**Activity 1.4.2 Reflection Behavior**

Use graph paper for this activity.

Construct a quadrilateral *PQRS* with all four points in Quadrant II.

a) What are the coordinates of the vertices?

*P* (\_\_\_\_,\_\_\_\_) *Q* (\_\_\_\_,\_\_\_\_) *R* (\_\_\_\_,\_\_\_\_) *S* (\_\_\_\_,\_\_\_\_)

1. Reflect the quadrilateral over the *y*-axis. What are the coordinates of the vertices of the image?

*P’* (\_\_\_\_,\_\_\_\_) *Q* ‘(\_\_\_\_,\_\_\_\_) *R’* (\_\_\_\_,\_\_\_\_) *S’* (\_\_\_\_,\_\_\_\_)

1. Go back to the original quadrilateral and reflect it over the *x*-axis. Again, find the coordinates for the image.

*P’* (\_\_\_\_,\_\_\_\_) *Q* ‘(\_\_\_\_,\_\_\_\_) *R’* (\_\_\_\_,\_\_\_\_) *S’* (\_\_\_\_,\_\_\_\_)

1. On a separate sheet of graph paper construct the same quadrilateral *PQRS* in Quadrant II. Graph the line with equation *y = x.* (Hint: (0,0) and (1,1) lie on the line.) Now reflect *PQRS* over the line *y* = *x*. Again, write down the new coordinates.

*P’* (\_\_\_\_,\_\_\_\_) *Q* ‘(\_\_\_\_,\_\_\_\_) *R’* (\_\_\_\_,\_\_\_\_) *S’* (\_\_\_\_,\_\_\_\_)

1. On the same sheet of graph paper, graph the line with equation *y = –x.* (Hint: (0,0) and (1,–1) lie on this line.) Now reflect *PQRS* over the line *y* = –*x*. Again, write down the new coordinates.

*P’* (\_\_\_\_,\_\_\_\_) *Q* ‘(\_\_\_\_,\_\_\_\_) *R’* (\_\_\_\_,\_\_\_\_) *S’* (\_\_\_\_,\_\_\_\_)

1. Explain what happens to both the *x*- and *y*-coordinates when reflected over the *x*-axis, the *y*-axis, the line *y* = *x* and the line *y* = –*x*.
2. Write your conclusions from (f) in the form of mapping rules. Fill in the blanks:

Reflection over the *x*-axis: (*x*, *y*) 🡪

Reflection over the *y*-axis: (*x*, *y*) 🡪

Reflection over *y* = *x*: (*x*, *y*) 🡪

Reflection over *y* = –*x*: (*x*, *y*) 🡪

1. Construct a triangle anywhere on the coordinate plane and test your conjectures from the previous question.

What are the coordinates of your triangle?

Were your conjectures confirmed?