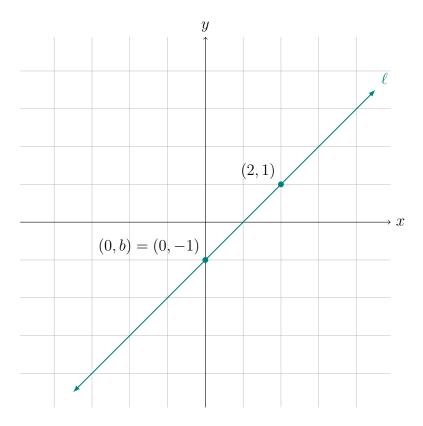
Cartesian Plane: Slope-Intercept Formula for Lines

Video companion

1 Derivation using point-slope form



From last video, the equation of a line in point-slope form that passes through (2,1) and has slope m=1 is

$$y - 1 = 1(x - 2).$$

The y-intercept is at point (0, b). To find b, we substitute that point into the definition of the line:

$$(0,b) \in \ell$$
, so $b-1 = 1(0-2)$
 $b = -1$

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Using the y-intercept in the equation for the line in point-slope form:

$$y - (-1) = 1(x - 0)$$
$$y + 1 = x$$
$$y = 1x - 1$$

2 Slope-intercept form

If ℓ has slope m, and ℓ hits the y-axis at (0, b), then

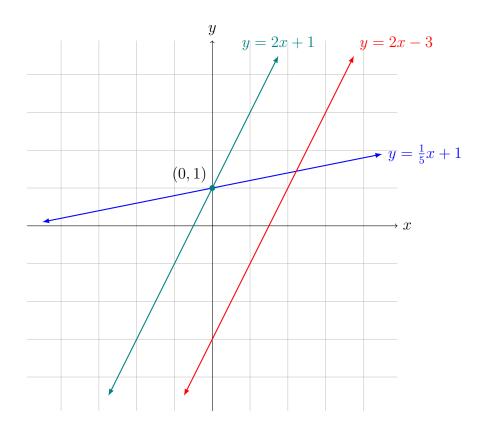
$$y = mx + b$$

is an equation for ℓ , where m is the slope and b is the y-intercept.

3 Drawing lines

Draw line with equation

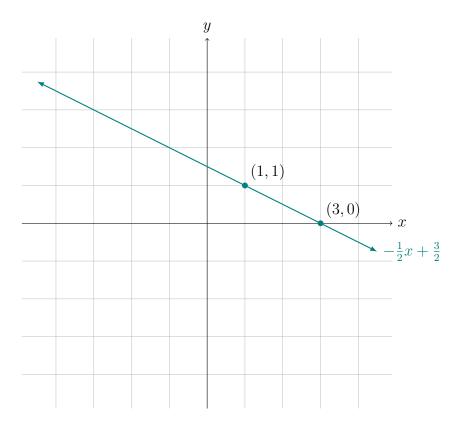
$$y = 2x + 1$$
$$y = \frac{1}{5}x + 1$$
$$y = 2x - 3$$



The slope tells you how to angle the line, and the y-intercept tells you where to anchor it on the y-axis.

4 Example

Problem: Line ℓ has points (1,1) and (3,0) on it. Find an equation for ℓ .



Find the slope:

$$m = \frac{0-1}{3-1} = -\frac{1}{2}$$

Some possible equations for the line in point-slope form:

$$y - 1 = -\frac{1}{2}(x - 1)$$
$$y - 0 = -\frac{1}{2}(x - 3)$$

An equation for the line in slope-intercept form:

$$y = -\frac{1}{2}x + \frac{3}{2}$$