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. 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.
   * Now that we know the slope of the line, we can use the point-slope form of the line to write the equation.
   * We can use the point \((-2, 4)\)
   * 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 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
   \[ y - b = -\frac{b}{a}x \]
   * 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.
   * 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.
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