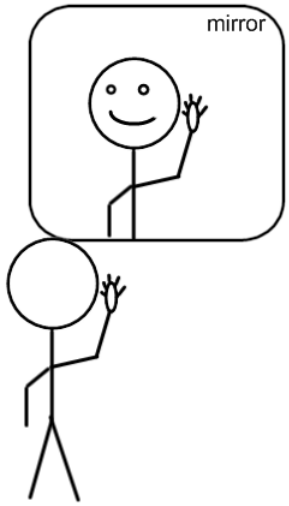
Lesson 2.2 – Moving Shapes Around - Reflections

Let us first think about what happens when we look into a mirror to explore our next method of moving around shapes. When you look into the mirror you see a reflection of yourself inside of the mirror. Unless it is a trick mirror, your reflection retains the same shape and size as you. However, there is one aspect that does not hold true.

Set 1 – Use the diagram on the left to answer the questions on the right.



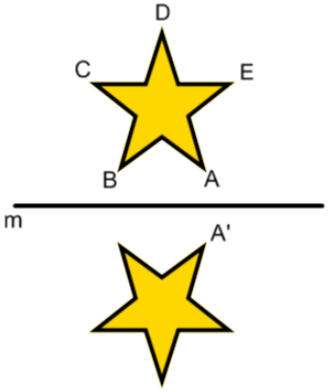
Which hand is the actual person holding up? Which hand is the reflection holding up?

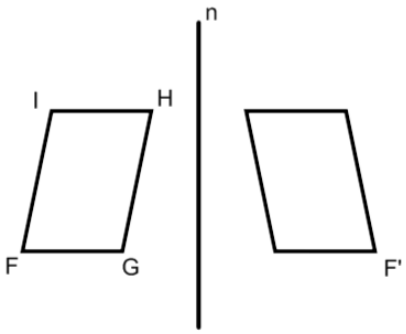
Which hand is the actual person holding down? Which hand is the reflection holding down?

Based on our answers above, we can see that in our reflection, things do not appear how they really are. Our reflection shows a reverse image of ourselves.

In order to reflect an object, we need something to reflect it through. When you look into a mirror, you are reflected through the mirror to your image on the other side. In this section we will reflect images through a line. When performing this process, we commonly say that we are "flipping the image over the line."

Class Discussion – the images below have been reflected through horizontal and vertical lines. Label the unlabelled points in the following diagrams.





Set 2 – Follow all instructions and use the diagram to answer the questions.

<u>For triangles DEF and D'E'F'.</u>

The distance from the *x* – axis to point D is _____.

The distance from the *x* – axis to point D' is _____.

The distance from the *x* – axis to point E is _____.

The distance from the *x* – axis to point E' is _____.

The distance from the *x* – axis to point F is _____.

The distance from the *x* – axis to point F' is _____.

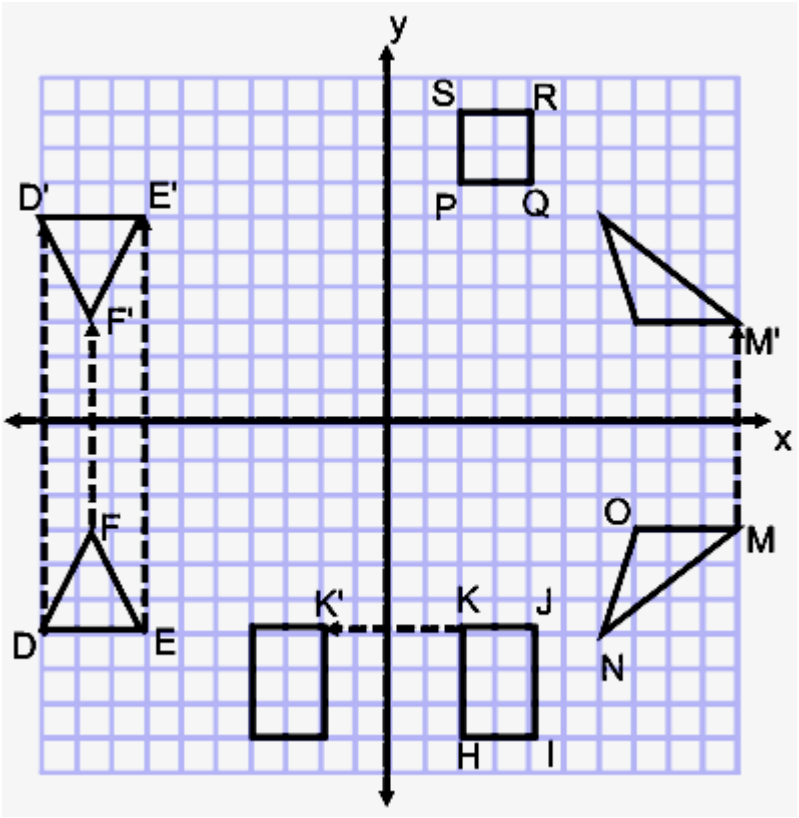
For the following questions answer **clockwise or counter-clockwise**.

Trace the vertices of triangle DEF in alphabetical order. In what direction did you trace?

Trace the vertices of triangle D'E'F' in alphabetical order. In what direction did you trace?

In the diagram:

- triangle DEF has been reflected over the *x* – axis. The triangle's new image is labeled D'E'F'.
- rectangle HIJK has been reflected over the *y* – axis. The rectangle's new image is not completely labeled.
- triangle MNO has been reflected over the *x* – axis. The triangle's new image is not completely labeled.
- square PQRS has yet to be reflected.



<u>For rectangles KJHI and K'J'H'I'.</u>

Label the image of rectangle KJHL

State the coordinates for both rectangles.

K(,) K'(,)

J(,) J'(,)

H(,) H'(,)

I (,) I' (,)

<u>For triangles MNO and M'N'O'.</u>

Label the image of triangle MNO.

State the coordinates for both rectangles.

M(,) M'(,)

N(,) N'(,)

O(,) O'(,)

<u>For square PQRS.</u>

Reflect square PQRS through the *y* - axis.

State the coordinates for both rectangles.

P(,) P'(,)

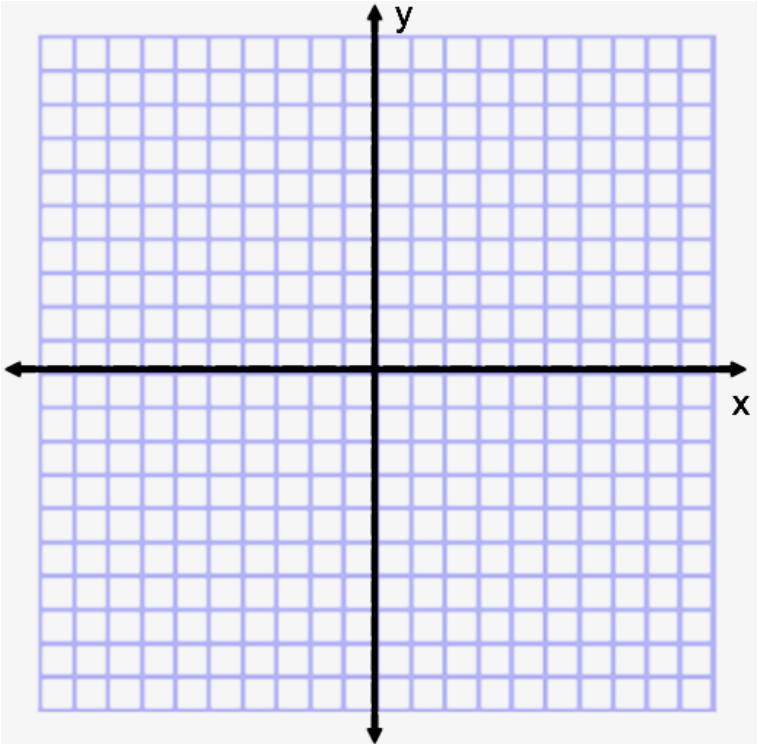
Q(,) Q'(,)

R(,) R'(,)

S(,) S' (,)

Trace the remaining shapes similar to how triangles DEF and D'E'F were. Do you see a similar pattern occurring? Explain.

Set 3



Plot the points A(2, -8), B(6, -3) and C(9, -7). Connect the points to form triangle ABC.

Reflect triangle ABC through the *x* –axis and label the image A'B'C'.

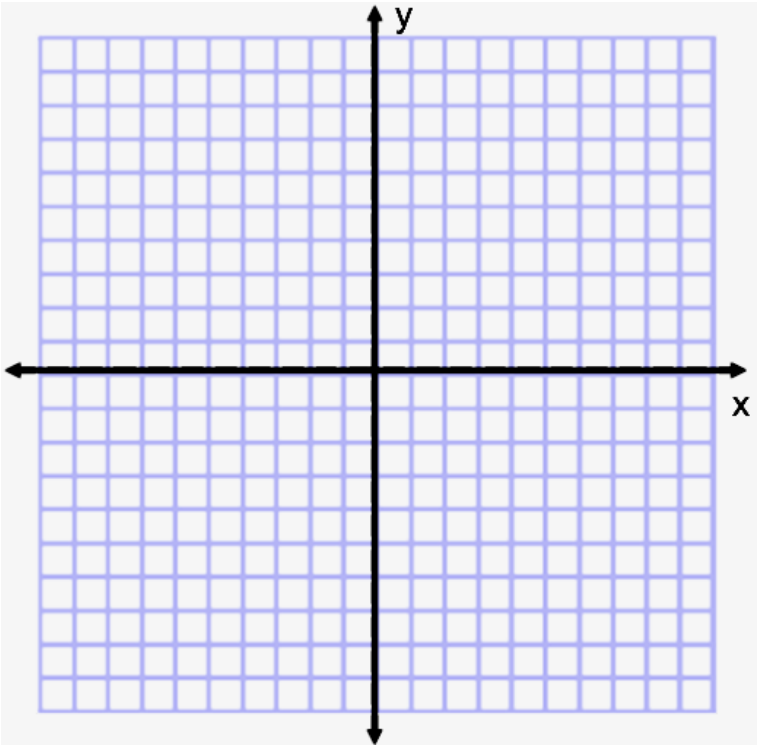
State the coordinates of A'B'C'

Plot the points D(-5, 8) and E (-9, 6). Connect the points to form line segment DE.

Reflect line segment DE through the *x* –axis and label the image D'E'.

State the coordinates to D'E'.

Set 4



Plot the points F(1, 3), G(1, 6), H(4 , 3) and I(4, 6). Connect the points to form square FGHI.

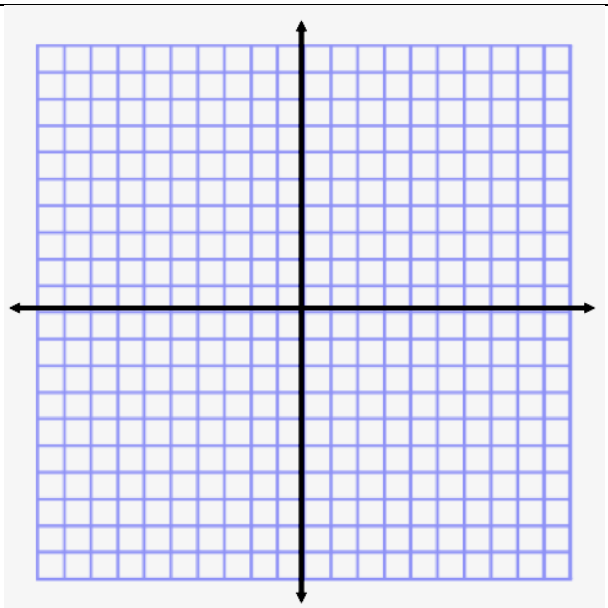
Reflect square FGHI through the *y* –axis and label the image F'G'H'I'.

Plot the points K(7, 2), L(9 , 3) and M (8, 5). Connect the points to form triangle KLM.

Reflect triangle KLM through the *y* – axis and label the image K'L'M'.

Describe what occurs to a point when you reflect it through the *y* – axis.

Is the orientation of the images in relation to their pre-images the same or opposite?



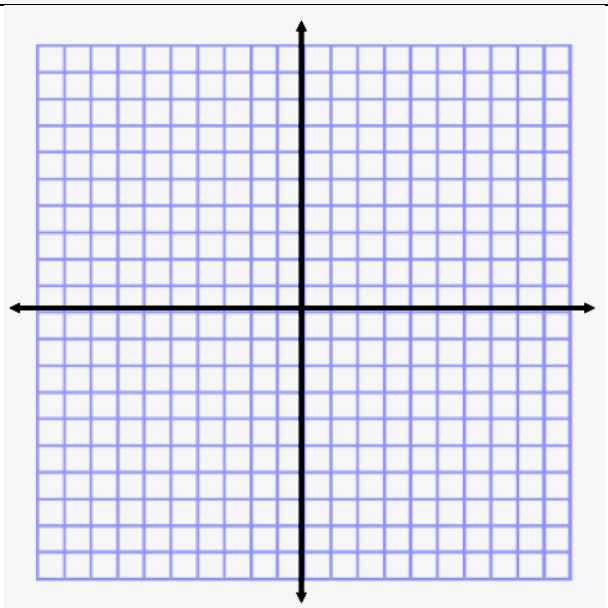
R#1

Label the axes. Plot the following points, connect the points to form triangle DEF: D(-4, -1) , E (-1, -1) , F(-2, -6).

Reflect triangle DEF through the *y* - axis. Label the new triangle D'E'F'.

Triangle DEF reflected from quadrant ____ to its image triangle D'E'F' in quadrant _____.

How could we move triangle DEF into quadrant II?



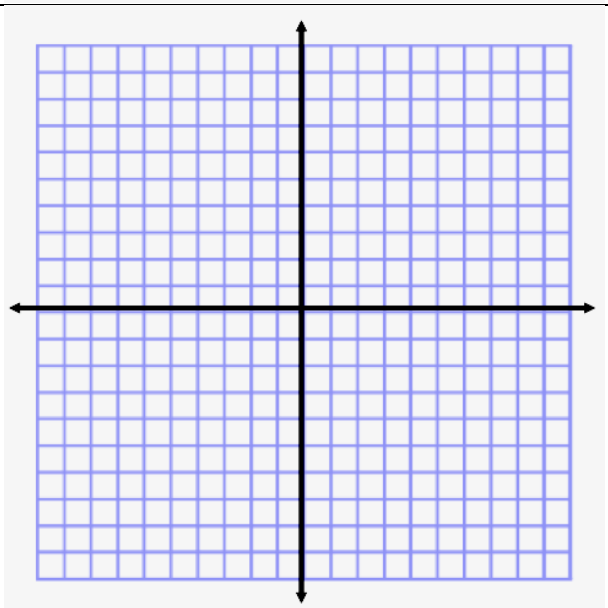
R#2

Label the axes. Plot the following points, connect the points to form triangle XYZ: X(5, -2) , Y(2, 0) , Z(1, -6).

Reflect triangle XYZ through the *x* - axis. Label the new triangle X'YZ'.

Triangle XYZ reflected from quadrant ____ to its image triangle X'YZ' in quadrant _____ .

Which point was mapped onto itself?



R#3

Label the axes. Plot the following points, connect the points to form square ABCD: A(2, 2) , B(6, 2) , C(6, 6) , D(2, 6).

Reflect square through the *x* – axis. Label the new square A'B'C'D'.

Reflect square A'B'C'D' through the *y* – axis. Label the new square A"B"C"D".

Which quadrant does not have an image in it?