

Finding the equation of a line through two points... when your slope is a fraction!

Using the slope intercept form $y = mx + b$ (big hint: you need to know this formula and how to do problems like these on the midterm!), I will show how to find the equation of a line through two points when the slope is a fraction.

5.2 #45

Find an equation of the line containing the given pair of points. $(-5, 2)$ and $(6, -5)$

Always find the slope first. Hint: When your ordered pairs have negative signs, it might be helpful to write out the general form with parentheses first and then fill in the numbers.

$$\frac{(\quad) - (\quad)}{(\quad) - (\quad)} \text{ So our slope is } \frac{(-5) - (2)}{(6) - (-5)} = \frac{-7}{11}$$

$$m = \frac{-7}{11}$$

Now, we know that slope intercept form is $y = mx + b$ and now we know $m = \frac{-7}{11}$.

Substituting, we know that our linear equation will look like

$$y = \frac{-7}{11}x + b$$

But if only we knew b !

We can find b , but by plugging in one of the points for x and y . However, we want to clear fractions first to make the problem a lot easier. Our LCD is 11, and because this is an equation, we can multiply both sides by 11. Doing so will clear the fractions. *Don't forget to distribute the 11 to every term on the right hand side!*

$$11(y) = \left(\frac{-7}{11}x + b\right) 11$$

$$11y = -7x + 11b$$

Now we get $11y = -7x + 11b$ and no fractions! Use either ordered pair to plug it's x and y values into the equation so that we can solve for b .

use $(-5, 2)$
 $\begin{matrix} x & y \end{matrix}$

either point is okay to use - I usually just pick the first one.

$$11(2) = -7(-5) + 11b$$

$$22 = 35 + 11b$$

$$\begin{array}{r} -35 & -35 \\ \hline -13 & = 11b \end{array}$$

$$\frac{-13}{11} = \frac{11b}{11} \quad b = \frac{-13}{11}$$

$$\text{So } y = \frac{-7}{11}x - \frac{13}{11}$$

So now we know $b = -\frac{13}{11}$. Plugging that back into the linear equation in the box above, we get the linear equation we were looking for $y = -\frac{7}{11}x - \frac{13}{11}$.

Try one on your own: Find an equation of the line containing the given pair of points. $(-2, -1)$ and $(-8, -6)$

Don't forget to simplify!
 Answer: $y = \frac{5}{6}x + \frac{3}{2}$