

standard form: $\boxed{a}x + \boxed{b}y = \boxed{c}$

Lesson 14: The Graph of a Linear Equation—Horizontal and Vertical Lines

Classwork

Exercises

1. Find at least four solutions to graph the linear equation $1x + 2y = 5$.

2. Find at least four solutions to graph the linear equation $1x + 0y = 5$. $x = 5$

3. What was different about the equations in Exercises 1 and 2? What effect did this change have on the graph?

The "b" changed. When $b = 0$ the line is vertical

4. Graph the linear equation $x = -2$.

5. Graph the linear equation $x = 3$.

6. What will the graph of $x = 0$ look like?

The graph of $x=0$ will be the y-axis

7. Find at least four solutions to graph the linear equation $2x + 1y = 2$.

8. Find at least four solutions to graph the linear equation $0x + 1y = 2$.

9. What was different about the equations in Exercises 7 and 8? What effect did this change have on the graph?

When "a" = 0, the line is horizontal

10. Graph the linear equation $y = -2$.

11. Graph the linear equation $y = 3$.

12. What will the graph of $y = 0$ look like?

The graph of $y=0$ will be the x-axis

$$1.) \quad \downarrow$$

$$1x + 2y = 5$$

x	y
-1	3
0	2.5
1	2
2	1.5

$$1(-1) + 2y = 5$$

$$\begin{array}{r} -1 \\ +1 \end{array} + 2y = 5 + 1$$

$$\frac{2y}{2} = \frac{6}{2}$$

$$y = 3$$

$$1(0) + 2y = 5$$

$$0 + 2y = 5$$

$$2y = 5$$

$$y = 2.5$$

$$1(1) + 2y = 5$$

$$1 + 2y = 5$$

$$\begin{array}{r} -1 \\ -1 \end{array} \quad \begin{array}{r} -1 \\ -1 \end{array}$$

$$2y = 4$$

$$y = 2$$

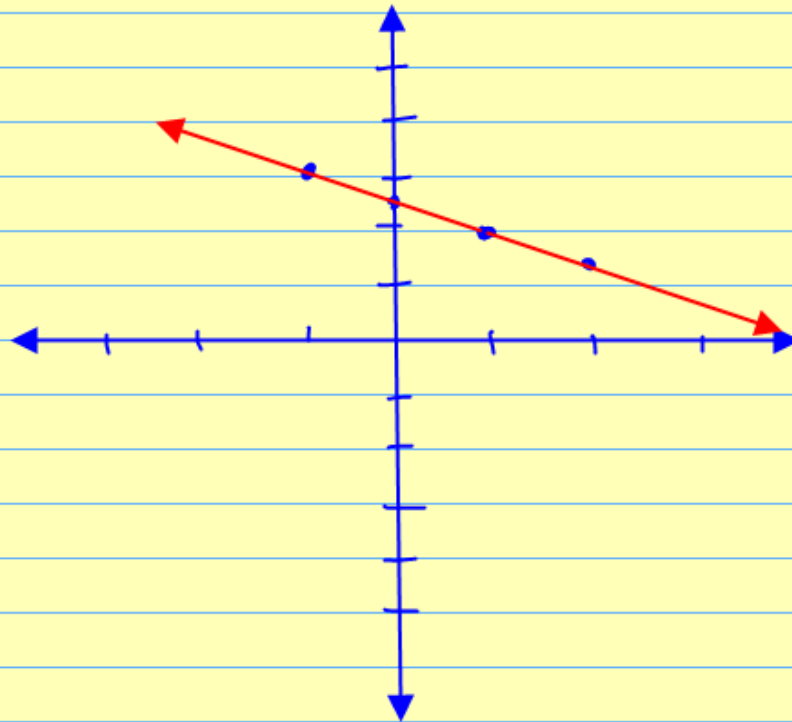
$$1(2) + 2y = 5$$

$$2 + 2y = 5$$

$$\begin{array}{r} -2 \\ -2 \end{array} \quad \begin{array}{r} -2 \\ -2 \end{array}$$

$$2y = 3$$

$$y = 1.5$$



$$2.) \quad |x + \cancel{0y} = 5 \quad \Rightarrow \quad x = 5$$

x	y
5	-1
5	2
5	4
5	5

$$\begin{aligned} 1(-1) + 0y &= 5 \\ -1 + 0 &= 5 \\ -1 &\neq 5 \end{aligned}$$

$$|x + 0(2) = 5 \quad |x + 0(-1) = 5$$

$$|5 + 0y = 5$$

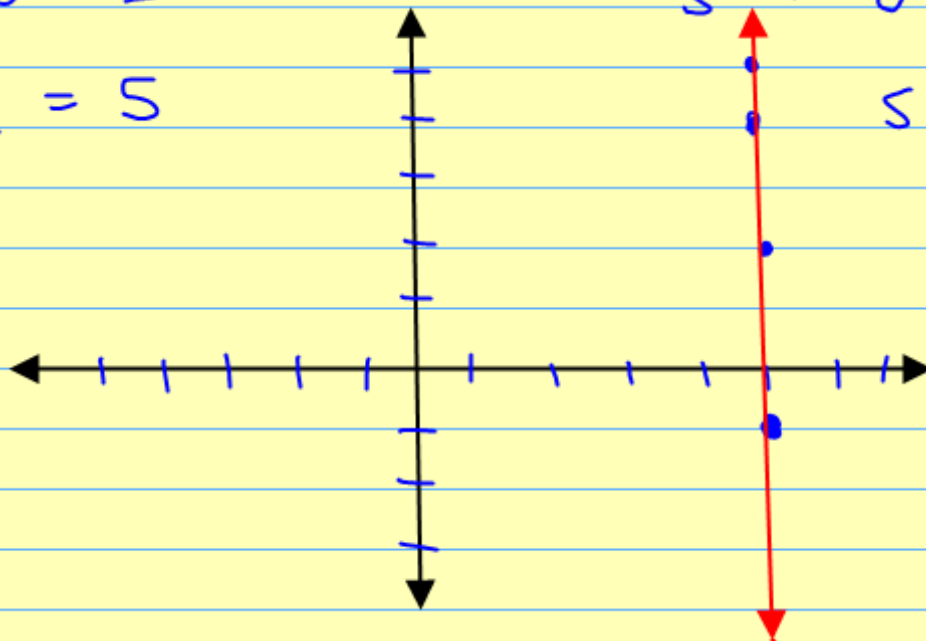
$$x + 0 = 5 \quad x + 0 = 5$$

$$5 + 0 = 5$$

$$x = 5$$

$$x = 5$$

$$5 = 5$$



$$a = 2$$

$$b = 4$$

$$c = 7$$

$$2x + 4y = 7$$

$$a = 5$$

$$b = -2$$

$$c = 10$$

$$5x$$

$$-2y = 10$$

$$a = 1 \quad b = -3 \quad c = 0$$

$$x - 3y = 0$$

$$2x + 11y = 5$$

$$a = 2 \quad b = 11 \quad c = 5$$

$$x - 3y = 3$$

$$a = 1 \quad b = -3 \quad c = 3$$

Lesson Summary

A linear equation in standard form, $ax + by = c$, where $a = 1$ and $b = 0$, is the graph of the equation $x = c$. The graph of $x = c$ is the vertical line passing through the point $(c, 0)$.

A linear equation in standard form, $ax + by = c$, where $a = 0$ and $b = 1$, is the graph of the equation $y = c$. The graph of $y = c$ is the horizontal line passing through the point $(0, c)$.

Problem Set

1. Graph the two-variable linear equation $ax + by = c$, where $a = 0$, $y = 1$, and $c = -4$.
2. Graph the two-variable linear equation $ax + by = c$, where $a = 1$, $y = 0$, and $c = 9$.
3. Graph the linear equation $y = 7$.
4. Graph the linear equation $x = 1$.
5. Explain why the graph of a linear equation in the form of $y = c$ is the horizontal line, parallel to the x -axis passing through the point $(0, c)$.
6. Explain why there is only one line with the equation $y = c$ that passes through the point $(0, c)$.