Algebra 1   3.1
Identify linear equations,
intercepts, and zeros
Graph linear equations

integer –
linear equation   x , y , numbers
standard form   no expon.
constant   ''   x·y
variable   '' var in denom
x-intercept
y-intercept

whiteboards

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 $C = -7$.

Format
GCF
Pos x

$3x + 2y = 5$

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

$y = +3x + 2$

$+3x \qquad +3x$

$3x + y = 2$

$A = 3$
$B = 1$
$C = 2$

$$y = \left(-\frac{1}{2}x\right) + 5$$

$$+\frac{1}{2}x \qquad +\frac{1}{2}x$$

$$2\left(\frac{1}{2}x + 1y = 5\right)$$

$$2\cdot\frac{1}{2} \quad 2\cdot 1 \quad 2\cdot 5$$

$$1x + 2y = 10$$

$$A = 1$$
$$B = 2$$
$$C = 10$$

How can I use what I know about intercepts?

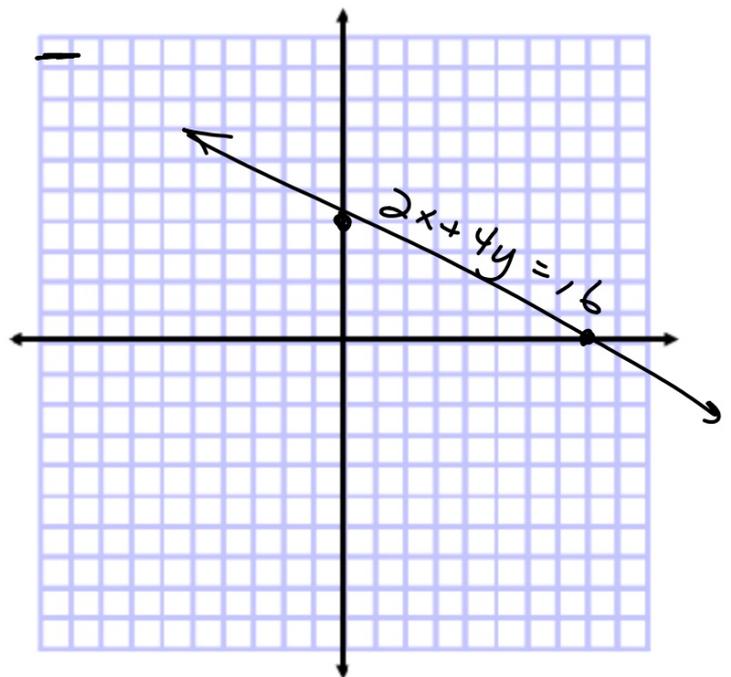**Example 4** Graph by Using Intercepts

Graph $2x + 4y = 16$ by using the x- and y-intercepts.

$(0, 4)$
y-int

$(8, 0)$
x-int

$2x + 4y = 16$

$2 \cdot 0 + 4y = 16$

$0 + 4y = 16$

$\dfrac{4y}{4} = \dfrac{16}{4}$

$2x + 4 \cdot 0 = 16$

$2x + 0 = 16$

$2x = 16$

$\dfrac{2x}{2} = \dfrac{16}{2}$

$x = 8$

Graph by making a table of values
y = 2x + 1

x	2x+1	
2	2·2+1	5
-1	2·-1+1	-1
0	2·0+1	1
1	2·1+1	3
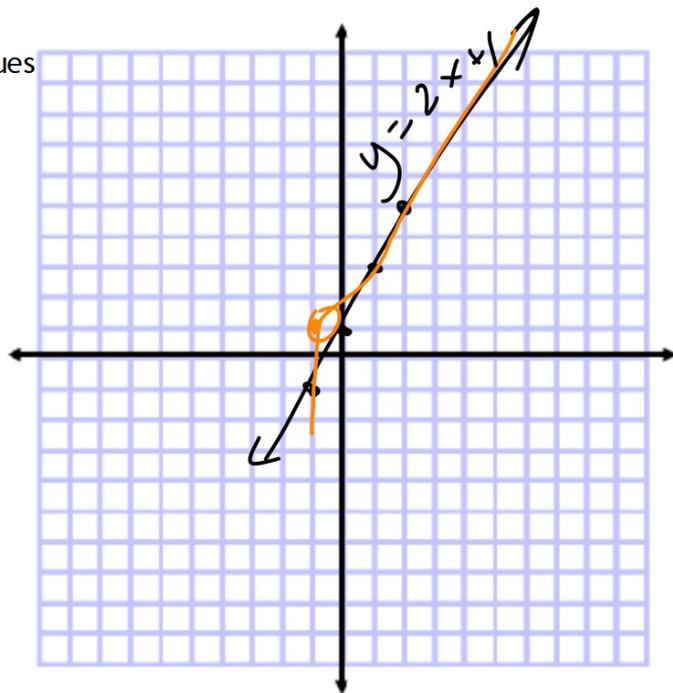
Example 5 Graph by Making a Table

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

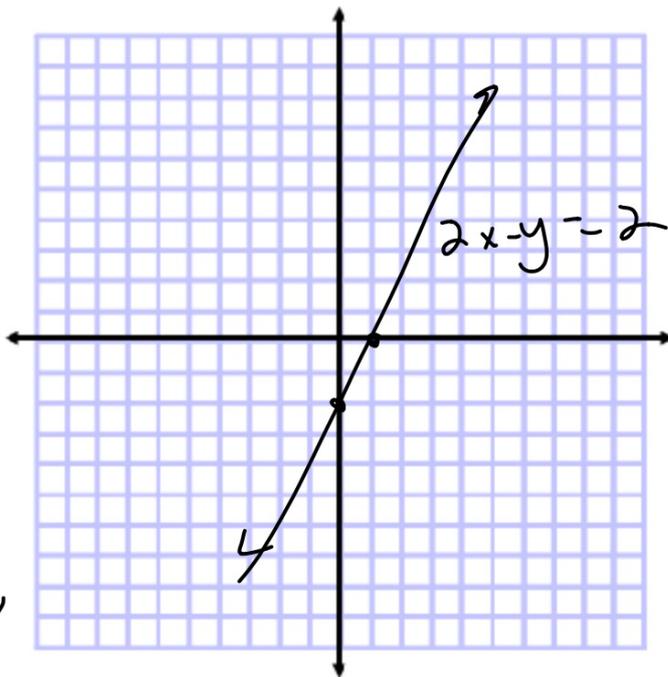| x	$\frac{1}{3}x + 2$	
-2	$\frac{1}{3} \cdot -2 + 2$ $-\frac{2}{3} + 2$	$1\frac{1}{3}$ ←
-1	$\frac{1}{3} \cdot -1 + 2$ $-\frac{1}{3} + 2$	$1\frac{2}{3}$
1	$\frac{1}{3} \cdot 1 + 2$ $\frac{1}{3} + 2$	$2\frac{1}{3}$
0	$\frac{1}{3} \cdot 0 + 2$	2
3	$\frac{1}{3} \cdot 3 + 2$ $1 + 2$	3

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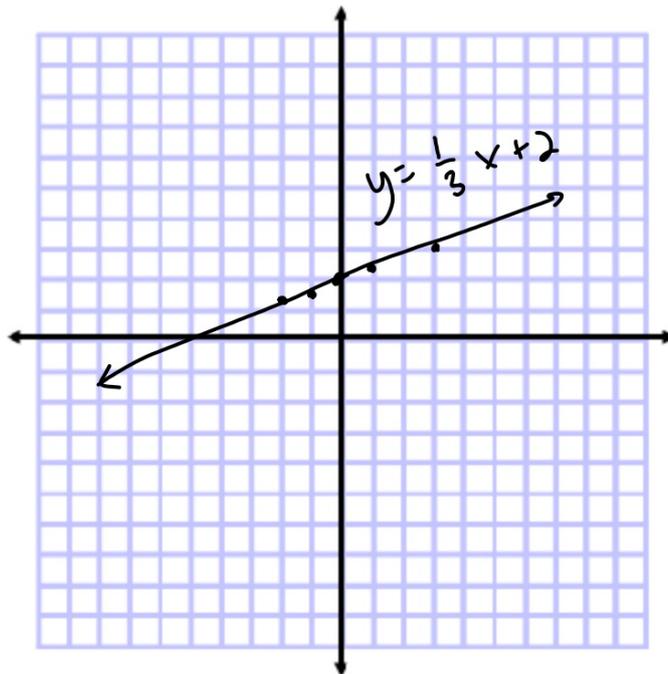
Solve for y

Graph each equation

5A. $2x - y = 2$

$(0, -2)$
y-int

$2 \cdot 0 - y = 2$
$0 - y = 2$
$\dfrac{-y}{-1} = \dfrac{2}{-1}$
$y = -2$

$(1, 0)$

$2x - 0 = 2$
$\dfrac{2x}{2} = \dfrac{2}{2}$ $x = 1$

$2x - y = 2$

You can only choose 3 for x

5B. $x = \overline{3}$
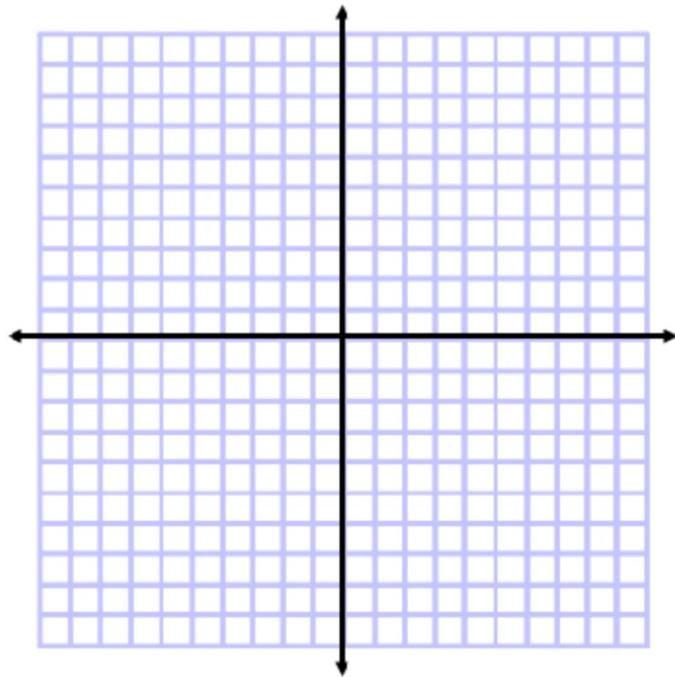
You will get -2 for y, no matter what.

5C. $y = -2$