Exercise 30

For the following exercises, given each set of information, find a linear equation satisfying the conditions, if possible.

$$f(-5) = -4, \text{ and } f(5) = 2$$

[TYPO: Remove the comma.]

Solution

The general formula for the equation of a line is

$$y = mx + b.$$

The first condition says that when $x = -5$, $y = -4$.

$$-4 = m(-5) + b$$

The second condition says that when $x = 5$, $y = 2$.

$$2 = m(5) + b$$

This is a system of two equations with two unknowns that can be solved.

$$\begin{cases} -5m + b = -4 \\ 5m + b = 2 \end{cases}$$

Add the respective sides of these two equations to eliminate m.

$$b + b = -4 + 2 \quad \rightarrow \quad 2b = -2 \quad \rightarrow \quad b = -1$$

Subtract the respective sides of these two equations to eliminate b.

$$-5m - 5m = -4 - 2 \quad \rightarrow \quad -10m = -6 \quad \rightarrow \quad m = \frac{3}{5}$$

Now that m and b are solved for, the equation of the line is known.

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