Linear Equations in Two Variables

Linear Equations in Two Variables

A **linear equation in two variables** is an equation that describes an infinite set of ordered pairs (x, y). The graph of a linear equation is a line.

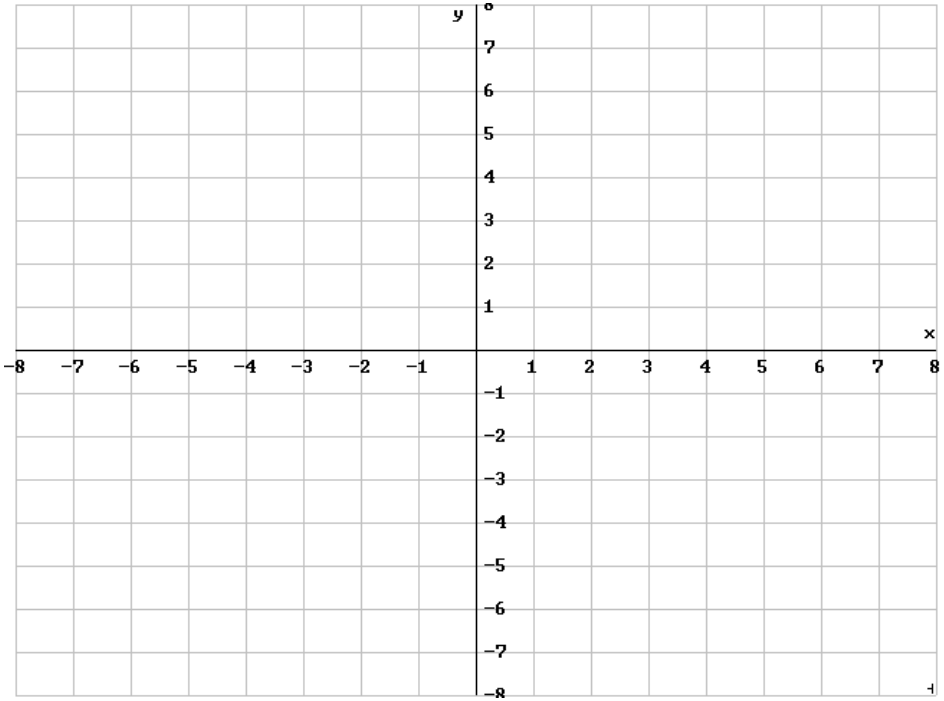
Example 1 Complete the table of ordered pairs that satisfy the linear equation $5x + 2y = 6$.

x	y
0	
	-7
1	

Linear Equations in Two Variables

Slope-Intercept Form: $y = mx + b$ where m is the slope, and (0, b) is the y-intercept

Example 2 Write the equation $5x + 2y = 6$ in slope-intercept form and use the slope and y-intercept to graph the line.



Finding the Equation of a Line

Finding the Equation of a Line

Slope-Intercept Form: $y = mx + b$ where m is the slope, and (0, b) is the y-intercept

Example 1 Determine the equation of the line having slope -3 and passing through the point (6, -4). *Express final answer in slope-intercept form (i.e., $y = mx + b$).*

Finding the Equation of a Line

Slope-Intercept Form: $y = mx + b$ where
m is the slope, and (0, b) is the y-intercept

Standard Form: $Ax + By = C$ where
A, B, and C are integers, and A is positive

Example 2 Determine the equation of the line having slope $\frac{-1}{2}$ and passing through the point (-3, 1). *Express final answer in standard form (i.e., Ax + By = C).*

Finding the Equation of a Line

Slope-Intercept Form: $y = mx + b$ where
m is the slope, and (0, b) is the y-intercept

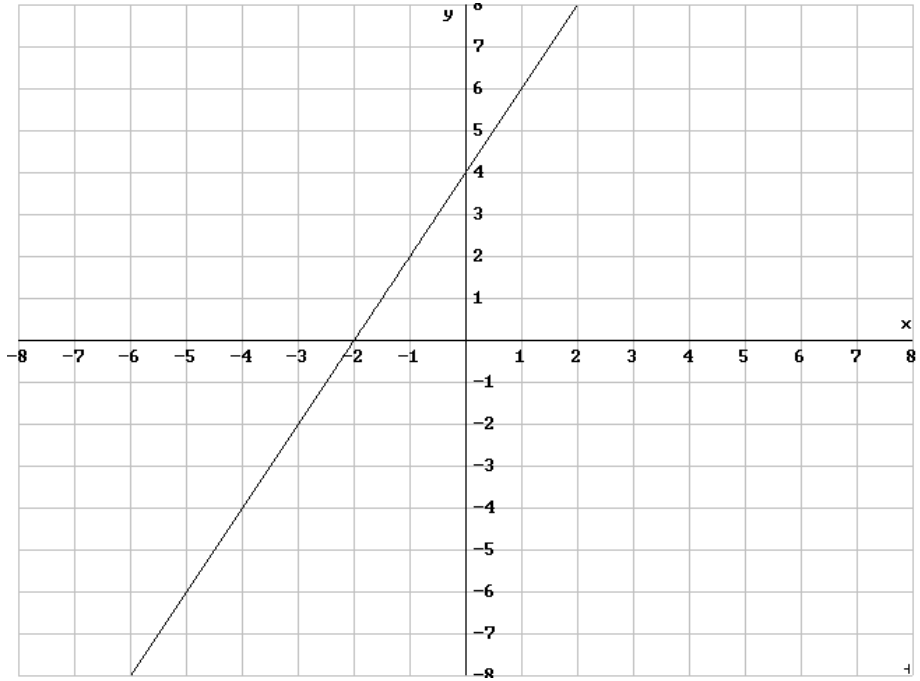
Standard Form: $Ax + By = C$ where
A, B, and C are integers, and A is positive

Example 3 Determine the equation of the line passing through the points (5, 6) and (-1, 4). *Express final answer in standard form (i.e., Ax + By = C).*

Finding the Equation of a Line

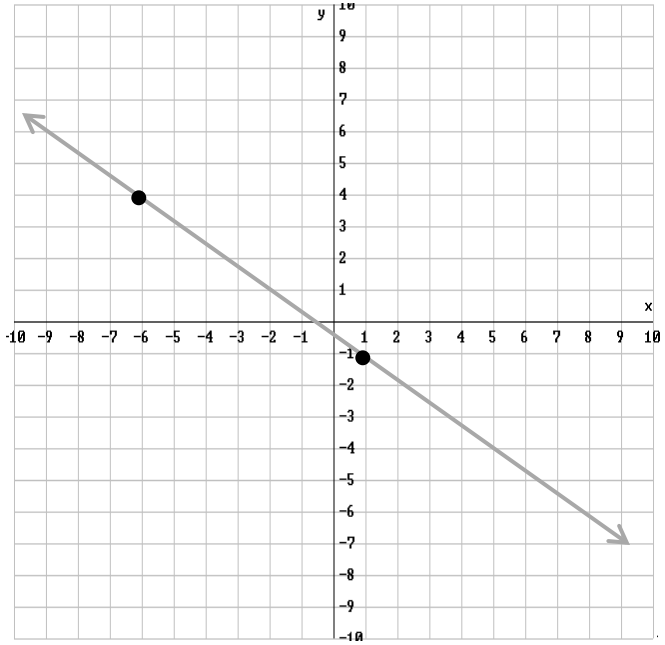
Example 4 Determine the equation of the line given below.

Express final answer in standard form (i.e., Ax + By = C).



Finding the Equation of a Line

Example 5 Determine the equation of the given line. Express answer in slope-intercept form.



Equations for Horizontal and Vertical Lines

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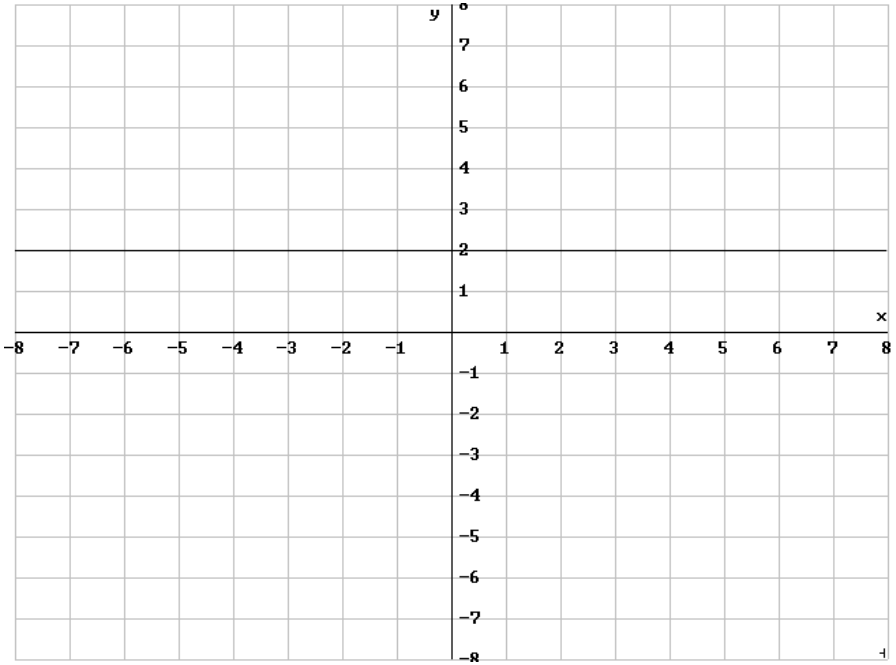
The equation of a horizontal line: $y = b$

Example 1 Determine the equation of the line given below.

Express final answer in standard form (i.e., Ax + By = C).

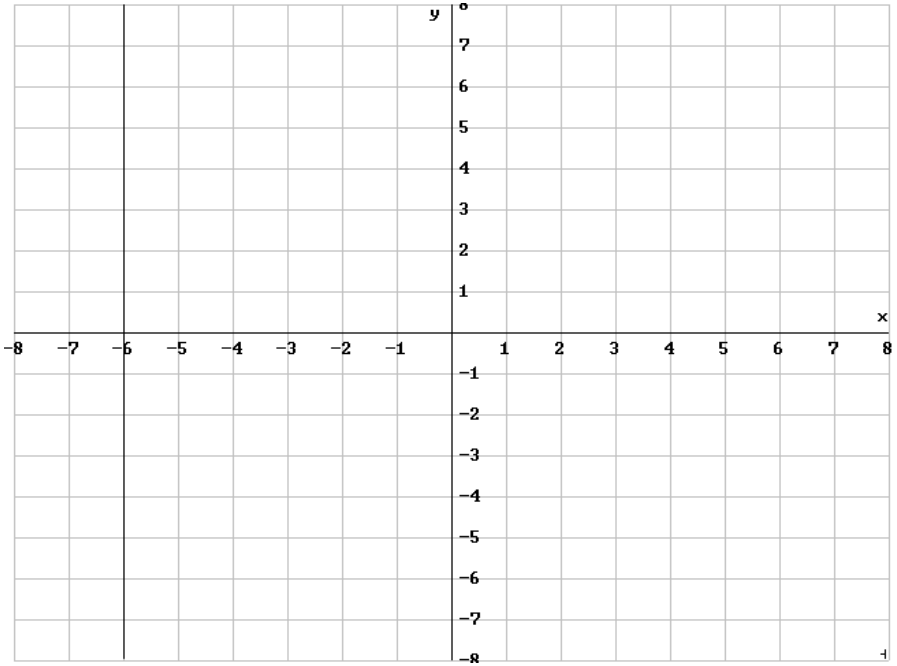


Equations for Horizontal and Vertical Lines

The equation of a vertical line: x = a

Example 2 Determine the equation of the line given below.

Express final answer in standard form (i.e., Ax + By = C).



Equations for Horizontal and Vertical Lines

Horizontal lines have slope 0.
Vertical lines have undefined slope.

Example 3 Determine the equation of the line having the given slope and passing through the given point.

(a) slope is 0 ; (7, -10)

(b) slope is undefined ; (3, 1)

Determining Characteristics of a Line

Determining Characteristics of a Line

y-intercept, (0, b): the point where a graph crosses the y-axis
x-intercept, (a, 0): the point where a graph crosses the x-axis

Slope-intercept form: $y = mx + b$
where m = slope and (0, b) is the y-intercept

Example 1 Determine the slope, the y-intercept, and the x-intercept for the linear equation $2x + 5y = 10$.

The slope is m = ☐.

The x-intercept occurs at x = ☐.

The y-intercept occurs at y = ☐.

Determining Characteristics of a Line

x-intercept, (a, 0): the point where a graph crosses the x-axis

Example 2 Determine the x-intercept of the line having slope $\frac{1}{-5}$ and passing through the point (-20, -4).

The x-intercept occurs at x = ☐.

Determining Characteristics of a Line

y-intercept, (0, b): the point where a graph crosses the y-axis

Example 3 Determine the y-intercept of the line passing through the points (-3, 7) and (-9, 2).

The y-intercept occurs at y = ☐.

Determining Characteristics of a Line

Example 4 Determine the x- and y-intercepts of the line passing through the points (2, -9) and (-8, -9).

The x-intercept occurs at x = ☐.

The y-intercept occurs at y = ☐.

Determining Characteristics of a Line

Example 5 Determine the x- and y-intercepts of the line passing through the points (1, 5) and (1, -2).

The x-intercept occurs at x = ☐.

The y-intercept occurs at y = ☐.