

Outcome 9 Review – Foundations and Pre-Calculus 10

Level 2

Example: Writing an equation in slope intercept form

Slope-Intercept Form: $y = mx + b$

$m = \text{slope}$

$b = \text{y-intercept}$

Ex : Write the equation of a line that has a y-intercept of 3 and a slope of -4 in slope-intercept form

$$Y = mx + b$$

Our $m = -4$ our $b = 3$ so: $y = -4x + 3$

Ex : Write the equation of a line in slope-intercept form that has a slope of $\frac{2}{3}$ and a y-intercept of -5

Our $m = \frac{2}{3}$ and $b = -5$ so: $y = \frac{2}{3}x - 5$

1. Write the equation of the following lines in slope intercept form

a) Slope of -8, y-intercept of 6

c) Slope of 4 and a y-intercept of -2

b) Slope of $-\frac{5}{3}$ and y-intercept of 0

d) Slope of 1 and a y-intercept of $\frac{5}{2}$

Example: Writing the equation of a line in slope-point form

Slope-Point form: $y - y_1 = m(x - x_1)$

$m = \text{slope}$

$(x_1, y_1) = \text{point}$ ***Remember to change the signs on the point coordinates only

Ex: Write the equation of a line in slope-point form passing through (-4,7) and a slope of -3

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

Our m is -3 with a point of (-4, 7) so: $y - 7 = -3(x + 4)$

Ex: Write the equation of a line in slope-point form passing through (2,-5) and a slope of 9

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

Our m is 9 with a point of (2,-5) so: $y + 5 = 9(x - 2)$

2. Write the equations of the following lines in slope-point form

a) Slope of -5 and goes through (-3, -6)

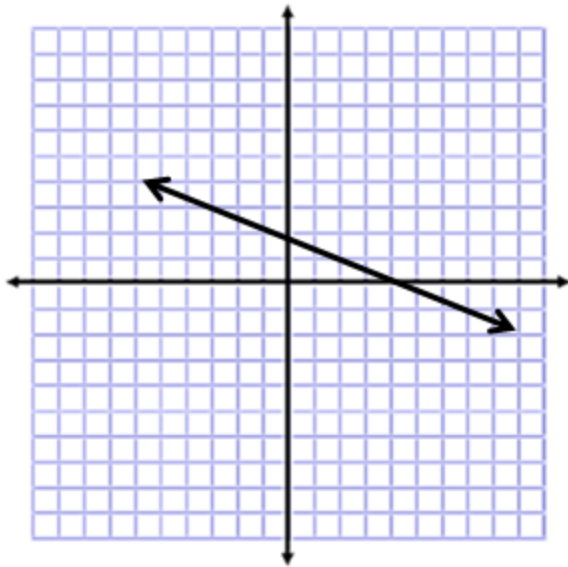
c) Slope of 3 and goes through (9,-7)

b) Slope of -1 and goes through (3,7)

d) Slope of 7 and goes through (-8,2)

Level 3

Example: Writing equations from a graph



Step number 1: Determine the b value. Remember b = y-intercept. On our graph the b = 2

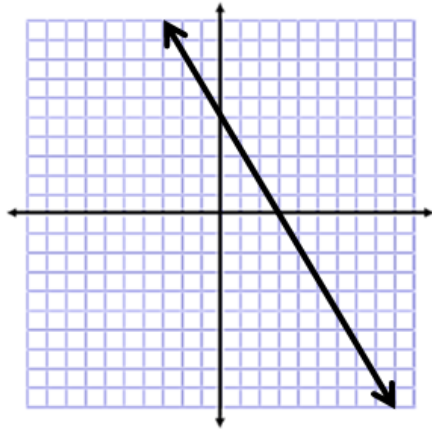
Step number 2: Determine the slope. Find two points and do rise/run.

On our graph the $m = -2/4 = -1/2$

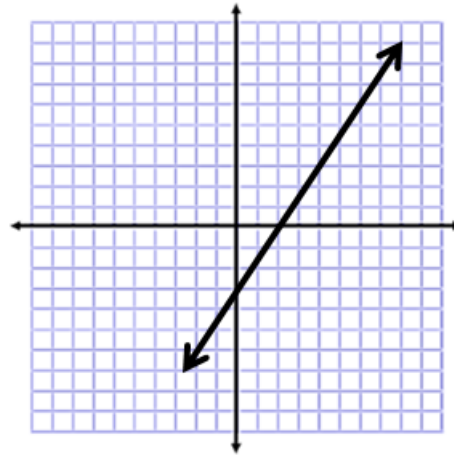
Step number 3: Substitute into $y = mx + b$. For our graph: $y = -\frac{1}{2}x + 2$

3. Determine the equation of each graph below

a)



b)



Example: Writing the equation of a line in General Form

General Form: $Ax + By + C = 0$

Rules:

1. Must = 0
2. No fractions or decimals allowed
3. First term (Ax) must be positive

Ex. Write the equation of a line in general form with a slope of 4 and goes through the point (-5, 8)

Step 1: Write equation in slope: point form $y - y_1 = m(x - x_1)$

$$y - 8 = 4(x + 5)$$

Step 2: Distribute through the brackets (Multiply)

$$y - 8 = 4x + 20$$

Step 3: Move terms on right hand side to left hand side by doing inverse operations to make it =0

$$\begin{array}{r} y - 8 = 4x + 20 \\ -4x \quad + 20 \quad -4x \quad - 20 \end{array}$$

$$-4x + y + 12 = 0$$

Step 4 – Check first term. Since -4x is negative, you must either multiply or divide the entire equation by -1

$$-1(-4x + y + 12 = 0)$$

$$4x - y - 12 = 0$$

4. Write the following equations in general form

a) Slope of 9 and goes through (-6, 2)

b) Slope of -4 and goes through (2, -3)

c) Slope of 3 and with an x-intercept of -7

Example: Writing the equation of a line in slope-intercept form ($y = mx + b$)

Ex. Write the equation of a line with a slope of 6 and goes through (-3, -5) in slope-intercept form

Step 1: Write equation in slope: point form $y - y_1 = m(x - x_1)$

$$y + 5 = 6(x + 3)$$

Step 2: Distribute through the brackets

$$y - 8 = 6x + 18$$

Step 3: Now get the y by itself

$$y - 8 = 6x + 18$$

$$+8 \quad +8$$

$$y = 6x + 26$$

5. Write the following equation in slope intercept form

a) Slope of 5 and goes through (4, -6)

b) Slope of -2 and goes through (-3, 4)

c) Slope of 4 with an x-intercept of 5

Example: Writing the equation of a line in General form with a fractional slope

Ex. Write the equation of a line with a slope of $-\frac{2}{3}$ and goes through (8, -5)

Step 1: Write equation in slope: point form $y - y_1 = m(x - x_1)$

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

Step 2: Distribute through the brackets (Multiply numerator only)

$$y + 5 = -\frac{2}{3}x + \frac{16}{3}$$

Step 3: Get rid of the fraction by multiply each term with the common denominator

-in our example, the denominator is 3

$$3(y + 5) = -\frac{2}{3}x + \frac{16}{3}$$

$$3y + 15 = -\frac{6}{3}x + \frac{48}{3}$$

Now divide your fractions

$$3y + 15 = -2x + 16$$

Step 4: The question wanted general form ($Ax + By + C = 0$). So follow the rules of general form

$$\begin{array}{r} 3y + 15 = -2x + 16 \\ +2x \quad -16 \quad +2x \quad -16 \end{array}$$

$$2x + 3y - 1 = 0$$

6. Write the following equations in general form

a) Slope of $-\frac{5}{7}$ and goes through (4, 6)

b) Slope of $\frac{2}{5}$ and goes through (-2, 3)

Example: Writing the equation of a line in slope-intercept form with a fractional slope

Ex. Write the equation of a line with a slope of $-\frac{5}{4}$ and goes through (-5, 2)

Step 1: Write equation in slope: point form $y - y_1 = m(x - x_1)$

$$y - 2 = -\frac{5}{4}(x + 5)$$

Step 2: Distribute through the brackets (Multiply numerator only)

$$y - 2 = -\frac{5}{4}x - \frac{25}{4}$$

Step 3: Get rid of the fraction by multiply each term with the common denominator

-in our example, the denominator is 4

$$4(y - 2) = -\frac{5}{4}x - \frac{25}{4}$$

$$4y - 8 = -\frac{20}{4}x - \frac{100}{4}$$

Now divide your fractions:

$$4y - 8 = -5x - 25$$

Step 4: The question wanted slope intercept form ($y = mx + b$), so get y by itself

$$4y - 8 = -5x - 25$$

$$+8 \quad +8$$

$$\underline{4y = -5x - 17}$$

$$4 \quad 4 \quad 4$$

$$y = \frac{-5}{4}x - \frac{17}{4}$$

7. Write the following equations in slope intercept form

a) Slope of $-\frac{3}{4}$ and goes through (-5, 9)

b) Slope of $\frac{2}{5}$ and goes through (-4, -1)

Example: Finding the equation of a line in slope intercept form or general form given two points

Ex: Determine the equation of a line in both slope-intercept form and general form going through (2, -3) and (4,3)

Step 1: Find the slope using the formula: $\frac{y_2 - y_1}{x_2 - x_1}$

For our equation: $\frac{3 - (-3)}{4 - 2} = \frac{6}{2} = 3$

Step 2: Slope Point form (Pick one of the points to use), and simplify

I will use (4,3)

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

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

Slope - Intercept (get y by itself) ($y = mx + b$)

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

$$+3 \quad +3$$

$$Y = 3x - 9$$

General ($Ax + By + c = 0$)

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

$$-3x \quad + 12 \quad - 3x + 12$$

$$(-3x + y + 9 = 0) - 1$$

$$3x - y - 9 = 0$$

8. Write the following equations in both slope intercept form and general form
- Goes through (3,7) and (4, 5)

- Goes through (-2, 4) and (3, -5)

Example: Finding the equation of a line in slope-intercept form or general form given that the line is parallel

Parallel Lines: Slope is the same

Ex. Determine the equation of a line in slope intercept form and general form that is parallel to $y = -3x + 7$ and goes through $(5, -6)$

Step 1: Determine the slope

Our slope will be -3 (number in front of x)

Step 2: Use slope point $y + 6 = -3(x - 5)$

Distribute $y + 6 = -3x + 15$

Slope -Intercept (get y by itself) ($y = mx + b$)

General ($Ax + By + c = 0$)

$$y + 6 = -3x + 15$$

$$-6 \quad -6$$

$$Y = -3x + 9$$

$$Y + 6 = -3x + 15$$

$$+ 3x \quad - 15 \quad + 3x \quad - 15$$

$$3x + y - 9 = 0$$

Ax is positive so you are done

9. Write the equation of line in both slope-intercept and general form that

a) Is parallel to $y = 2x - 8$ and goes through $(-7, 3)$

b) Is parallel to $y - 4 = -9(x + 3)$ and goes through $(-3, -1)$

Example: Finding the equation of a line in slope-intercept form or general form given that the line is perpendicular

Perpendicular slopes – Negative Reciprocals (Flip the slope, make sure one is positive one is negative)

Ex. Determine the equation of a line in slope intercept form and general form that is perpendicular to $y = -2x - 5$ and has an x intercept of 4

Step 1: Determine the slope: Our slope will be $+\frac{1}{2}$

Step 2: Use slope point *x-intercept means point is (4,0) $y = \frac{1}{2}(x - 4)$**

Distribute $y = \frac{1}{2}x - \frac{4}{2}$

Slope –Intercept (get y by itself) (y = mx + b) General (Ax + By + c = 0)

$$y = \frac{1}{2}x - \frac{4}{2} \qquad 2(y = \frac{1}{2}x - \frac{4}{2})$$

Y is by itself...by you can divide 4 by 2

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

$$2y = 1x - 4$$

$$-1x + 4 \quad -1x + 4$$

$$(-1x + 2y + 4 = 0) -1$$

$$1x - 2y - 4 = 0$$

We don't normally write coefficients of 1 so:

$$x - 2y - 4 = 0$$

10. Write the following equation of a line in both slope-intercept and general form

a) Perpendicular to $y = -4x + 5$ and goes through (-2. 9)

b) Perpendicular to $y = \frac{2}{3}x - 2$ and goes through (4 - 7)