

The Use of Point-Slope Formula

Part I)

Introduction of the different formulas:

1) 2-Point Form	$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$
2) Point-Slope Form	$y - y_1 = m(x - x_1)$
3) Y-Intercept Form	$y = mx + b$

m = slope
b = y-intercept

Part II)

Eg. 1) (When given two points): Find the equation of a line that goes through the points (4,2) and (-2,-1):

First, we find the slope:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 2}{-2 - 4} = 1/2$$

Then, we choose a set of points, let's say (4,2), and substitute the slope and the points into the point-slope form, as follow:

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

Eg.2) (When the slope and a point): Find the equation of a line that the slope is -1 and it passes through the point (3,1):

In this case, we simply substitute the given information into the formula, as follow:

$$y - 1 = -1(x - 3)$$

Eg.3) (When the y-intercept and the slope): Find the equation of a line that the y-intercept is -1 and the slope is 2.

First, we find the coordinate for the y-intercept. We know that the “x” is always zero for the y-intercept, so, our coordinate will be: (0,-1). We have our slope, which is 2. Now, we simply substitute into the formula, as follow:

$$\begin{aligned}y - (-1) &= 2(x - 0) \\y + 1 &= 2x\end{aligned}$$

Eg.4) (We are given the slope and the x-intercept): Find the equation of a line that the x-intercept is 2 and the slope is 5.

This case is very similar to the previous one, but instead of the y-intercept, we now have the x-intercept. We then find its coordinate. We know that the “y” is always zero for the x-intercept, so the coordinate will be (2,0). Our slope is 5. We now simply substitute the information into the formula:

$$\begin{aligned}y - 0 &= 5(x - 2) \\y &= 5(x - 2)\end{aligned}$$

Part III) How to write a line equation in Standard Form: $Ax + By = C$

Eg.) Transform the equation $y - 2 = \frac{1}{2}(x - 4)$ into Standard Form.

- 1) Distribute;
 $y - 2 = (1/2)x - 2$
- 2) Move the variables to one side and leave the constant “C” to the other side;
 $-(1/2)x + y = 0$
- 3) Simplify;
N/A in this example
- 4) Make the “A” and “B” terms positive and integers;

Multiply the equation by (-2) to make it positive and integers → $x - 2y = 0$