

3-5 Reteaching

Standard Form

The **standard form** of a linear equation is $Ax + By = C$, where A , B , and C are real numbers, and A and B are not both zero.

Each intercept occurs when one coordinate is 0. When substituting 0 for either x or y , one of the terms on the left side of the standard form equation disappears. This leaves a linear equation in one variable, with a variable term on the left and a constant on the right. Determining the other coordinate of the intercept requires at most multiplication or division.

Problem

What are the x - and y -intercepts and the slope of the graph of $6x - 9y = 18$?

NOTES

Find the x -intercept.

$$6x - 9y = 18$$

$$6x - 9(0) = 18 \quad \text{Substitute 0 for } y.$$

$$6x = 18 \quad \text{Simplify.}$$

$$x = 3 \quad \text{Divide each side by 6.}$$

Find the y -intercept.

$$6x - 9y = 18$$

$$6(0) - 9y = 18 \quad \text{Substitute 0 for } x.$$

$$-9y = 18 \quad \text{Simplify.}$$

$$y = -2 \quad \text{Divide each side by } -9.$$

To find the slope m , rewrite the equation in slope-intercept form:

$$6x - 9y = 18$$

$$6x - 6x - 9y = -6x + 18 \quad \text{Subtract } 6x \text{ from each side.}$$

$$-9y = -6x + 18 \quad \text{Simplify.}$$

$$y = \frac{2}{3}x - 2 \quad \text{Divide each side by } -9.$$

The slope is $\frac{2}{3}$.

Exercises

Find the x - and y -intercepts and the slope of the graph of each equation.

1. ~~$x - y = 12$~~

2. ~~$3x + 2y = 12$~~

3. ~~$-7x + 3y = 42$~~

3-5 Reteaching (continued)

Standard Form

You can graph many linear equations in standard form by plotting the x - and y -intercepts.

Problem

What is the graph of $2x - y = 4$?

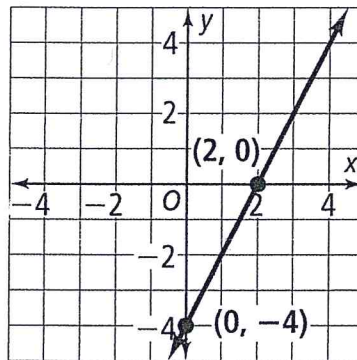
Find the intercepts.

$$\begin{aligned} 2x - y &= 4 \\ 2x - (0) &= 4 \\ 2x &= 4 \\ x &= 2 \end{aligned}$$

$$\begin{aligned} 2x - y &= 4 \\ 2(0) - y &= 4 \\ -y &= 4 \\ y &= -4 \end{aligned}$$

NOTES

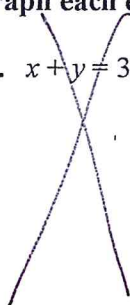
The x -intercept is 2, and the y -intercept is -4 . Plot the x - and y -intercepts and draw a line through the points.



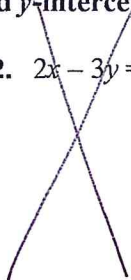
Exercises

Graph each equation using x - and y -intercepts.

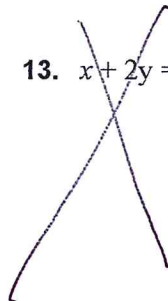
11. $x + y = 3x$



12. $2x - 3y = 6$



13. $x + 2y = -4$



Standard Form

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Date _____ Period _____

Write the standard form of the equation of each line.

1) $y = -x + 5$

2) $y = \frac{1}{4}x + 2$

3) $y = \frac{5}{2}x - 1$

4) $y = -4x - 3$

5) $y + 5 = -10(x - 1)$

6) $0 = x + 1$

7) $y + 1 = -\frac{4}{5}(x + 5)$

8) $y - 5 = \frac{8}{3}(x - 3)$

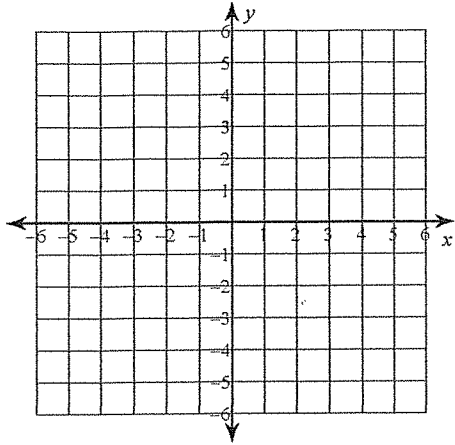
9) $-3 + 2x = y$

10) $0 = -y + x - 4$

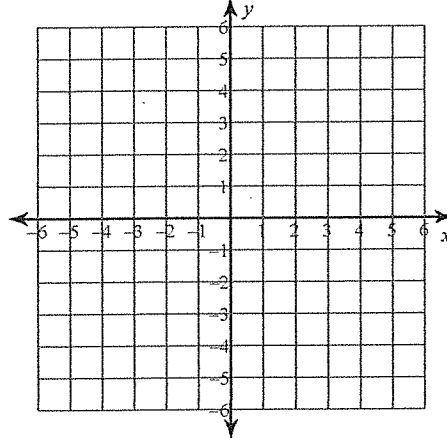
Graphing Lines

Sketch the graph of each line.

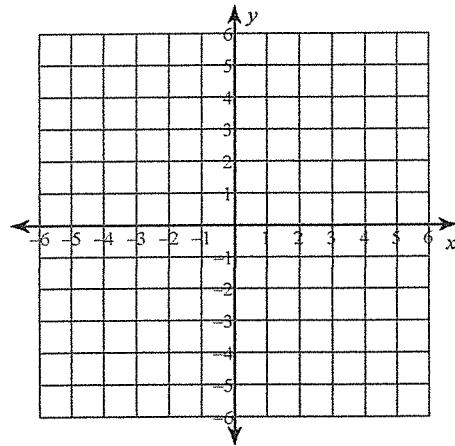
1) $7x + y = 5$



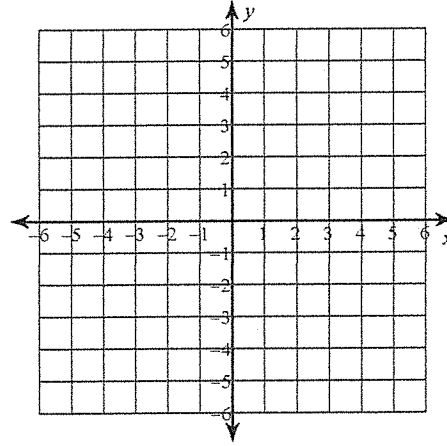
2) $3x + 5y = -5$



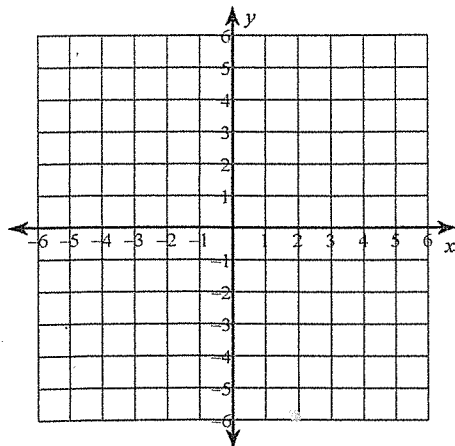
3) $y = 4$



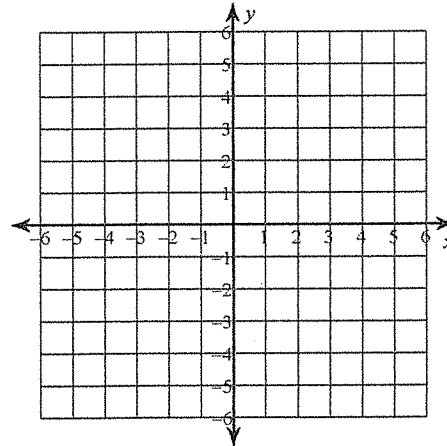
4) $6x + 5y = 20$



5) $x = -3$



6) $2x + y = 4$



Direct Variation

Direct Variation is the relation between two variables x and y provided $y = ax$ and $a \neq 0$. The nonzero number a is called the *Constant of variation* (k), and y is said to *vary directly* with x .

so basically... A relation is being directly varied when you only have $y=mx$ and are missing the b value.

Direct Variation: $y = 4x$

NOT DIRECT VARIATION: $y = 4x + 1$

Which of the following examples provide direct variation

$$-x + y = 1$$

$$2x + y = 0$$

$$4x - 5y = 0$$

$$2x - 3y = 0$$

You will also have to solve word problems for direct variation. These problems give you a command, a few variables, and solve for that value k .

If x varies directly with y , find the equation for...

$$x = 3, y = 9$$

(14,7)

Now for checking a table... To vary directly, all there must be a constant rate of change with no values added on. So we have to check if every x value has the same rate of the y values and then solve the direct variation normally.

X	-2	-1	0	1	2
y	-10	-5	0	5	10

X	8	2	-4	-5	14
y	176	44	-88	-11	308

X	2	4	8	16	34
y	1	2	4	6	8