

Chapter 3, Lesson 5 – Standard Form Notes

Slope-Intercept Form

The **x-intercept** of a line is the **x-coordinate** of the **point** where the **graph** crosses the **x-axis**. Since **any linear equation** can be **graphed** using **two points**, you can use the **x- and y-intercepts** to **graph** an equation.

Example



1. State the x- and y-intercepts of $y = 1.5x - 9$. Then use the intercepts to graph the equation.

Step 1 First find the **y-intercept**.

$y = 1.5x + (-9)$ Write the equation in the form $y = mx + b$.

$b = -9$

Step 2 To find the **x-intercept**, let $y = 0$.

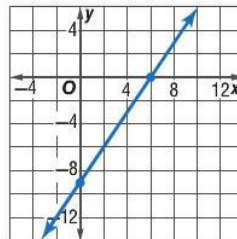
$0 = 1.5x - 9$ Write the equation. Let $y = 0$.

$9 = 1.5x$ Addition Property of Equality

$\frac{9}{1.5} = \frac{1.5x}{1.5}$ Division Property of Equality

$6 = x$ Simplify.

Step 3 Graph the points $(6, 0)$ and $(0, -9)$ on a coordinate plane. Then connect the points.

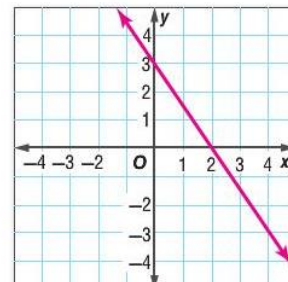
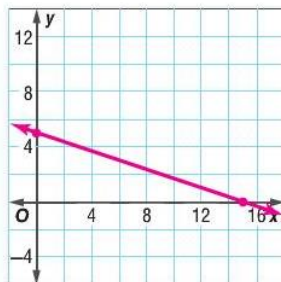


$$\begin{array}{r} 0 = 1.5x - 9 \\ +9 \qquad +9 \\ \hline 9 = 1.5x \\ 1.5 \quad 1.5 \\ \hline x = 6 \\ (6, 0) \leftarrow \text{x-intercept} \end{array}$$

Got It? Do these problems to find out.

a. $y = -\frac{1}{3}x + 5$

b. $y = -\frac{3}{2}x + 3$



$$\begin{array}{r} 0 = -\frac{3}{2}x + 3 \\ -3 \qquad -3 \\ \hline -3 = -\frac{3}{2}x \end{array}$$

$$\left(-\frac{2}{3}\right) \cdot \frac{-3}{1} = -\frac{3}{2}x \cdot \left(-\frac{2}{3}\right)$$

$$\begin{array}{l} 2 = x \\ (2, 0) \end{array}$$

x-intercept: 15;
a. y-intercept: 5

x-intercept: 2;
b. y-intercept: 3

$$\begin{array}{r} \textcircled{a} \quad 0 = -\frac{1}{3}x + 5 \\ -5 \qquad -5 \\ \hline -5 = -\frac{1}{3}x \\ \left(-\frac{3}{1}\right) \cdot -5 = -\frac{1}{3}x \cdot \left(-\frac{3}{1}\right) \\ 15 = x \quad (15, 0) \end{array}$$

Show your work.

Standard Form

When an equation is written in the form $Ax + By = C$, where $A \geq 0$, and A , B , and C are integers, it is written in **standard form**.



Examples



Mauldin Middle School wants to make \$4,740 from yearbooks. Print yearbooks x cost \$60 and digital yearbooks y cost \$15. This can be represented by the equation $60x + 15y = 4,740$.

2. Use the x - and y -intercepts to graph the equation.

To find the **x -intercept**, let $y = 0$. To find the **y -intercept**, let $x = 0$.

$60x + 15y = 4,740$	$60x + 15y = 4,740$
$60x + 15(0) = 4,740$	$60(0) + 15y = 4,740$
$60x = 4,740$	$15y = 4,740$
$x = 79$	$y = 316$

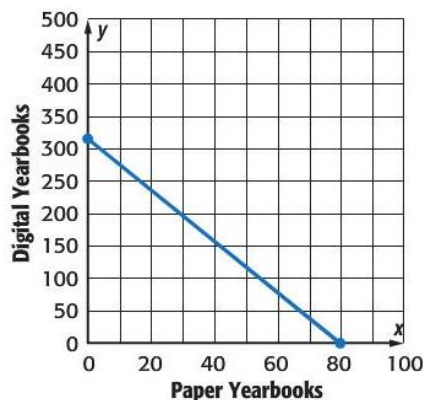
Describe below two different methods for graphing a line.

$A = 60$
 $B = 15$
 $C = 4,740$

3. Interpret the x - and y -intercepts.

The **x -intercept** is at the point $(79, 0)$. This means they can sell **79 print yearbooks** and **0 digital yearbooks** to earn \$4,740.

The **y -intercept** is at the point $(0, 316)$. This means they can sell **0 print yearbooks** and **316 digital yearbooks** to earn \$4,740.

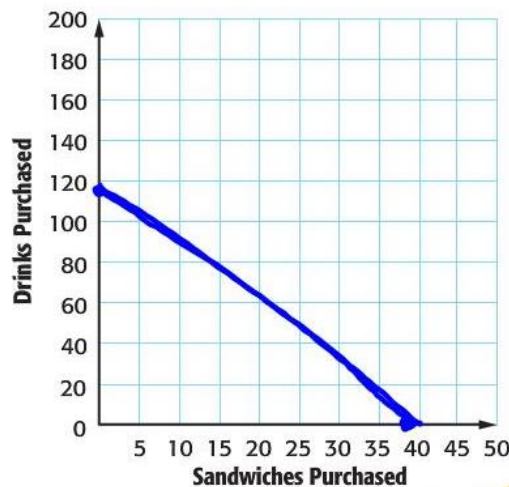


y-intercept

When an equation is written in slope-intercept form, $y = mx + b$, the y -intercept is equal to b .

Got It? Do this problem to find out.

- c. Mr. Davies spent \$230 on lunch for his class. Sandwiches x cost \$6 and drinks y cost \$2. This can be represented by the equation $6x + 2y = 230$. Use the x - and y -intercepts to graph the equation. Then interpret the intercepts.



Show your work.

c. _____
 $6x + 2(0) = 230$
 $6x = 230$
 $x = 38\frac{1}{3}$
 $(38\frac{1}{3}, 0)$
 $6(0) + 2y = 230$
 $2y = 230$
 $y = 115$

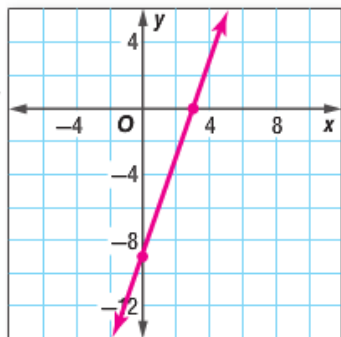
Guided Practice



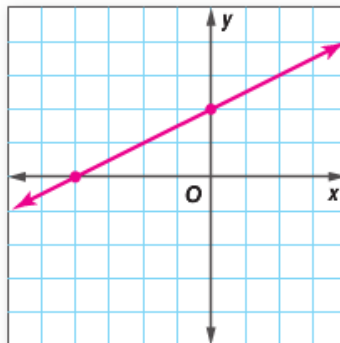
State the x - and y -intercepts of each equation. Then use the intercepts to graph the equation. (Example 1)

1. $y = 3x - 9$ **x -intercept: 3; y -intercept: -9**

Show your work.



2. $y = \frac{1}{2}x + 2$ **x -intercept: -4 ; y -intercept: 2**



3. A store sells juice boxes in packages of 6 boxes and 8 boxes. They have 288 total juice boxes. This is represented by the function $6x + 8y = 288$. Use the x - and y -intercepts to graph the equation. Then interpret the x - and y -intercepts. (Examples 2 and 3)

The x -intercept of 48 means that the store has 48 packages of 6 boxes and 0 packages of 8 boxes. The y -intercept of 36 means that the store has 36 packages of 8 boxes and 0 packages of 6 boxes.

