Name:

Problem 1: *Give an equation for the line passing through the points* $(-4, 5)$ *and* $(-1, -1)$.

Solution: We will write the equation in slope-intercept form, and follow the steps given in class:

The first step is to find the slope of the line. We are given two points already, so following our steps to compute the slope of a line, we can skip the first step (which is to get two points). All we need is to plug into the formula. To do this, we will use $x_1 = -4$, $y_1 = 5$, $x_2 = -1$ and $y_2 = -1$:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 5}{-1 - (-4)} = \frac{-6}{-1 + 4} = \frac{-6}{3} = -2.$$

The slope of this line is $m = -2$.

The second step is take the equation $y = mx + b$ and plug into it one of the given points and the slope we just found. We do this to solve for b. We will use $x = -4$ and $y = 5$, and of course $m = -2$.

$$y = mx + b$$
$$5 = (-2)(-4) + b$$
$$5 = 8 + b$$
$$-3 = b.$$

The y-intercept of this line is $b = -3$.

The last step is to write the equation of the line, with $m = -2$ and $b = -3$ but leaving x and y as variables now. The equation is

$$y = -2x - 3.$$