

Algebra 1: 3.4 Standard Form

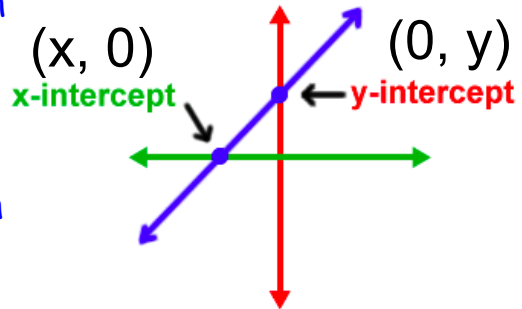
Learning outcomes:

- > I can graph equations of horizontal and vertical lines.
- > I can graph equations in standard form using x and y intercepts.
- > I can use linear equations in standard form to solve real-life problems.

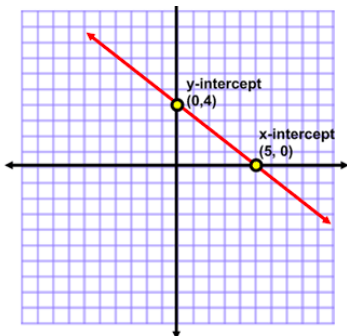
intercepts

x-intercept: coordinate where graph crosses the x-axis

y-intercept: coordinate where graph crosses the y-axis

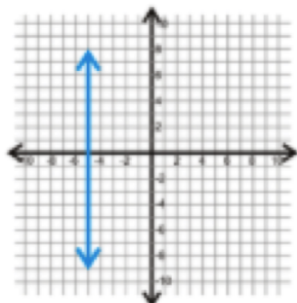


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The x-intercept is: (5, 0)

The y-intercept is: (0, 4)

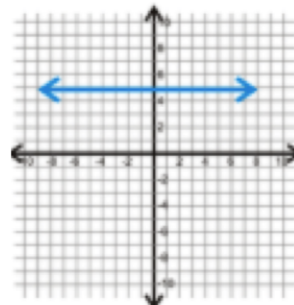


x-intercept?

(-5, 0)

y-intercept?

none



x-intercept?

none

y-intercept?

(0, 5)

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The **standard form** of a linear equation is: $Ax + By = C$

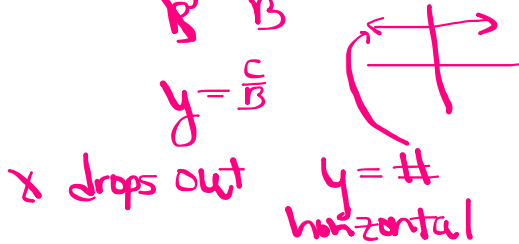
(A, B and C are real numbers; A and B are not both zero)

A cannot be negative and no fractions are allowed. $2x + 3y = 6$

What if **A is zero**?

$Ax + By = C$

~~$0x + By = C$~~
 $y = \frac{C}{B}$



What if **B is zero**?

$Ax + 0y = C$

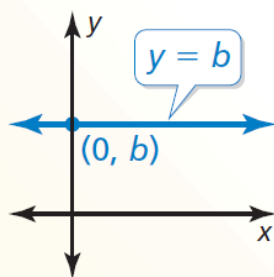
~~$Ax = C$~~
 $x = \frac{C}{A}$



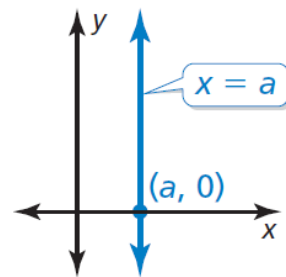
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Core Concept

Horizontal and Vertical Lines



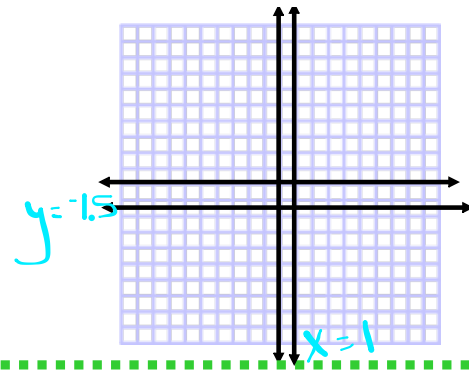
The graph of $y = b$ is a horizontal line. The line passes through the point $(0, b)$.



The graph of $x = a$ is a vertical line. The line passes through the point $(a, 0)$.

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Graph the following: $y = -1.5$ & $x = 1$



When an equation is in standard form, we can use the x and y intercepts to graph the equation very quickly:

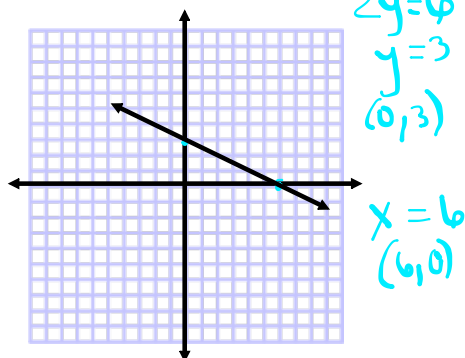
x-intercept: occurs when $y = 0$... so find it by substituting zero in for y in the equation.

y-intercept: occurs when $x = 0$... so find it by substituting zero in for x in the equation.

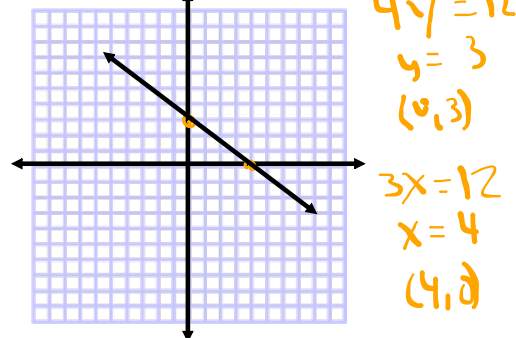
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Graph the following using the intercepts:

1. $x + 2y = 6$



2. $3x + 4y = 12$



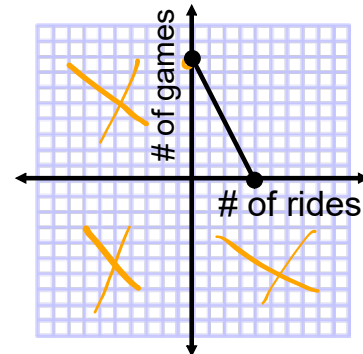
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You are going to the fair and have \$16 to spend on rides and games.
Ride tickets cost \$4 and game tickets cost \$2.

The equation $4x + 2y = 16$ models this situation, where x is
of rides and y is # of games.

Graph the equation and interpret the intercepts.

$$\begin{array}{l} 4x + 2(0) = 16 \\ 4x = 16 \\ x = 4 \\ (4, 0) \end{array} \quad \begin{array}{l} 4(0) + 2y = 16 \\ y = 8 \\ (0, 8) \end{array}$$



Find 4 possible solutions in the context of the problem.

x	$4x + 2y = 16$	y	
2	$4(2) + 2y = 16$	4	$(2, 4)$
3	$4(3) + 2y = 16$	2	$(3, 2)$
0	$4(0) + 2y = 16$	8	$(0, 8)$
1	$4(1) + 2y = 16$	6	$(1, 6)$

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HW 3.4 pg. 133:

A: 1, 2, 10, 12, 20 - 34 (e), 35, 39 - 42

B: 1, 2, 4 - 26 (e), 27, 30 - 34 (e), 39 - 42

C: 4, 8, 12, 18, 22, 26, 27, 30, 32, 39, 41

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