

6.1-6.3: Forms of Linear Equations

Fill in each of the three general forms of linear equations:

Slope-Intercept	Point-Slope	Standard
$y = mx + b$	$y - y_1 = m(x - x_1)$	$Ax + By = C$

1. A line passes through the points $(-2, 3)$ and $(-5, -3)$. Determine the point-slope, slope-intercept, and standard forms of the equation.

$$m = \frac{-3 - 3}{-5 - 2} = \frac{-6}{-3} = 2$$

Pt-Slope:

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

or

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

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

$$y = 2x + 7$$

Slope-int

Standard:

$$-2x + y = 7$$

Write a linear equation for each described line. You must use each form at least one time in the four problems below:

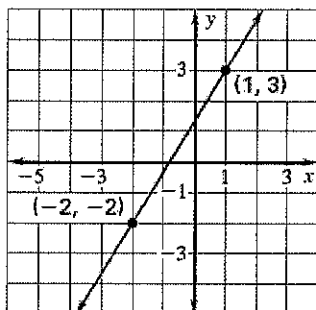
2. $m = \frac{3 + 2}{1 + 2} = \frac{5}{3}$

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

$$y + 2 = \frac{5}{3}x + \frac{10}{3}$$

$$y = \frac{5}{3}x + \frac{4}{3}$$

$$-5x + 3y = 4$$

3. Slope of $\frac{4}{5}$ and through $(0, 15)$

$$y = \frac{4}{5}x + 15$$

$$y - 15 = \frac{4}{5}(x - 0)$$

$$-4x + 5y = 75$$

4. Through $(3, -8)$ and $(5, -9)$

$$m = \frac{-9 + 8}{5 - 3} = \frac{-1}{2}$$

$$y + 8 = -\frac{1}{2}(x - 3)$$

$$y + 8 = -\frac{1}{2}x + \frac{3}{2}$$

$$y = -\frac{1}{2}x - \frac{13}{2}$$

$$x + 2y = -13$$

5. Through $(7, -3)$ and $(4, 1)$

$$m = \frac{1 + 3}{4 - 7} = \frac{4}{-3}$$

$$y - 1 = -\frac{4}{3}(x - 4)$$

$$y - 1 = -\frac{4}{3}x + \frac{16}{3}$$

$$y = -\frac{4}{3}x + \frac{19}{3}$$

$$4x + 3y = 19$$

6. Which of the given lines has a slope of -3 and passes through the point (-4, 5).

A. ~~$y = -3x + 5$~~

B. $6x + 2y = -14$

C. $y + 4 = -3(x - 5)$

D. $-4x + 5y = -3$

$$y - 5 = -3(x + 4)$$

$$y - 5 = -3x - 12$$

$$y = -3x - 7$$

$$3x + y = -7$$

7. Write the equation of a vertical line that passes through the point (-3, 7)

$$x = -3$$

8. Write the equation of the horizontal line that passes through the point (-3, 7)

$$y = 7$$

9. Mr. Kimball receives a \$3000 annual salary increase on the anniversary of his hiring if he receives a satisfactory performance review. His starting salary was \$41,250.

A. Write an equation to show s , Mr. Kimball's salary after x years at this company if his performance reviews are always satisfactory.

$$(0, 41,250)$$

$$y = 3000x + 41,250$$

B. What form did you use?

slope-intercept

C. Find the x-intercept for your equation. Is the x-intercept a valid point for the situation? Why or why not?

$$0 = 3000x + 41,250$$

$$x = -13.75$$

No valid; can't have negative years

10. The table shows how women's shoe sizes in the United Kingdom compare to women's shoe sizes in the United States.

Women's Shoe Sizes							
UK	3	3.5	4	4.5	5	5.5	6
US	5.5	6	6.5	7	7.5	8	8.5

A. Write a linear equation to determine any U.S. size if you are given the U.K. size.

$$(3, 5.5) \quad (3.5, 6) \quad y - 5.5 = 1(x - 3)$$

$$m = \frac{.5}{.5} = 1$$

B. What form did you use?

Point-Slope (can use any)

C. Find the y-intercept of your equation. Is the y-intercept a valid point for the given information? Why or why not?

$$y - 5.5 = x - 3$$

$$y = x + 2.5 \quad \text{the UK}$$

$$y\text{-int } (0, 2.5)$$

Not valid; would not have a size 0 in