize the ideas in problems 1- 4, fill in the work below:

a. Reflect point A over the ***x***-axis.



Coordinates of A (,)
Coordinates of A' (,)

For any point (x, y)
To reflect over the x-axis
$(x, y) \rightarrow$ (,)

b. Reflect point B over the ***y***-axis.

Coordinates of B (,)
Coordinates of B' (,)

For any point (x, y)
To reflect over the y-axis
$(x, y) \rightarrow$ (,)

c. Reflect point A over the line ***y = x***.

Coordinates of A (,)
Coordinates of A' (,)

For any point (x, y)
To reflect over the line $y = x$
$(x, y) \rightarrow$ (,)

Answers:

2. a. Answers will vary.
   b. The x-coordinates of A to A′ are opposites of one another and the y-coordinates of these two points are the same.
   c. The other points have the same characteristics as the relationship between A and A′.
3. a. Answers will vary.
   b. The corresponding vertices have the same x-coordinates and the y-coordinates are opposites.
4. a. $y = x$
   b. Answers will vary.
   c. Answers will vary.
   d. The x- and y-coordinates interchange with one another, $(x, y) \rightarrow (y, x)$.
5. a. Coordinates of A (-4, 3) and A′ (-4, -3)
      $(x, y) \rightarrow (x, -y)$.
   b. Coordinates of B (3, 5) and B′ (-3, 5)
      $(x, y) \rightarrow (-x, y)$.
   c. Coordinates of A (-4, 3) and A′ (3, -4)
      $(x, y) \rightarrow (y, x)$.