

1. Point-Slope Form of a Line
2. You should be familiar with the equation for slope. It may be helpful to know the slope-intercept form of a line. In this lesson, we will find the equation of a line, given the slope of the line and a point on the line.
3. (a) Here is an example, we are given the slope of the line and a point on the line. We could graph the line by counting out the slope
 (b) and connecting the dots.
 (c) From the graph, we could try to find the y -intercept and use the slope-intercept form of a line. However, sometimes this is hard to do.
4. (a) Another approach is to use the slope formula. We will use the ordered pair (x, y) to denote an arbitrary point on the line. We know the slope of the line is $\frac{2}{3}$,
 (b) and can write a general formula for slope by subtracting coordinates.
5. (a) We can simplify this equation by multiplying both sides by $x - 1$. This form is called point-slope form.
6. In general, the point-slope equation of the line with slope m that passes through the point (h, k) is given by the equation $y - k = m(x - h)$. That is: y minus the y -coordinate of the point equals x minus the x -coordinate of the point.
7. (a) If we wish, we can convert point-slope form to slope-intercept form by distributing
 (b) and combining like terms.
8. Here is another example. This time, we can find the y -intercept directly using the slope.
9. Let's confirm this using the point-slope formula.
10. Returning to the first example, we could find the intercept directly using the slope formula. Notice that for the final calculation, we are combining the same terms as we did when we simplified the point-slope for to the slope intercept form.
11. Here is the direct calculation of the y -intercept for the second example.
12. To recap: the point-slope equation of a line with slope m through the point (h, k) is given by the formula

$$y - k = m(x - h)$$