

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.

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

Point-Slope: $y - 3 = 2(x + 2)$

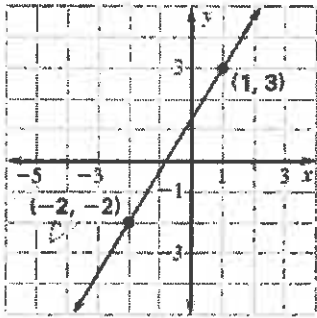
Slope-Intercept: $y = 2x + 7$

Standard: $-2x + y = 7$

Write a linear equation for each described line in the form requested.

2. Slope-intercept Form

$m = \frac{3+2}{1+2} = \frac{5}{3}$
 $y + 2 = \frac{5}{3}(x + 2)$
 $y + 2 = \frac{5}{3}x + \frac{10}{3}$
 $y = \frac{5}{3}x + \frac{10}{3} - \frac{6}{3}$
 $y = \frac{5}{3}x + \frac{4}{3}$



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

Standard Form

$y = \frac{4}{5}x + 15$
 $5y = 4x + 75$
 $-4x + 5y = 75$

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

Point-Slope Form

$m = \frac{-9+8}{5-3} = \frac{-1}{2}$
 $y + 8 = -\frac{1}{2}(x - 3)$

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

Standard Form

$m = \frac{1+3}{4-7} = \frac{4}{-3} = -\frac{4}{3}$
 $y + 3 = -\frac{4}{3}(x - 7)$
 $y + 3 = -\frac{4}{3}x + \frac{28}{3}$
 $3y + 9 = -4x + 28$
 $3y = -4x + 19$
 $4x + 3y = 19$

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

- A. $y = -3x + 5$ $5 = 12 + 5$
 B. $6x + 2y = -14$ $m = -3$ $-24 + 10 = -14$
 C. $y + 4 = -3(x - 5)$ $5 + 4 = -3(-4 - 5)$
 D. $-4x + 5y = -3$ $m = \frac{4}{5}$

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

$$x = -3$$

8. Write the following linear equation in slope-intercept form. Then write three other points that will be on the line.

$5x - 2y = 6$
 $-2y = -5x + 6$ Start from (0, -3)
 Add 5 to y and 2 to x
 $y = \frac{5}{2}x - 3$ (2, 2) (4, 7) (6, 12)

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

$$y = 7$$

10. 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.

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

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

$0 = 41,250 + 3000x$
 $-41,250 = 3000x$
 $-13.75 = x$ Negative # of years
 (-13.75, 0) is NOT valid

C. How much money will Mr. Kimball have after 10 years?

$s = 41,250 + 3000(10)$
 $s = 71,250$

D. How long will it take him to exceed \$60,000?

$60,000 = 41,250 + 3000x$
 $18750 = 3000x$
 $x = 6.25$ years

11. 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							
U.K.	3	3.5	4	4.5	5	5.5	6
U.S.	3.5	4	4.5	5	5.5	6	6.5

A. Write a linear equation in slope-intercept form to determine any U.S. size if you are given the U.K. size.

$m = \frac{.5}{.5} = 1$ $y - 5.5 = 1(x - 3)$
 $y - 5.5 = x - 3$
 $y = x + 2.5$

B. Write the equation in standard and point-slope form.

$-x + y = 2.5$ $\left\{ \begin{array}{l} y - 5.5 = 1(x - 3) \end{array} \right.$

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

y-int (0, 2.5)
 Not valid. Can't have a shoe size of 0 in the UK