

LESSON
5-7

Guided Notes

Slope-Intercept Form

An equation is in **slope-intercept form** if it is written as:

$$y = mx + b.$$

m is the slope.
 b is the y-intercept.

A line has a **slope of -4** and a **y-intercept of 3**. Write the equation in slope-intercept form.

$$y = mx + b$$

Substitute the given values for m and b .

$$y = -4x + 3$$

A line has a **slope of 2**. The ordered pair **(3, 1)** is on the line. Write the equation in slope-intercept form.

Step 1: Find the y-intercept.

$$y = mx + b$$

$$y = 2x + b$$

Substitute the given value for m .

$$1 = 2(3) + b$$

Substitute the given values for x and y .

$$1 = 6 + b$$

Solve for b .

$$\underline{-6} \quad \underline{-6}$$

$$-5 = b$$

Step 2: Write the equation.

$$y = mx + b$$

$$y = 2x - 5$$

Substitute the given value for m and the value you found for b .

Write the equation that describes each line in slope-intercept form.

1. slope = $\frac{1}{4}$, y-intercept = 3

$$y = \frac{1}{4}x + 3$$

2. slope = -5, y-intercept = 0

$$y = -5x + 0$$

$$y = -5x$$

3. slope = 7, y-intercept = -2

$$y = 7x + (-2)$$

$$y = 7x - 2$$

4. slope is 3, (4, 6) is on the line.

$m \times y$

$$y = mx + b$$

$$(6) = (3)(4) + b \quad \frac{-12 \quad -12}{-12 \quad -12}$$

$$b = 12 + b$$

$$\underline{-12} \quad \underline{-12}$$

$$-b = b$$

$$y = 3x + (-6)$$

$$y = 3x - 6$$

5. slope is $\frac{1}{2}$, (-2, 8) is on the line.

$m \times y$

$$y = mx + b$$

$$(8) = (\frac{1}{2})(-2) + b \quad \frac{+1 \quad +1}{+1 \quad +1}$$

$$8 = -1 + b$$

$$\underline{+1} \quad \underline{+1}$$

$$9 = b$$

$$y = \frac{1}{2}x + 9$$

6. slope is -1, (5, -2) is on the line.

$m \times y$

$$y = mx + b$$

$$y = mx + b \quad (-2) = (-1)(5) + b \quad \frac{+5 \quad +5}{+5 \quad +5}$$

$$-2 = -5 + b$$

$$\underline{+5} \quad \underline{+5}$$

$$3 = b$$

$$y = -1x + 3$$

$$y = -x + 3$$

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Slope-Intercept Form *continued*

You can use the slope and y-intercept to graph a line.

Write $2x + 6y = 12$ in slope-intercept form. Then graph the line.

Step 1: Solve for y .

$$2x + 6y = 12 \quad \text{Subtract } 2x \text{ from both sides.}$$

$$\begin{array}{r} -2x \\ \hline 6y = -2x + 12 \end{array}$$

$$\frac{6y}{6} = \frac{-2x + 12}{6} \quad \text{Divide both sides by 6.}$$

$$y = -\frac{1}{3}x + 2 \quad \text{Simplify.}$$

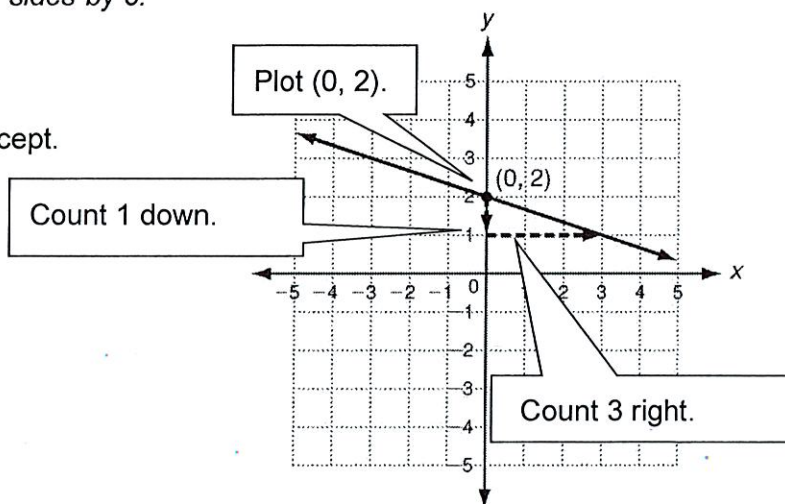
Step 2: Find the slope and y-intercept.

$$\text{slope: } m = -\frac{1}{3} = -\frac{1}{3}$$

$$\text{y-intercept: } b = 2$$

Step 3: Graph the line.

- Plot $(0, 2)$.
- Then count 1 **down** (because the rise is **negative**) and 3 **right** (because the run is **positive**) and plot another point.
- Draw a line connecting the points.



Write the following equations in slope-intercept form.

7. $5x + y = 30$
 $-5x \quad -5x$

$$y = 30 - 5x$$

$$y = -5x + 30$$

$$y = mx + b$$

$$m = -5 \quad b = 30$$

8. $x - y = 7$

$-x \quad -x$

$$\frac{-y}{-1} = \frac{7}{-1} - \frac{x}{-1}$$

$y = -7 + x$

$y = x - 7$

9. $-4x + 3y = 12$

$+4x \quad +4x$

$$\frac{3y}{3} = \frac{12}{3} + \frac{4x}{3}$$

$y = 4 + \frac{4x}{3}$

$y = \frac{4}{3}x + 4$

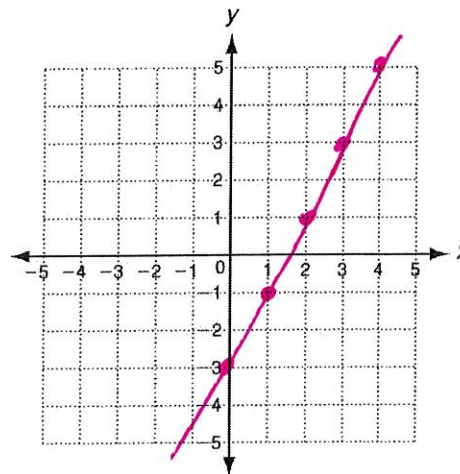
10. Write $2x - y = 3$ in slope-intercept form. Then graph the line.

$2x - y = 3$

$-y = 3 - 2x$

$y = -3 + 2x$

$y = 2x - 3$



$m = \frac{2}{1}$ $b = -3$

to graph
 → plot b
 → use m to find the next points

