Foundations of Algebra Unit 5: Linear Functions Notes

Day 9 – Writing Equations of Lines

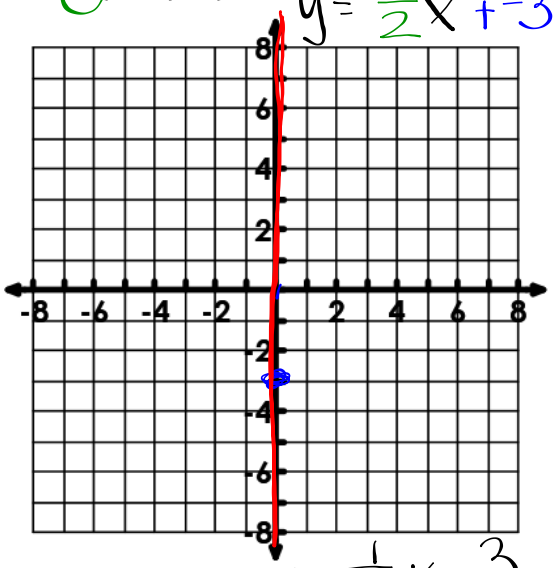
Explore: For each of the following problems, write the equation of the line using the given parameters (slope and a point on the line).

$y = mx + b$

a. m = ½, point (0, -3)

$= b$

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

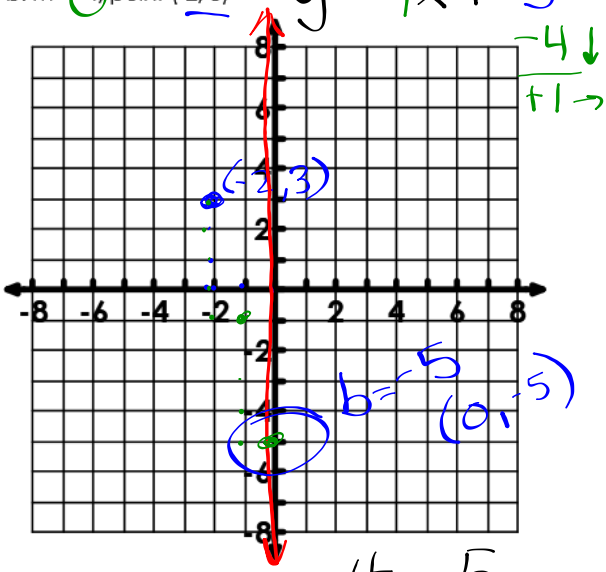


Equation of the Line: $y = \frac{1}{2}x - 3$

b. m = -4, point (-2, 3)

$y = -4x + -5$

$-4 \downarrow$ $+1 \rightarrow$

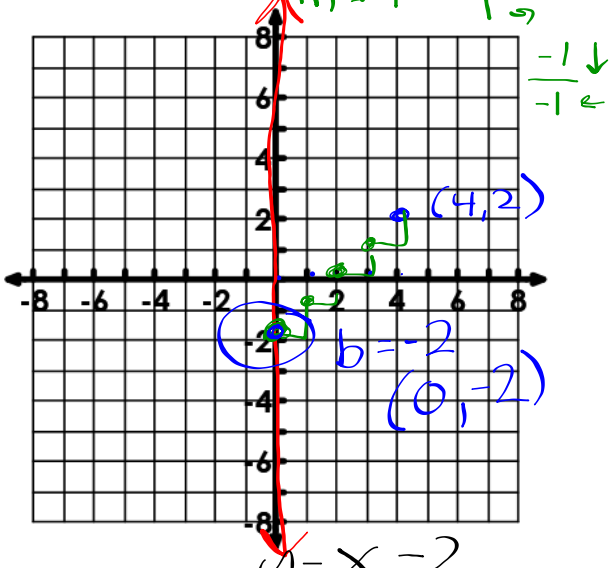


Equation of the Line: $y = -4x - 5$

c. m = 1, point (4, 2)

$m = 1 = \frac{1}{1}$ $1 \uparrow$ $1 \rightarrow$

$-1 \downarrow$ $-1 \leftarrow$

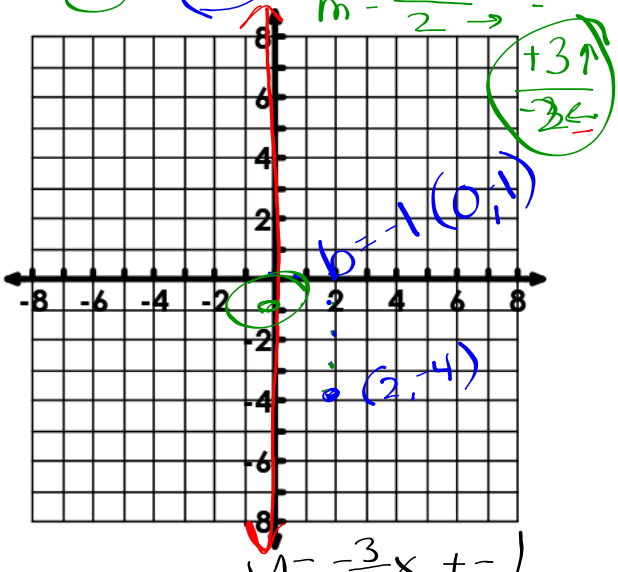


Equation of the Line: $y = x - 2$

d. m = -3/2, point (2, -4)

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

$+3 \uparrow$ $-2 \leftarrow$



Equation of the Line: $y = \frac{-3}{2}x + -1$

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Foundations of Algebra Unit 5: Linear Functions Notes

Writing Equations of Lines Given Slope & a Point

So far in Unit 5, you have been able to determine the y-intercept from either a graph or an equation in slope intercept form. How will you find the y-intercept or equation of a line without a graph or equation? You can use the slope intercept form to find the y-intercept or equation of a line if you know the slope and a point on the line.

Writing Equations Using Slope Intercept Form $y = mx + b$		**Writing Equations Using Point Slope Form $(y - y_1) = m(x - x_1)$**	
1. Write the formula $y = mx + b$. 2. Substitute the value of the slope in for *m* and the value of the point in for x and *y*. 3. Solve the equation for *b*. 4. Substitute the value of *m* and the newly founded *b* into $y = mx + b$.		1. Write the formula $(y - y_1) = m(x - x_1)$. 2. Substitute the value of the slope in for *m* and the value of the point in for x_1 and y_1. 3. Solve the equation for y	

Ex 1: Write the equation of a line with a slope of -3 and y-intercept of 2.

$y = mx + b$ $\quad y = -3x + 2$ (m = -3, b = 2, (x, y))

Ex 2: Write the equation of a line if m = 9 and passes through the point (2, 11).

$y = mx + b$
$11 = 9(2) + b$
$11 = 18 + b$
$-18 \quad -18$
$-7 = b$
$y = 9x - 7$

$y - y_1 = m(x - x_1)$
$y - 11 = 9(x - 2)$
$y - 11 = 9x - 18$
$+11 \quad +11$
$y = 9x - 7$

m = 9 b = -7
Equation: $y = 9x - 7$
x y

Ex 3: Write the equation of a line with m = -8 and passes through the point (3, 12).

slope intercept method
$y = mx + b$
$12 = -8(3) + b$
$12 = -24 + b$
$+24 \quad +24$
$36 = b$

$y = mx + b$
$y = -8x + 36$

m = -8 b = 36
Equation: $y = -8x + 36$
(x_1, y_1)

Ex 4: Write the equation of a line with m = 4 and passing through the point (2, 5).

point slope form method
$y - y_1 = m(x - x_1)$
$y - 5 = 4(x - 2)$
$y - 5 = 4x - 8$
$+5 \quad +5$
$y = 4x - 3$

m = 4 b = -3
Equation: $y = 4x - 3$

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