

## X and Y Intercepts of Linear Equations

## Vocabulary

x-intercept  
y-intercept

What does it mean to  
**INTERCEPT** a pass in football?

The path of the defender **crosses** the  
path of the thrown football.

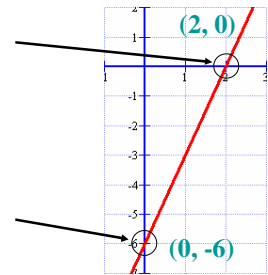


In algebra, what are x- and y-intercepts?

What are the x- and y-intercepts?

The **x-intercept** is  
where the graph  
crosses the x-axis.  
\*The y-coordinate  
is always 0.

The **y-intercept** is  
where the graph  
crosses the y-axis.  
\*The x-coordinate  
is always 0.



Find the x- and y intercepts.

1.  $x - 2y = 12$

x-intercept: Plug in **0** for y.  
 $x - 2(\mathbf{0}) = 12$   
 $x = 12$ ; **(12, 0)**

y-intercept: Plug in **0** for x.  
 $\mathbf{0} - 2y = 12$   
 $y = -6$ ; **(0, -6)**

Find the x- and y intercepts.

2.  $-3x + 5y = 9$

x-intercept: Plug in **0** for y.  
 $-3x - 5(\mathbf{0}) = 9$   
 $-3x = 9$   
 $x = -3$ ; **(-3, 0)**

y-intercept: Plug in **0** for x.  
 $-3(\mathbf{0}) + 5y = 9$   
 $5y = 9$   
 $y = \frac{9}{5}$ ; **(0,  $\frac{9}{5}$ )**

**Find the x- and y-intercepts.**

3.  $y = 7$  \*\*\*Special case\*\*\*

x-intercept: Plug in 0 for y.

Does  $0 = 7$ ?

No! There is no x-intercept. **None**

What type of lines have no x-intercept?

Horizontal!

Horizontal lines... $y = 7$ ...y-int = **(0, 7)**

You can graph a linear equation easily by finding the **x-intercept** and the **y-intercept**.

The **x-intercept** of a line is the value of x where the line crosses the x-axis (where  $y = 0$ ).

The **y-intercept** of a line is the value of y where the line crosses the y-axis (where  $x = 0$ ).

(x,y)

- x- Intercept = (x,0)
- y- Intercept = (0,y)

**Additional Example 1: Finding x-intercepts and y-intercepts to Graph Linear Equations**

**Find the x-intercept and y-intercept of the line  $4x - 3y = 12$ . Use the intercepts to graph the equation.**

Find the x-intercept ( $y = 0$ ).

$$4x - 3y = 12$$

$$4x - 3(0) = 12$$

$$4x = 12$$

$$\frac{4x}{4} = \frac{12}{4}$$

$$x = 3$$

The x-intercept is 3.

**Additional Example 1 Continued**

Find the y-intercept ( $x = 0$ ).

$$4x - 3y = 12$$

$$4(0) - 3y = 12$$

$$-3y = 12$$

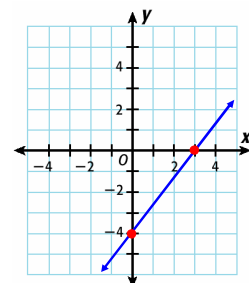
$$\frac{-3y}{-3} = \frac{12}{-3}$$

$$y = -4$$

The y-intercept is -4.

**Additional Example 1 Continued**

The graph of  $4x - 3y = 12$  is the line that crosses the x-axis at the point (3, 0) and the y-axis at the point (0, -4).



Try This: Example 1

Find the x-intercept and y-intercept of the line  $8x - 6y = 24$ . Use the intercepts to graph the equation.

Find the x-intercept ( $y = 0$ ).

$$8x - 6y = 24$$

$$8x - 6(0) = 24$$

$$8x = 24$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$x = 3$$

The x-intercept is 3.

Try This: Example 1 Continued

Find the y-intercept ( $x = 0$ ).

$$8x - 6y = 24$$

$$8(0) - 6y = 24$$

$$-6y = 24$$

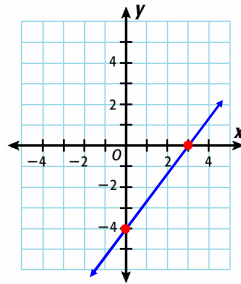
$$\frac{-6y}{-6} = \frac{24}{-6}$$

$$y = -4$$

The y-intercept is  $-4$ .

Try This: Example 1 Continued

The graph of  $8x - 6y = 24$  is the line that crosses the x-axis at the point  $(3, 0)$  and the y-axis at the point  $(0, -4)$ .



What is the x-intercept of

$$3x - 4y = 24?$$

1.  $(3, 0)$
- ✓ 2.  $(8, 0)$
3.  $(0, -4)$
4.  $(0, -6)$

What is the y-intercept of

$$-x + 2y = 8?$$

1.  $(-1, 0)$
2.  $(-8, 0)$
3.  $(0, 2)$
- ✓ 4.  $(0, 4)$

What is the y-intercept of

$$x = 3?$$

1.  $(3, 0)$
2.  $(-3, 0)$
3.  $(0, 3)$
- ✓ 4. None