

Parallel and Perpendicular Lines



Preliminaries and Objectives

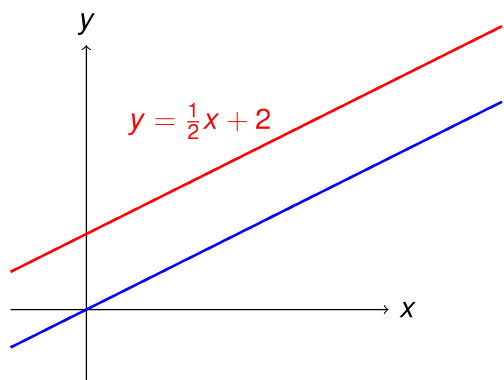
Preliminaries

- Slope-Intercept Form of a Line
- Point-Slope Form of a Line

Objectives

- Find the equation of a line through a given point parallel to a given line.
- Find the equation of a line through a given point perpendicular to a given line.

Parallel Lines



Definition of Parallel

Two lines are **parallel** if they have the same slope.

Recap

- If two lines are **parallel**, their slopes are equal.
- If two lines are **perpendicular**, their slopes are negative reciprocals.

That is, if a line has slope m , then a line perpendicular to it has slope $-\frac{1}{m}$

Perpendicular Lines

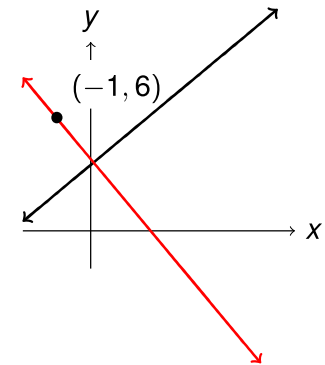
Find the equation of the line perpendicular to the line $3x - 2y = 7$ through the point $(-1, 6)$

$$3x - 2y = 7 \Rightarrow 3x - 7 = 2y$$

$$\Rightarrow \frac{3}{2}x - \frac{7}{2} = y$$

$$\Rightarrow m_{\perp} = -\frac{2}{3}$$

$$\text{Answer: } y - 6 = -\frac{2}{3}(x + 1)$$



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