

10.5 Key Concepts 1 Equation of a Line Given the Slope and a Point Worked Example

Example: Find the equation of a line with a slope of $-\frac{3}{4}$ passing through the point $(-1, 1)$.

Solution: Substitute the slope and the coordinates of the point into the general equation $y = mx + b$. Then, solve for b .

$$y = mx + b$$

$$1 = -\frac{3}{4}(-1) + b$$

$$1 = \frac{3}{4} + b$$

$$1 - \frac{3}{4} = \frac{3}{4} + b - \frac{3}{4}$$

$$\frac{4}{4} - \frac{3}{4} = b$$

$$\frac{1}{4} = b$$

The equation of the line is $y = -\frac{3}{4}x + \frac{1}{4}$.

Practice:

1. Find the equation of a line with a slope of -5 passing through the point $(1, -1)$.

2. Find the equation of a line with a slope of $-\frac{1}{2}$ passing through the point $(3, -1)$.

Answers: 1. $y = -5x + 4$, 2. $y = -\frac{1}{2}x + \frac{1}{2}$