

Exercise 47

For the following exercises, which of the tables could represent a linear function? For each that could be linear, find a linear equation that models the data.

x	0	5	10	15
$g(x)$	5	-10	-25	-40

Solution

This table represents a linear function because x increases by 5 in each entry to the right, and $g(x)$ increases by -15 in each entry to the right. Two points on this line are

$$(0, 5) \text{ and } (5, -10).$$

The general equation for a line is

$$y = mx + b.$$

The first point says that when $x = 0$, $y = 5$.

$$5 = m(0) + b$$

The second point says that when $x = 5$, $y = -10$.

$$-10 = m(5) + b$$

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

$$\begin{cases} b = 5 \\ 5m + b = -10 \end{cases}$$

Plug the value for b into the second equation.

$$5m + (5) = -10$$

Solve for m .

$$5m = -15$$

$$m = -3$$

Now that m and b have been solved for, the line is known.

$$y = -3x + 5$$