Objective

The student will be able to:

1) write equations using slope-intercept form.
2) identify slope and y-intercept from an equation.
3) write equations in standard form.

SOL: A.6b

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Important!!!

This is one of the big concepts in Algebra 1. You need to thoroughly understand this!

Slope – Intercept Form

$$y = mx + b$$

m represents the slope

b represents the y-intercept

Writing Equations

When asked to write an equation, you need to know two things – slope (m) and y-intercept (b).

There are three types of problems you will face.

Writing Equations – Type #1

Write an equation in slope-intercept form of the line that has a slope of 2 and a y-intercept of 6.

To write an equation, you need two things:

slope (m) = **2**

y – intercept (b) = **6**

We have both!! Plug them into slope-intercept form

$$y = mx + b$$

$$\downarrow \quad \downarrow$$

$$\mathbf{y = 2x + 6}$$

Write the equation of a line that has a y-intercept of -3 and a slope of -4.

1. $y = -3x - 4$
2. ✓ $y = -4x - 3$
3. $y = -3x + 4$
4. $y = -4x + 3$

Writing Equations – Type #2

Write an equation of the line that has a slope of 3 and goes through the point (2,1).

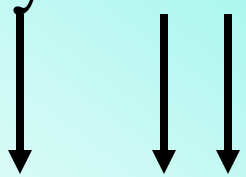
To write an equation, you need two things:

slope (m) = **3**

y – intercept (b) = **???**

We have to find the y-intercept!! Plug in the slope and ordered pair into

$$y = mx + b$$



$$\mathbf{1 = 3(2) + b}$$

Writing Equations – Type #2

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

Solve the equation for b

$$1 = 6 + b$$
$$-6 \quad -6$$
$$-5 = b$$

To write an equation, you need two things:

slope (m) = **3**

y – intercept (b) = **-5**

y = 3x - 5

Writing Equations – Type #3

Write an equation of the line that goes through the points (-2, 1) and (4, 2).

To write an equation, you need two things:

slope (m) = ???

y – intercept (b) = ???

We need both!! First, we have to find the slope. Plug the points into the slope formula.

$$m = \frac{2-1}{4-(-2)}$$

Simplify $m = \frac{1}{6}$

Writing Equations – Type #3

Write an equation of the line that goes through the points (-2, 1) and (4, 2).

To write an equation, you need two things:

slope (m) = $\frac{1}{6}$

y – intercept (b) = **???**

It's now a Type #2 problem. Pick one of the ordered pairs to plug into the equation. Which one looks easiest to use?

I'm using (4, 2) because both numbers are positive.

$$2 = \frac{1}{6}(4) + b$$

Writing Equations – Type #3

$$2 = \frac{1}{6}(4) + b$$

Solve the equation for b

$$2 = \frac{2}{3} + b$$

$$-\frac{2}{3} \quad -\frac{2}{3}$$

$$1\frac{1}{3} = b$$

To write an equation, you need two things:

slope (m) = $\frac{1}{6}$

y – intercept (b) = $1\frac{1}{3}$

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

Write an equation of the line that goes through the points (0, 1) and (1, 4).

1. $y = 3x + 4$
2. $y = 3x + 1$ ✓
3. $y = -3x + 4$
4. $y = -3x + 1$

To find the slope and y-intercept of an equation, write the equation in slope-intercept form: $y = mx + b$.

Find the slope and y-intercept.

1) $y = 3x - 7$

$y = \mathbf{m}x + \mathbf{b}$

$m = 3, b = -7$

Find the slope and y-intercept.

2) $y = \frac{2}{3}x$

$y = \mathbf{m}x + \mathbf{b}$

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

$m = \frac{2}{3}$

$b = 0$

3) $y = 5$

$y = \mathbf{m}x + \mathbf{b}$

$y = 0x + 5$

$m = 0$

$b = 5$

Find the slope and y-intercept.

4) $5x - 3y = 6$

Write it in slope-intercept form. ($y = mx + b$)

$$5x - 3y = 6$$

$$\frac{-3y}{-3} = \frac{-5x}{-3} + \frac{6}{-3}$$

$$y = \frac{5}{3}x - 2$$

$m = \frac{5}{3}$

$b = -2$

Find the slope and y-intercept.

5) $2y + 2 = 4x$

Write it in slope-intercept form. ($y = mx + b$)

$$2y + 2 = 4x$$

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

$$y = 2x - 1$$

$m = 2$

$b = -1$

Find the slope and y-intercept of $y = -2x + 4$

1. $m = 2; b = 4$
2. $m = 4; b = 2$
3. ✓ $m = -2; b = 4$
4. $m = 4; b = -2$

Write your equation in STANDARD form given $m = -\frac{1}{3}$ and $b = 2$.

First, write in slope-intercept form:

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

Now, write it in standard form.

(Ax + By = C where A, B, and C are integers).

Clear the fractions - multiply everything by 3.

$$(3)y = (3)(-\frac{1}{3}x) + (3)2$$

$$3y = -x + 6$$

Get the variables on the same side.

$x + 3y = 6$

Write the standard form for a line passing through the points (-1, -3) and (-4, 6).

Oh no! This is a Type #3 problem! Find slope…

$$m = \frac{6-(-3)}{-4-(-1)} = \frac{9}{-3} = -3$$

Find y-intercept. I'm choosing the point (-4, 6).

$$6 = -3(-4) + b$$

$$6 = 12 + b$$

$$-6 = b$$

Slope-intercept form: $y = -3x - 6$

Standard form: **$3x + y = -6$**