1. Point-Point Form of a Line

2. You should be familiar with the equation for slope and the point-slope equation of a line. In this lesson, we will find the equation of a line, given two points on the line.

3. (a) Suppose we wish to find the equation of a line through the points $(-2, 4)$ and $(3, 1)$. Given two points, we can use the slope formula to find the slope of the line.

   (b) Now that we know the slope of the line, we can use the point-slope form of the line to write the equation.

   (c) We can use the point $(-2, 4)$

   (d) or we could use the point $(3, 1)$. At the end of this video, we will show that these two equations are the same by writing them both in slope-intercept form.

4. To recap: The procedure to find the equation of a line, given two points is as follows; first use the slope formula to find the slope, then use either point in the point-slope form

5. (a) A special case is when the two points are the x and y-intercepts. In this case, the slope is $-\frac{b}{a}$. Using the y-intercept, the point-slope equation of the line is

   $$y - b = -\frac{b}{a}x$$

   (b) which can also be written as

   $$y = -\frac{b}{a}x + b$$

   We could have arrived at this formula directly, as this is the slope-intercept form of a line.

   (c) You may wish to verify that this is the same equation that you can when you use the x-intercept instead.

6. Here is the original example once again, with the point-slope form using both points. You may wish to pause the video and simplify each equation to slope-intercept form.