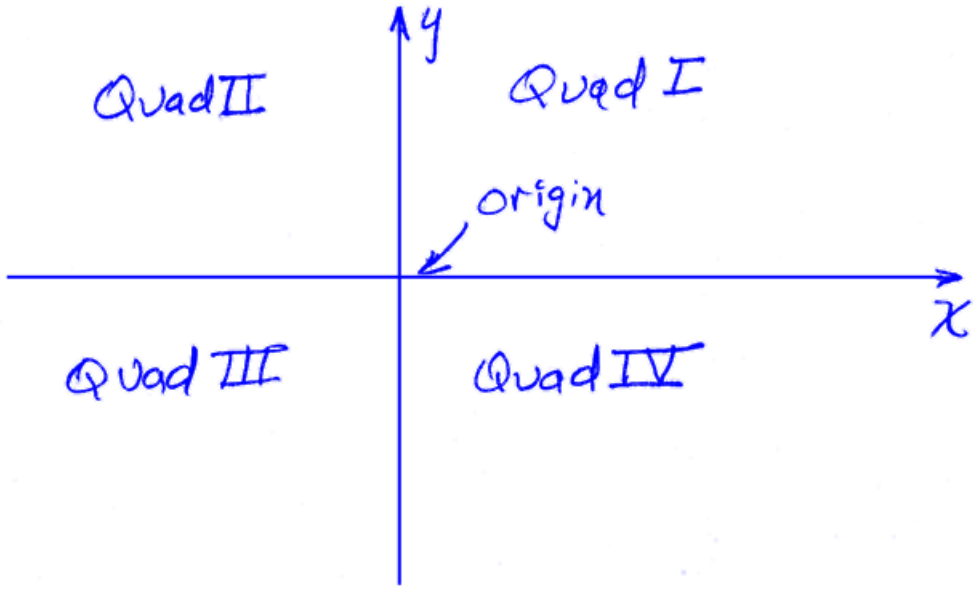
Unit 5: Lesson 01 — The coordinate plane, reflections, and translations

The coordinate plane is divided into four **quadrants** by the coordinate axes.



Notice that the **arrow heads** show the directions of the positive x-axis and y-axis.

Example 1: Give the coordinates of the following points. Also give the quadrant in which the point resides. If a point lies on an axis, then state which axis.

A. *(-4, 2), quad II*

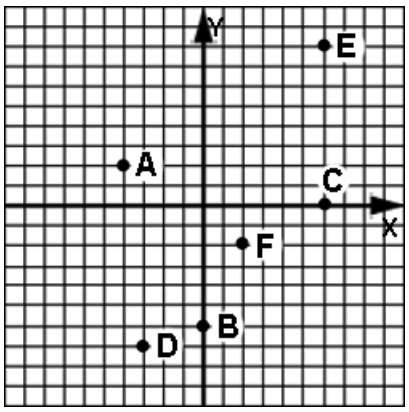
B. *(0, -6), y-axis*

C. *(6, 0), x-axis*

D. *(-3,-7), quad III*

E. *(6, 8), quad I*

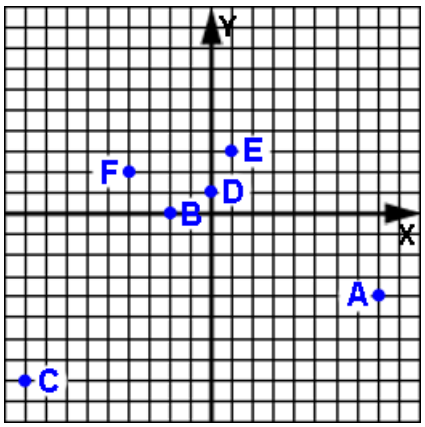
F. *(2, -2), quad IV*



Example 2: Plot and label the following points on the provided coordinate plane.

A. (8, -4) B. (-2, 0) C. (-9, -8)

D. (0, 1) E. (1, 3) F. (-4, 2)

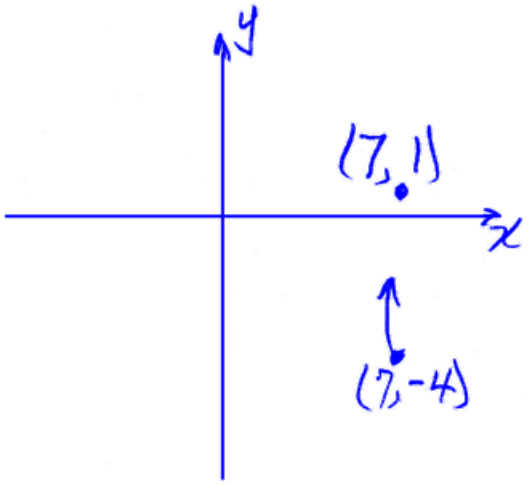


To **translate** a point means to **move** it.

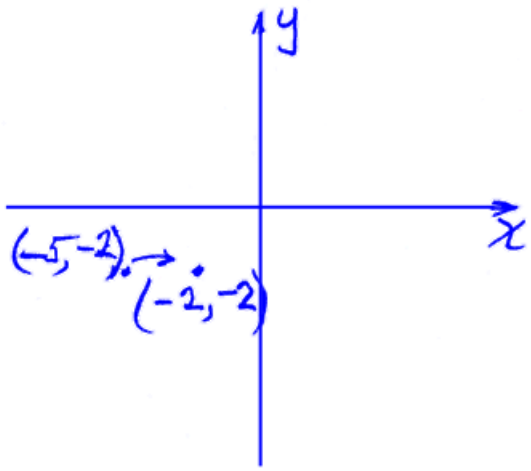
To translate a point **left or right**, add or subtract the appropriate amount from the **x-axis** coordinate.

To translate a point **up or down**, add or subtract the appropriate amount from the **y-axis** coordinate.

Example 3: Plot and label the point (7, -4) on a coordinate plane and then plot and label another point that is translated up 5 units.



Example 4: Plot and label the point (-5, -2) on a coordinate plane and then plot and label another point that is translated right 3 units.



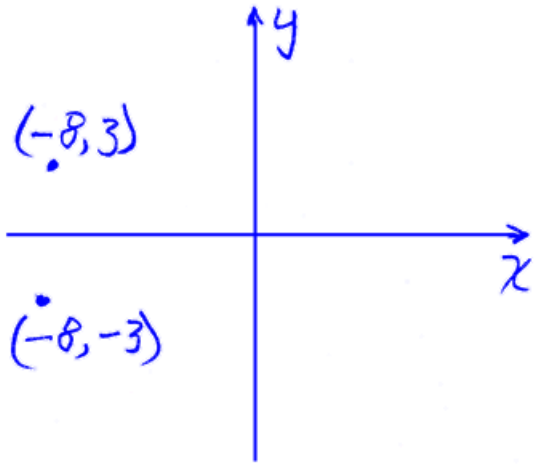
Reflection across the x- axis:

To reflect a point across the x-axis, draw its **mirror image** across the x-axis. The reflected point will have the same coordinates as the original point except the **sign of the y-coordinate will be changed**.

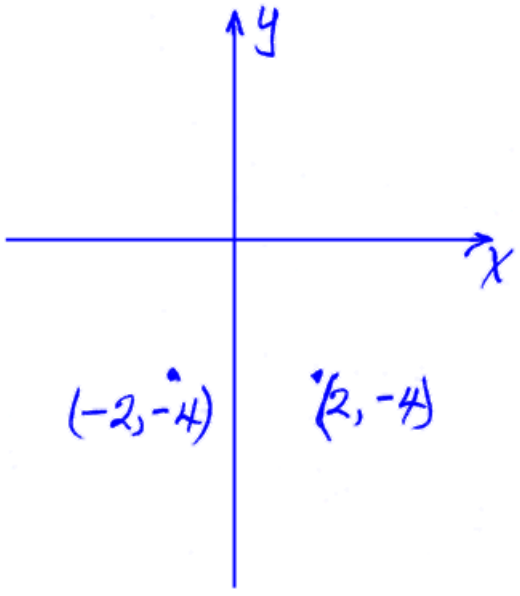
Reflection across the y-axis:

To reflect a point across the y-axis, draw its **mirror image** across the y-axis. The reflected point will have the same coordinates as the original point except the **sign of the x-coordinate will be changed**.

Example 5: Plot and label the point (-8, 3) on a coordinate plane and then plot and label another point that is the reflection of that point across the x-axis.



Example 6: Plot and label the point (2, -4) on a coordinate plane and then plot and label another point that is the reflection of that point across the y-axis.



Assignment:

1. Give the coordinates of the following points. Also give the quadrant in which the point resides. If a point lies on an axis, then state which axis.

A. _____

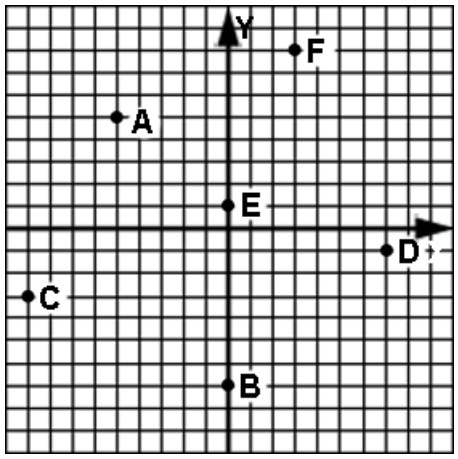
B. _____

C. _____

D. _____

E. _____

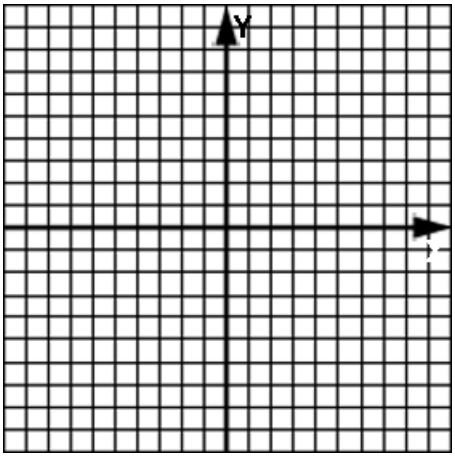
F. _____



2. Plot and label the following points on the provided coordinate plane.

A. (0, 5) B. (-4, -6) C. (3, -2)

D. (7, 2) E. (-9, 1) F. (2, 0)



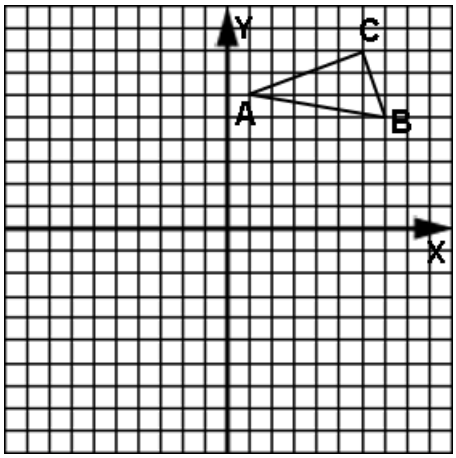
3. Which of the points in problem 2 are in the 2nd quadrant?

4. Which of the points in problem 2 are in no quadrant?

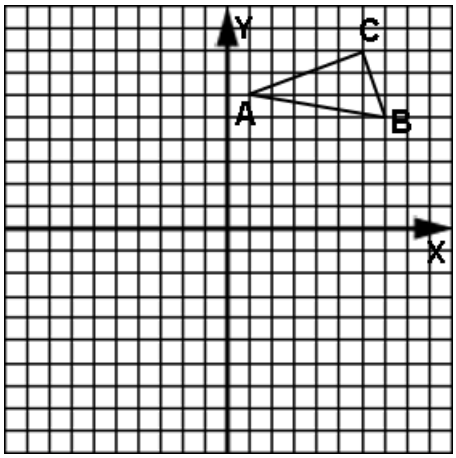
5. What is the x-coordinate of point E in problem 2?	6. What is the y-coordinate of point B in problem 2?
7. What is the x-coordinate of any point on the y-axis?	8. What are the coordinates of the origin of a plane coordinate system?
9. Plot and label the point (8, 3) on a coordinate plane and then plot and label another point that is the reflection of that point across the y-axis.	10. Plot and label the point (-10, 4) on a coordinate plane and then plot and label another point that is the reflection of that point across the x-axis.

11. Plot and label the point (0, -8) on a coordinate plane and then plot and label another point that is the reflection of that point across the x-axis.	12. Plot and label the point (0, 1) on a coordinate plane and then plot and label another point that is the reflection of that point across the y-axis.
13. Plot and label the point (2, -8) on a coordinate plane and then plot and label another point that is translated to the left 6 units.	14. Plot and label the point (-3, 5) on a coordinate plane and then plot and label another point that is translated down 2 units.
15. Plot and label the point (4, -4) on a coordinate plane and then plot and label another point that is translated up 5 units.	16. Plot and label the point (0, -3) on a coordinate plane and then plot and label another point that is translated to the right 4 units.

17. Draw triangle ABC reflected across the x-axis.



18. Draw triangle ABC reflected across the y-axis.



19.What are the new coordinates of C in problem 17 after the reflection?

20. What are the new coordinates of A in problem 18 after reflection?