

Linear Equation Practice

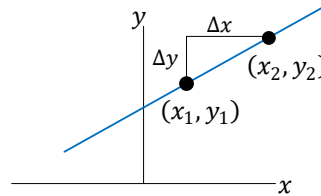
Linear Equation: A relationship between two variables, e.g., x and y , that gives a straight line when plotted on a graph.

Slope-Intercept Form of Linear Equation: A linear equation written so that the slope, m , and the y -intercept, b , are explicitly shown.

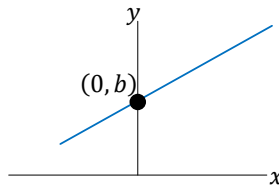
$$y = mx + b$$

Slope of a Line: A number that describes the “steepness” of the line, usually indicated with the letter m . We can compute the slope if we are given two points, $P_1 = (x_1, y_1)$, $P_2 = (x_2, y_2)$, on the line.

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

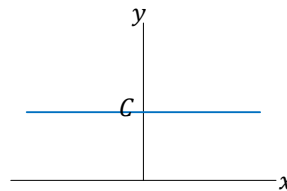


Y-Intercept of a Line: The corresponding y value when $x = 0$, indicated with the letter b .



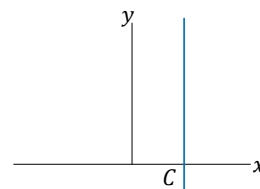
Horizontal Line: A line with a slope of 0. The value of y doesn't depend on x .

$$y = C$$



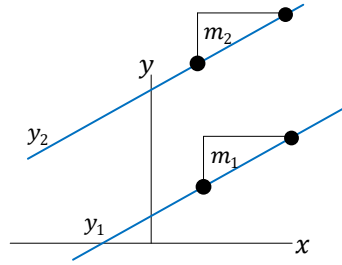
Vertical Line: A line with a slope of infinity (or undefined). The value of x doesn't depend on y .

$$x = C$$



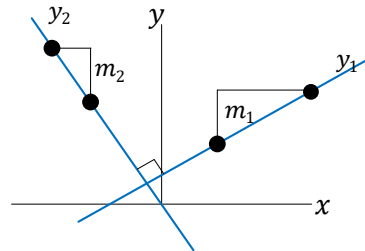
Parallel Lines: Two or more lines that never intersect. Any two parallel lines have the same slope.

$$m_2 = m_1$$



Perpendicular Lines: Two or more lines that intersect at a right angle. Any two perpendicular lines have slopes that are the negative reciprocal of each other.

$$m_2 = -\frac{1}{m_1}$$



Practice Problems

1. Write the equation of the line with the following properties:
 - a. $m = 3$, $b = 2$
 - b. $m = 0$, and passes through the point $(112, -4)$
 - c. $m = \text{Undefined}$, and passes through the point $(7, 234)$
 - d. $m = 4$, and passes through the point $(3, 10)$
 - e. Passes through the following two points: $P_1 = (-3, 10)$, $P_2 = (3, -2)$
 - f. Is parallel to $y = 8x + 9$, and passes through the point $(1, 4)$
 - g. Is parallel to $y = 10$, and passes through the point $(216, 2)$
 - h. Is perpendicular to $y = -2x + 62$ and passes through the point $(2, 5)$
 - i. Is perpendicular to $x = 10$, and passes through the point $(2, 216)$

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