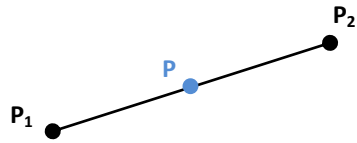**Linear Interpolation**

Linear interpolation determines the value of a given point by taking a weighted average of the two neighboring points based on the distance from each of those points.

$$P \rightarrow (x, y)$$
$$P_1 \rightarrow (x_1, y_1)$$
$$P_2 \rightarrow (x_2, y_2)$$

The distance from P_1 to P and the distance from P_1 to P_2 are proportional between the x and y directions for a linear system.

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

Given the value of x, the value of y can be solved for with some simple algebra.

$$y = \left(\frac{x - x_1}{x_2 - x_1}\right) \cdot (y_2 - y_1) + y_1$$