

Exercise 49

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
$f(x)$	-5	20	45	70

Solution

This table represents a linear function because x increases by 5 in each entry to the right, and $f(x)$ increases by 25 in each entry to the right. Two points on this line are

$$(0, -5) \text{ and } (5, 20).$$

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 $x = 5$, $y = 20$.

$$20 = m(5) + b$$

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

$$\begin{cases} b = -5 \\ 5m + b = 20 \end{cases}$$

Plug the value for b into the second equation.

$$5m + (-5) = 20$$

Solve for m .

$$5m = 25$$

$$m = 5$$

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

$$y = 5x - 5$$