NAME _____ DATE_____ PERIOD _____

Study Guide and Intervention

Alg1 7.0

Linear Functions

Identify Linear Equations A **linear equation** is an equation that can be written in the form $Ax + By = C$. This is called the **standard form** of a linear equation.

Standard Form of a Linear Equation	$Ax + By = C$, where $A \geq 0$, A and B are not both zero, and A, B, and C are integers whose GCF is 1.

Example 1 **Determine whether $y = 6 - 3x$ is a linear equation. If so, write the equation in standard form.**

First rewrite the equation so both variables are on the same side of the equation.

$y = 6 - 3x$ Original equation.
$y + 3x = 6 - 3x + 3x$ Add $3x$ to each side.
$3x + y = 6$ Simplify.

The equation is now in standard form, with $A = 3$, $B = 1$ and $C = 6$. This is a linear equation.

Example 2 **Determine whether $3xy + y = 4 + 2x$ is a linear equation. If so, write the equation in standard form.**

Since the term $3xy$ has two variables, the equation cannot be written in the form $Ax + By = C$. Therefore, this is not a linear equation.

Exercises

Determine whether each equation is a linear equation. If so, write the equation in standard form.

1. $2x = 4y$

2. $6 + y = 8$

3. $4x - 2y = -1$

4. $3xy + 8 = 4y$

5. $3x - 4 = 12$

6. $y = x^2 + 7$

7. $y - 4x = 9$

8. $x + 8 = 0$

9. $-2x + 3 = 4y$

10. $2 + \frac{1}{2}x = y$

11. $\frac{1}{4}y = 12 - 4x$

12. $3xy - y = 8$

13. $6x + 4y - 3 = 0$

14. $yx - 2 = 8$

15. $6a - 2b = 8 + b$

16. $\frac{1}{4}x - 12y = 1$

17. $3 + x + x^2 = 0$

18. $x^2 = 2xy$

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Study Guide and Intervention *(continued)*

Linear Functions

Graph Linear Equations The graph of a linear equations represents all the solutions of the equation. An x-coordinate of the point at which a graph of an equation crosses the x-axis in an ***x*-intercept.** A y-coordinate of the point at which a graph crosses the y-axis is called a ***y*-intercept.**

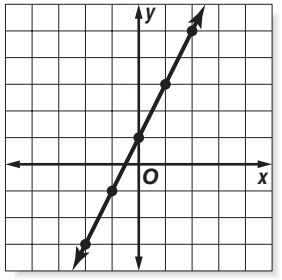
Example 1 **Graph the equation $y - 2x = 1$ by making a table.**

Solve the equation for y.

$y - 2x = 1$ Original equation.
$y - 2x + 2x = 1 + 2x$ Add $2x$ to each side.
$y = 2x + 1$ Simplify.

Select five values for the domain and make a table. Then graph the ordered pairs and draw a line through the points.

x	$2x + 1$	y	(x, y)
-2	$2(-2) + 1$	-3	$(-2, -3)$
-1	$2(-1) + 1$	-1	$(-1, -1)$
0	$2(0) + 1$	1	(0, 1)
1	$2(1) + 1$	3	(1, 3)
2	$2(2) + 1$	5	(2, 5)



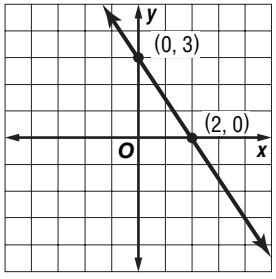
Example 2 **Graph the equation $3x + 2y = 6$ by using the *x*-intercept and *y*-intercept.**

To find the x-intercept, let $y = 0$ and solve for x. The x-intercept is 2. The graph intersects the x-axis at (2, 0).

To find the y-intercept, let $x = 0$ and solve for y.

The y-intercept is 3. The graph intersects the y-axis at (0, 3).

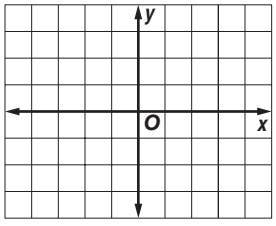
Plot the points (2, 0) and (0, 3) and draw the line through them.



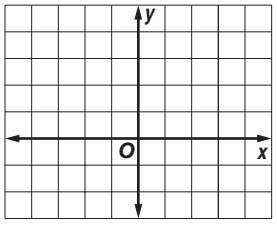
Exercises

Graph each equation by making a table.

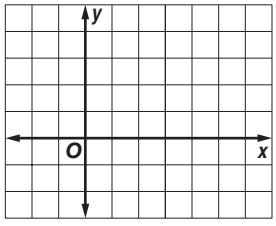
1. $y = 2x$



2. $x - y = -1$

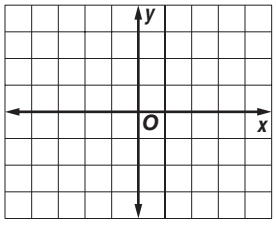


3. $x + 2y = 4$

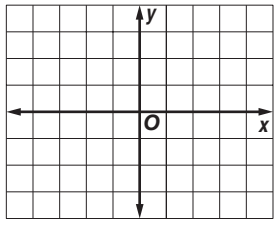


Graph each equation by using the *x*-intercept and *y*-intercept.

4. $2x + y = -2$



5. $3x - 6y = -3$



6. $-2x + y = -2$