NAME _____ DATE _____

8–2 Points, Lines, and Their Graphs

Objective: To graph ordered pairs and linear equations in two variables.

Vocabulary

Plot a point Locate the graph of an ordered pair in a number plane.

Horizontal axis The horizontal number line in a number plane; the ***x*-axis.**

Origin The intersection of the axes on a number plane. The zero point on each axis.

Vertical axis The vertical number line in a number plane; the ***y*-axis.**

Graph of an ordered pair The point in a number plane associated with an ordered pair.

Abscissa The first coordinate in an ordered pair of numbers; the ***x*-coordinate.**

Ordinate The second coordinate in an ordered pair of numbers; the ***y*-coordinate.**

Coordinates of a point The abscissa and ordinate of the point, written as an ordered pair.

Coordinate axes The x- and y-axes in a number plane.

Coordinate plane A number plane; a plane in which a coordinate system has been set up.

Quadrant One of the four regions into which the coordinate axes separate a number plane.

Graph of an equation in two variables All the points that are the graphs of the solutions of the equation.

Linear equation An equation whose graph is a line.

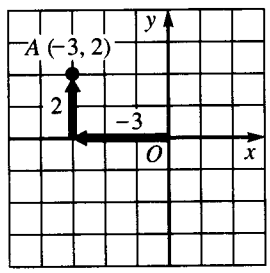
Standard form of a linear equation The form $ax + by = c$, where a, b, and c are integers and a and b are not both zero.

Example 1 Plot each point in a number plane.

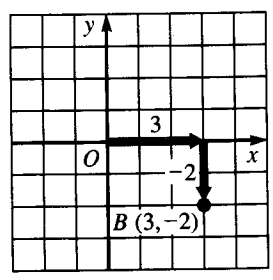
a. $A(-3, 2)$ **b.** $B(3, -2)$ **c.** $C(-1, -3)$

Solution

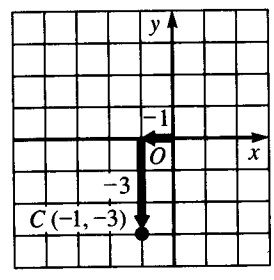
a.



b.



c.



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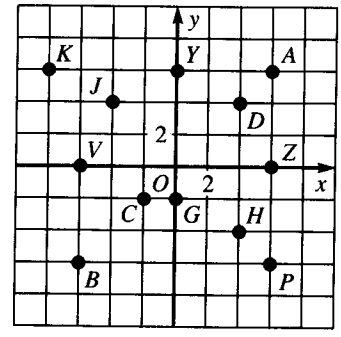
8–2 Points, Lines, and Their Graphs *(continued)*

Plot each point in a coordinate plane.

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

Refer to the diagram at the right. Name the point(s) described.



9. The point on the positive x-axis.
10. The point on the negative y-axis.
11. The points on the vertical line through Z.
12. The points on the horizontal line through Y.
13. The x-coordinate is zero.
14. The y-coordinate is zero.
15. The points have equal x- and y-coordinates.
16. The points have opposite x- and y-coordinates.

Example 2 Graph $x - 2y = 4$ in a coordinate plane.

Solution Let $y = 0$:

$x - 2(0) = 4$

$x = 4$

Solution $(4, 0)$

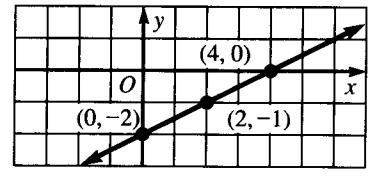
Let $x = 0$:

$0 - 2y = 4$

$-2y = 4$

$y = -2$

Solution $(0, -2)$



A third solution, such as $(2, -1)$ can be used as a check.

Graph each equation. You may wish to verify your graphs on a computer or a graphing calculator.

17. $x - y = 4$
18. $x + y = 5$
19. $y = 2x + 6$
20. $y = -2x + 2$
21. $2x + y = 4$
22. $x - 3y = 6$
23. $2x - 3y = 6$
24. $2x + 3y = 6$

Mixed Review Exercises

State whether each ordered pair is a solution of the given equation.

1. $2x + y = 7$
   $(4, -1), (-1, 9)$
2. $3a + 2b = 6$
   $(2, -6), (2, 0)$
3. $x + 3y = 11$
   $(2, 3), (-3, -2)$
4. $2m + 3n = 7$
   $(2, 1), (-1, 3)$

Solve.

5. $x^2 + 5x + 6 = 0$
6. $-z + 9 = 3$
7. $2b^2 - 6b - 8 = 0$
8. $\frac{10 - 5y}{3} = 5$
9. $5x + 9 = 3x - 11$
10. $10 = \frac{2}{5}n$