

Alternative Method for Finding the Equation of a Line

Find the equation of the line with slope of $-\frac{3}{7}$ passing through the point $(5, -2)$. Write your answer in both slope-intercept and standard form:

Traditional Method

$$y - y_1 = m(x - x_1)$$

$$y - (-2) = -\frac{3}{7}(x - 5)$$

Distribute and simplify:

$$y + 2 = -\frac{3}{7}x + \frac{15}{7} \text{ Solve for } y:$$

$$\underline{-2 = -2}$$

$$\text{Slope-Int. form: } y = -\frac{3}{7}x + \frac{1}{7}$$

Multiply both sides by 7:

$$7y = 7\left(-\frac{3}{7}x\right) + 7\left(\frac{1}{7}\right)$$

$$7y = -3x + 1$$

$$\underline{+3x = +3x}$$

$$\text{Standard Form: } 3x + 7y = 1$$

Donna's Method:

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

$$\frac{y - (-2)}{x - 5} = -\frac{3}{7}$$

Simplify, move $-$ to the numerator:

$$\frac{y + 2}{x - 5} = \frac{-3}{7} \text{ Cross Multiply:}$$

$$7(y + 2) = -3(x - 5) \text{ Distribute:}$$

$$7y + 14 = -3x + 15 \text{ Solve for } y:$$

$$\underline{-14 = -14}$$

$$7y = -3x + 1$$

$$\frac{7y}{7} = -\frac{3x}{7} + \frac{1}{7}$$

$$\text{Slope-Int. Form: } y = -\frac{3}{7}x + \frac{1}{7}$$

$$7y = -3x + 1$$

$$\underline{+3x = +3x}$$

$$\text{Standard Form: } 3x + 7y = 1$$