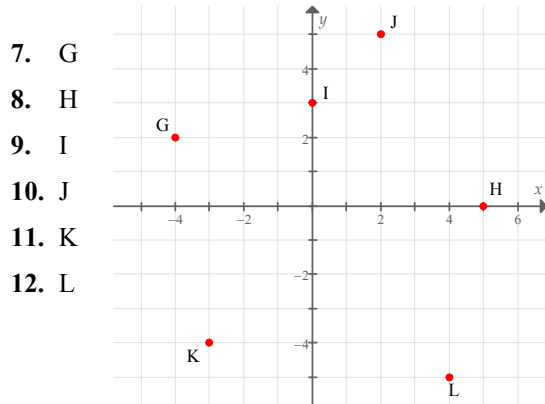


## Exercise Set 2.1: An Introduction to the Coordinate Plane

Plot the following points in a coordinate plane.

1.  $A(3, 4)$
2.  $B(2, -5)$
3.  $C(-3, -1)$
4.  $D(-4, -6)$
5.  $E(-5, 0)$
6.  $F(0, -2)$

Write the coordinates of each of the points shown in the figure below. Then identify the quadrant or axis in which the point is located.



7. G
8. H
9. I
10. J
11. K
12. L

Plot each of the following sets of points in a coordinate plane. Then identify the quadrant or axis in which each point is located.

13. (a)  $A(2, 5)$   
(b)  $B(-2, -5)$   
(c)  $C(2, -5)$   
(d)  $D(-2, 5)$
14. (a)  $A(4, -3)$   
(b)  $B(-4, -3)$   
(c)  $C(-4, 3)$   
(d)  $D(4, 3)$
15. (a)  $A(0, -2)$   
(b)  $B(-2, 0)$   
(c)  $C(2, 0)$   
(d)  $D(0, 2)$
16. (a)  $A(-3, 0)$   
(b)  $B(3, 0)$   
(c)  $(0, -3)$   
(d)  $D(0, 3)$

17. If the point  $(a, b)$  is in Quadrant I, identify the quadrant of each of the following points:  
(a)  $(-a, -b)$     (b)  $(-a, b)$     (c)  $(a, a)$
18. If the point  $(a, b)$  is in Quadrant I, identify the quadrant of each of the following points:  
(a)  $(-b, a)$     (b)  $(b, b)$     (c)  $(-b, -a)$
19. If the point  $(a, b)$  is in Quadrant II, then  $a < 0$  and  $b > 0$ . Identify the quadrant of each of the following points:  
(a)  $(-a, -b)$     (b)  $(b, a)$     (c)  $(a, -b)$
20. If the point  $(a, b)$  is in Quadrant III, then  $a < 0$  and  $b < 0$ . Identify the quadrant of each of the following points:  
(a)  $(-a, b)$     (b)  $(b, a)$     (c)  $(-a, -b)$
21. If the point  $(a, b)$  is in Quadrant IV, identify the quadrant of each of the following points:  
(a)  $(b, -b)$     (b)  $(-a, -a)$     (c)  $(b, a)$
22. If the point  $(a, b)$  is in Quadrant II, identify the quadrant of each of the following points:  
(a)  $(-a, b)$     (b)  $(b, b)$     (c)  $(a, -a)$
23. If the point  $(a, b)$  is in Quadrant III, identify the axis on which each of the following points lies:  
(a)  $(a, 0)$     (b)  $(0, b)$     (c)  $(-b, 0)$
24. If the point  $(a, b)$  is in Quadrant IV, identify the axis on which each of the following points lies:  
(a)  $(0, -b)$     (b)  $(-a, 0)$     (c)  $(b, 0)$

Answer True or False.

25. The point  $(0, 5)$  is on the  $x$ -axis.
26. The point  $(-4, 0)$  is in Quadrant II.
27. The point  $(1, -3)$  is in Quadrant IV.
28. The point  $(-2, -5)$  is in Quadrant III.
29. The point  $(0, 0)$  is in Quadrant I.
30. The point  $(-6, 1)$  is in Quadrant IV.
31. If the point  $(a, b)$  is in Quadrant IV, then  $b < 0$ .
32. If the point  $(a, b)$  is in Quadrant II, then  $a > 0$ .
33. If the point  $(a, b)$  is in Quadrant I, then the point  $(b, a)$  is also in Quadrant I.

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34. If the point  $(a, b)$  is in Quadrant I, then the point  $(a, -b)$  is in Quadrant II.
35. If the point  $(a, b)$  is in Quadrant II, then the point  $(-a, -b)$  is in Quadrant III.
36. If the point  $(a, b)$  is in Quadrant IV, then the point  $(-b, a)$  is in Quadrant I.
37. If the point  $(a, b)$  is in Quadrant III, then  $b > 0$ .
38. If the point  $(a, b)$  is on the  $y$ -axis, then  $a > 0$ .
39. If the point  $(a, b)$  is on the  $y$ -axis, then  $b > 0$ .
40. If the point  $(a, b)$  is on the  $y$ -axis, then  $a = 0$ .
41. If the point  $(a, b)$  is on the  $y$ -axis, then the point  $(b, a)$  is on the  $x$ -axis.
42. If the point  $(a, b)$  is on the  $x$ -axis, then the point  $(a, 3)$  lies in Quadrant I.
47. Graph the line  $x = 2$ .
48. Graph the line  $y = -5$ .
49. Graph the line  $y = 4$ .
50. Graph the line  $x = -3$ .
51. On the same set of axes, graph the lines  $x = -1$  and  $y = 3$ .
52. On the same set of axes, graph the lines  $x = 5$  and  $y = -2$ .
53. On the same set of axes, graph the lines  $x = \frac{7}{2}$  and  $y = 0$ .
54. On the same set of axes, graph the lines  $x = 0$  and  $y = -\frac{5}{2}$ .

Answer the following.

43. Given the following points:  
 $A(3, 5)$ ,  $B(3, 1)$ ,  $C(3, 0)$ ,  $D(3, -2)$
- Plot the above points on a coordinate plane.
  - What do the above points have in common?
  - Draw a line through the above points.
  - What is the equation of the line drawn in part (c)?
44. Given the following points:  
 $A(-3, 4)$ ,  $B(0, 4)$ ,  $C(1, 4)$ ,  $D(3, 4)$
- Plot the above points on a coordinate plane.
  - What do the above points have in common?
  - Draw a line through the above points.
  - What is the equation of the line drawn in part (c)?
45.
  - List four points that are on the  $x$ -axis.
  - Analyze the coordinates of the points you have listed. What do they have in common?
  - Give the equation of the  $x$ -axis.
46.
  - List four points that are on the  $y$ -axis.
  - Analyze the coordinates of the points you have listed. What do they have in common?
  - Give the equation of the  $y$ -axis.

Graph the following lines by first completing the table and then plotting the points on a coordinate plane.

55.  $y = 3x + 2$

| $x$ | $y$ |
|-----|-----|
| -2  |     |
| -1  |     |
| 0   |     |
| 1   |     |
| 2   |     |

56.  $y = -2x + 5$

| $x$ | $y$ |
|-----|-----|
| -2  |     |
| -1  |     |
| 0   |     |
| 1   |     |
| 2   |     |

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57.  $y = -4x + 7$

| $x$            | $y$ |
|----------------|-----|
| 0              |     |
| $\frac{1}{4}$  | -5  |
|                | 2   |
| $-\frac{3}{2}$ |     |

58.  $y = 5x - 1$

| $x$           | $y$ |
|---------------|-----|
| 2             | -1  |
|               | -6  |
| $\frac{3}{5}$ | 0   |

**Answer the following.**

59. Graph the line segment with endpoints  $(-7, 0)$  and  $(0, 7)$ .
60. Graph the line segment with endpoints  $(3, 5)$  and  $(-5, -3)$ .
61. Graph the line segment with endpoints  $(1, -4)$  and  $(-1, 4)$ .
62. Graph the line segment with endpoints  $(-2, 6)$  and  $(6, 2)$ .