Math 10 Chapter 7

Equations Using Slope Intercept Form

Worksheet 1

1. Convert each equation into standard form:

a) $y = \frac{2}{3}x + 3$ b) $y = -\frac{3}{2}x + 2$ c) $y = \frac{1}{2}x - \frac{1}{3}$

d) $y = -3x - 1$ e) $y = 2x - 4$ f) $y = 2x + 5$

2. Convert each equation into slope intercept form:

a) $3x + y - 4 = 0$ b) $2x - y + 3 = 0$ c) $x + y + 1 = 0$

d) $2x + 3y - 5 = 0$ e) $3x - 2y + 1 = 0$ f) $x + 2y - 4 = 0$

3. Determine the equation of each line with the given slope and coordinate. Give your answer in both slope intercept format and standard form.

a) $m = 2$; A(3,2) b) $m = 1$; P(-2,-3) c) $m = 3$; x-intercept 5

d) $m = \frac{2}{3}$; B(2,3) e) $m = -\frac{2}{5}$; Q(1,5) f) $m = 1$; y-intercept –2

g) $m = \frac{4}{3}$; C(7,5) h) $m = -2$; R(0,5) i) $m = -1$; x-intercept $\frac{1}{2}$

4. From each pair of coordinates, determine the equation of the line in slope intercept form.

a) A(2,4) ; B(5, 2) b) M(-1,3) ; N(2,1) c) O(0,0) ; P(3, 7)

7.3 Warm-Up

1. Rewrite each equation in general form.

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

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

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

$3y = 2x + 3$

$-3y \quad -3y$

$2x - 3y + 3 = 0$

b) $y = -\frac{1}{5}x - 3$

$5y = 5\left(-\frac{1}{5}x - 3\right)$

$5y = -1x - 15$

$0 = -1x - 5y - 15$

$x + 5y + 15 = 0$

2. Rewrite each equation in general form.

a) $y - 3 = 2(x + 5)$

$y - 3 = 2x + 10$

$-y + 3 \quad -y + 3$

$0 = 2x - y + 13$

b) $y + 2 = 4(x - 1)$

$y + 2 = 4x - 4$

$-y - 2 \quad -y - 2$

$0 = 4x - y - 6$

3. Simplify.

a) $2\left[\frac{3}{2}(x - 4)\right]$

$2\left[\frac{3}{2}x - 6\right]$

$3x - 12$

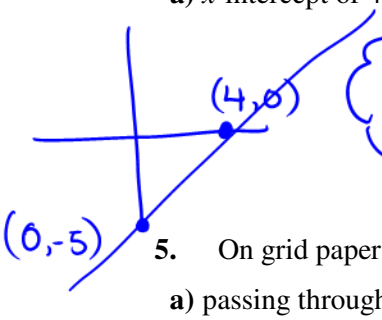
b) $5\left[\frac{4}{5}(x - 1)\right]$

$5\left[\frac{4}{5}x - \frac{4}{5}\right]$

$4x - 4$

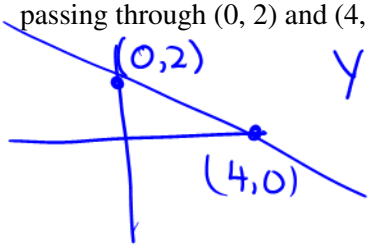
4. Visualize each of the following lines. Then, write the equation in slope-intercept form.

a) x-intercept of 4 and y-intercept of –5



$y = +\frac{5}{4}x - 5$

b) passing through (0, 2) and (4, 0)



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

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

5. On grid paper, draw each line. Then, write the equation of the line in slope-intercept form.

a) passing through (2, 5) and (–1, –4)

b) passing through (–3, 6) and (0, 0)

7.3 Slope-Point Form

can be used when the y-intercept is not obvious and you can't easily find slope-intercept form

Objectives:
- Write an equation using the slope-point form
- Determine the equation of a line using two points

We've seen two ways to write the equation of a non-vertical line:

a) slope intercept form $y = mx + b$

b) general form $0 = Ax + By + C$

There is a third way called the slope - point form.

Use the point-slope method to find the equation of a line with a slope of 2 and passing through (1,3).

Step1:
Use the equation for slope. We only know one coordinate, so we'll use (x,y) to represent another, unknown coordinate.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$m = 2$ $(1,3)$ (x,y)

Multiply both sides of the equation by the denominator:

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

$$2(x-1) = y-3$$

Your new equation shows both the coordinates of the known point and also shows the slope of the line

The point-slope equation of a line is written using

1) Slope m
2) A point (x_1, y_1)

$$y - y_1 = m(x - x_1)$$

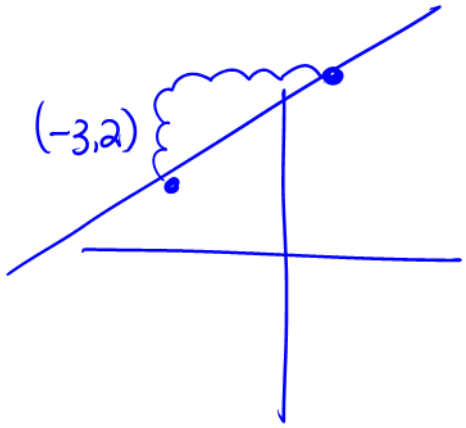
the "−" signs in the formula make the x and y values appear to switch signs.

Write the point-slope equation for each line:

Slope of -3 and passing through (2,5)	$m = \frac{2}{3}$ and passing through (4,1)	$m = \frac{3}{4}$ and passing through (-2,3)
$y - y_1 = m(x - x_1)$	$y - 1 = \frac{2}{3}(x - 4)$	$y - 3 = \frac{3}{4}(x + 2)$
$y - 5 = -3(x - 2)$		

$y - 2 = \frac{3}{4}(x + 3)$

$m = \frac{3}{4}$ $(-3, 2)$



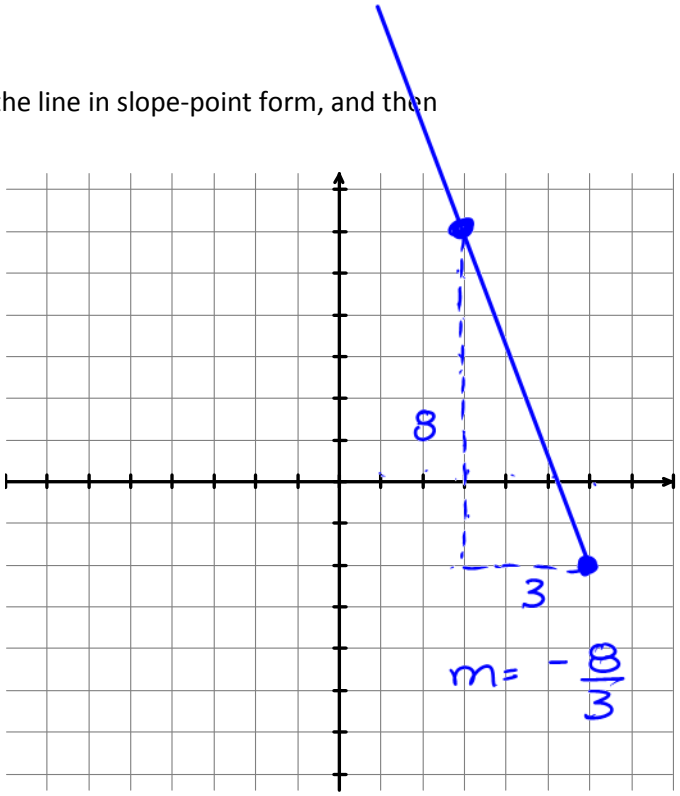
A line passes through (3,6) and (6,-2). Find the equation of the line in slope-point form, and then convert to both slope intercept and general form.

1. Find the slope first.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-2-6}{6-3}$$

$$m = \frac{-8}{3}$$



2. Use one of the coordinates to write the equation of the line in slope-point form:

(6,-2) or (3,6)

$$y - y_1 = m(x - x_1)$$

$$y + 2 = -\frac{8}{3}(x - 6)$$

$$y - 6 = -\frac{8}{3}(x - 3)$$

even though these have different numbers, they really are the same equation.

Slope Intercept

$$y + 2 = -\frac{8}{3}(x - 6)$$

$$y + 2 = -\frac{8}{3}x + 16$$

$$-2 \qquad -2$$

$$y = -\frac{8}{3}x + 14$$

General Form

$$y + 2 = -\frac{8}{3}(x - 6)$$

$$3(y+2) = 3\left(-\frac{8}{3}(x-6)\right)$$

$$3y + 6 = 3\left(-\frac{8}{3}x + 16\right)$$

$$3y + 6 = -8x + 48$$

$$-3y - 6 \qquad -3y - 6$$

$$0 = -8x - 3y + 42$$

rate = slope

The SDSS Mathletes are ordering team shirts. There is a set up fee, and the cost is $8 per shirt, where the number of shirts is represented by n. 8 shirts costs $89.

The total cost is C

1. Which should be the independent variable?

n : shirts
C : total cost.

(n, C)
(8, 89)

n = 8

2. What is the equation for this line in slope-point form?

$y - 89 = 8(x - 8)$

$C - 89 = 8(n - 8)$

3. What is the setup fee?

0 shirts means all cost is setup fee

$C - 89 = 8(0 - 8)$

$C - 89 = -64$

$+89 \quad +89$

$C = 25$

the setup fee is $25

4. How many shirts were bought if the total cost is $121?

$121 - 89 = 8(n - 8)$

$121 - 25 =$ shirts only

$96 = 8n$

$\frac{96}{8} = 12$

$n = 12$ shirts

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