# Linear Functions & Proportionality

1. A food bank distributes cans of vegetables every Saturday. The following table shows the total number of cans they have distributed since the beginning of the year. Assume that this total is a linear function of the number of weeks that have passed.

| Number of weeks $(x)$ | 1 | 12 | 20 | 45 |
|---|---|---|---|---|
| Number of cans of vegetables distributed $(y)$ | 180 | 2,160 | 3,600 | 8,100 |

a) Describe the function being considered in words.

b) Write the linear equation that describes the total number of cans handed out, $y$, in terms of the number of weeks, $x$, that have passed.

c) Assume that the food bank wants to distribute $20{,}000$ cans of vegetables. How long will it take them to meet that goal?

d) The manager had forgotten to record that they had distributed $35{,}000$ cans on January 1. Write an adjusted linear equation to reflect this forgotten information.

e) Using your function in part (d), determine how long in years it will take the food bank to hand out $80{,}000$ cans of vegetables.

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a) Describe the function being considered in words.

*The total number of cans handed out is a function of the number of weeks that pass.*

b) Write the linear equation that describes the total number of cans handed out, $y$, in terms of the number of weeks, $x$, that have passed.

$$y = \frac{180}{1}x$$
$$y = 180x$$

c) Assume that the food bank wants to distribute $20{,}000$ cans of vegetables. How long will it take them to meet that goal?

$$20\,000 = 180x$$
$$\frac{20\,000}{180} = x$$
$$111.1111 \ldots = x$$
$$111 \approx x$$

*It will take about* $111$ *weeks to distribute* $20{,}000$ *cans of vegetables, or about* $2$ *years.*

d) The manager had forgotten to record that they had distributed $35{,}000$ cans on January 1. Write an adjusted linear equation to reflect this forgotten information.

$$y = 180x + 35\,000$$

e) Using your function in part (d), determine how long in years it will take the food bank to hand out $80{,}000$ cans of vegetables.

$$80\,000 = 180x + 35\,000$$
$$45\,000 = 180x$$
$$\frac{45\,000}{180} = x$$
$$250 = x$$

*To determine the number of years:*

$$\frac{250}{52} = 4.8076 \ldots \approx 4.8$$

*It will take about* $4.8$ *years to distribute* $80{,}000$ *cans of vegetables.*