Equation of a line in point slope form

You'll need to know the formula for the equation of a line like the back of your hand (actually, better than the back of your hand, because who really knows what the back of their hand looks like anyway?). You have two options for writing the equation of a line. Both of them require that you know at least two of the following pieces of information about the line:

1. A point

2. Another point

3. The slope, m

4. The y-intercept, b

If you know any two of these things, you can plug them into either formula to find the equation of the line.

Point-slope form

The equation of a line can also be written in point-slope form as

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

In this form, (x_1, y_1) is a point on the line, and m is still the slope of the function. To use this form, find m the same way you did in slope-intercept form, then simply plug in your two points to the point-slope formula.

Example

Find the equation of the line in point-slope form that passes through the points $(4,2)$ and $(6,3)$.

We start by finding the slope.

$$m = \frac{3-2}{6-4} = \frac{1}{2}$$

Now plug in the slope and either one of the points into the formula.

Even though we could, simplifying any further would take this out of point slope form, so we leave it as is.

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

$$y = \frac{1}{2}x$$