

Algebra 1 3.1

Identify linear equations, intercepts, and zeros

Graph linear equations

integer

linear equation

standard form

constant

variable

x-intercept

y-intercept

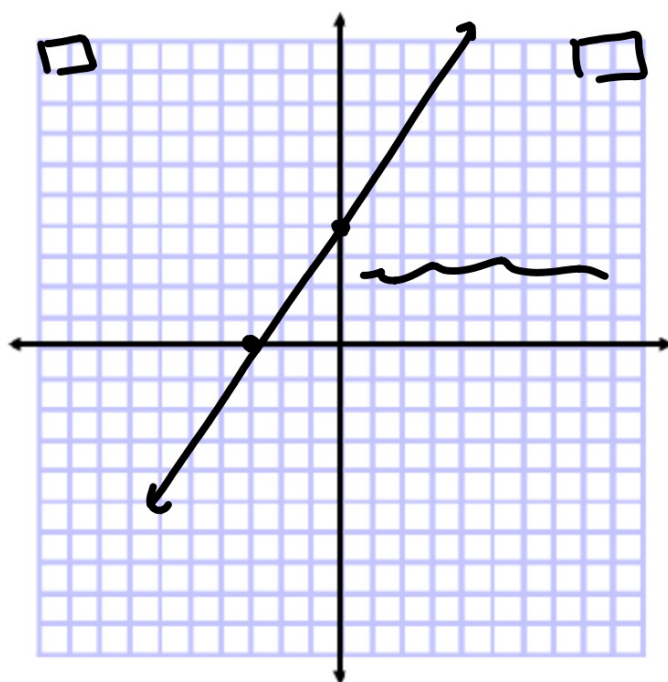
whiteboards

$$y = mx + b$$

$$A \cdot x + B \cdot y = C$$

$$(-3, 0)$$

$$(0, 4)$$



Graph each equation by using the x - and y -intercepts.

4A. $-x + 2y = 3$

4B. $y = -x - 5$

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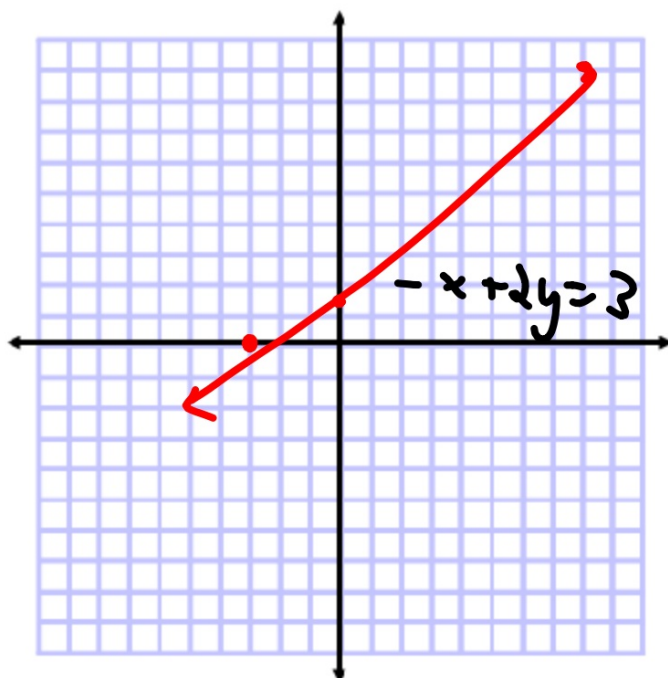
$(0, 1.5)$ y -int

$$-0 + 2y = 3$$
$$\frac{2y}{2} = \frac{3}{2}$$

$(-3, 0)$ x -int

$$-x + 2 \cdot 0 = 3$$

$$\frac{-x}{-1} = \frac{3}{-1}$$



 KeyConcept Standard Form of a Linear Equation

Words The standard form of a linear equation is $Ax + By = C$, where $A \geq 0$, A and B are not both zero, and A , B , and C are integers with a greatest common factor of 1.

Examples In $3x + 2y = 5$, $A = 3$, $B = 2$, and $C = 5$.
In $x = -7$, $A = 1$, $B = 0$, and $C = -7$.

$$3x + 2y = 5$$

$$A=3 \quad B=2 \quad C=5$$

- In order
- Integers
- no GCF
- *A is positive

$$Ax + By = C$$

Write in Std. form: Identify A, B, C

1) $A=5 \ B=-8 \ C=17$
 $5x - 8y = 17$

2) $3x + 6 = 2y$

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

3) $y = -5x + 7$
 ~~$+5x$~~ ~~$+5x$~~

$5x + y = 7$

$A=5$

$3x - 2y = -6$
 $A=3 \ B=-2 \ C=-6$
 $B=1 \ C=$

4) $\frac{-2x-8y=12}{-2 \quad -8 \quad -2}$

$-\frac{1}{2}x - 4y = \frac{6}{-2} \rightarrow x + 4y = -6$

$(1/2)x + (1/3)y = 5$

$A=1 \ B=4 \ C=-6$

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

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

$$\begin{array}{r} -\frac{1}{2}x \quad -\frac{1}{2}x \\ \hline \end{array}$$

$$\cdot 2 \cdot \quad \cdot 2 \cdot \quad \cdot 2 \cdot$$

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

$$\frac{-1x}{-1} + \frac{2y}{-1} = \frac{8}{-1}$$

$$1x - 2y = -8$$

$$A=1 \quad B=-2 \quad C=-8$$

$$\begin{array}{r} 8y = 4x - 16 \\ -4x \quad -4x \end{array}$$

$$\begin{array}{r} -4x + 8y = -16 \\ \underline{-4} \quad \underline{-4} \quad \underline{-4} \end{array}$$

$$x - 2y = 4 \quad A = 1 \quad B = -2 \quad C = 4$$

$$6 \cdot \frac{1}{2}x + 6 \cdot \frac{1}{3}y = 6 \cdot 5$$

$$3x + 2y = 30$$

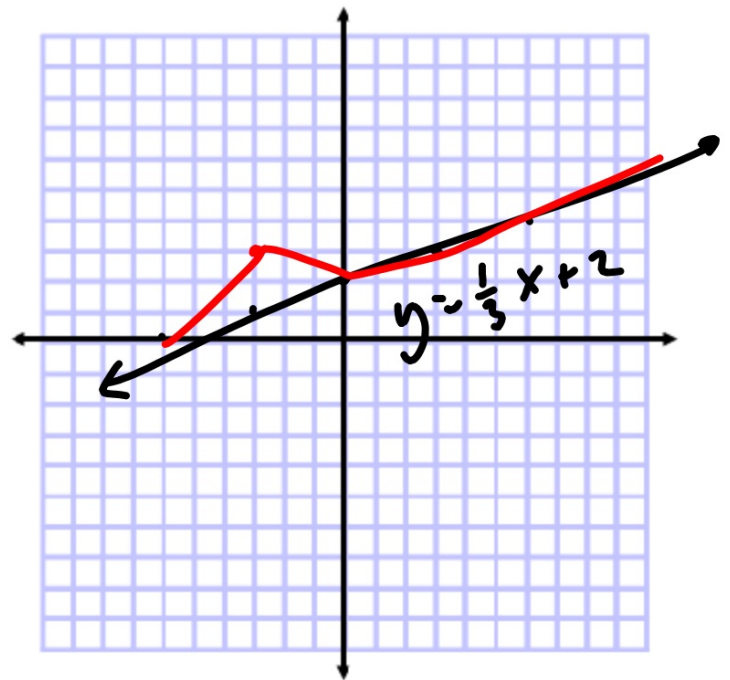
Example 5 Graph by Making a TableGraph $y = \frac{1}{3}x + 2$.

	$\frac{1}{3} \cdot x + 2$	
3	$\frac{1}{3} \cdot 3 + 2$	3
6	$\frac{1}{3} \cdot 6 + 2$	4
0	$\frac{1}{3} \cdot 0 + 2$	2
-3	$\frac{1}{3} \cdot -3 + 2$	1
-6	$\frac{1}{3} \cdot -6 + 2$	0

Table of values (TOV)

Choose 4 values for x:

1 pos, 1 neg, zero, cook's choice



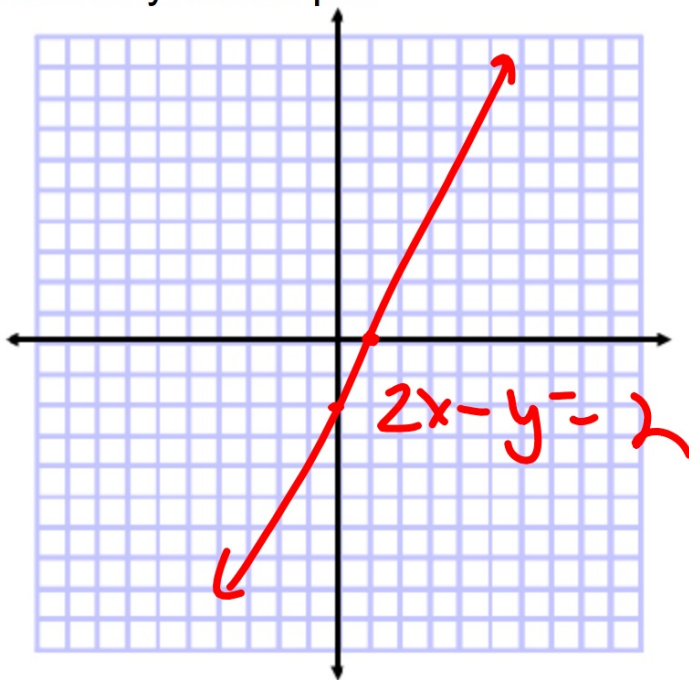
TOV: Solve for y first, OR use x&y intercepts
(Which would be easier?)

► **Guided Practice**

Graph each equation

5A. $2x - y = 2$

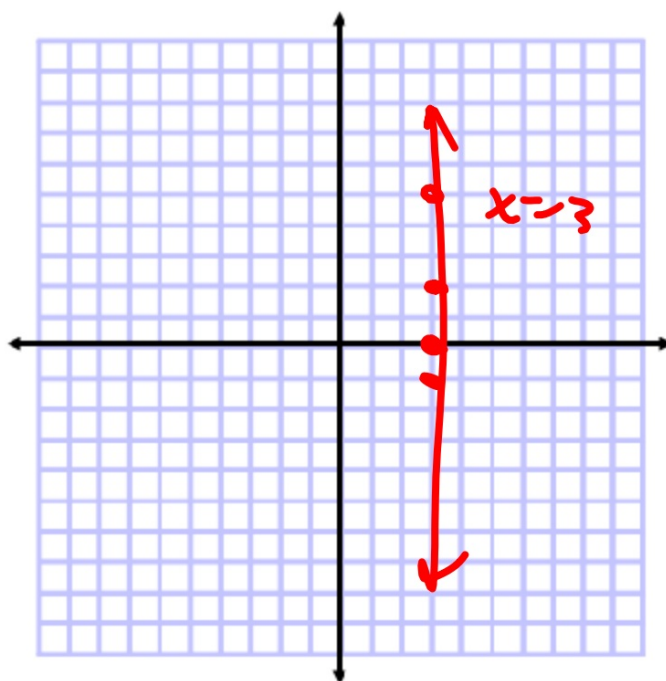
$$\begin{array}{l} (1, 0) \quad 2x = 2 \\ (0, -2) \quad -y = 2 \end{array}$$



Special cases:

5B. $x = 3$

3	0
3	5
3	2
3	-1



5C. $y = -2$

5	-2
0	-2
-1	-2
8	-2

