Linear Functions & Proportionality

1. A linear function has the table of values below. The information in the table shows the total volume of water, in gallons, that flows from a hose as a function of time, the number of minutes the hose has been running.

Time in minutes (x)	10	25	50	70
Total volume of water in gallons (y)	44	110	220	308

a) Describe the function in terms of volume and time.

b) Write the rule for the volume of water in gallons, y, as a linear function of time, x, given in minutes.

c) What number does the function assign to 250? That is, how many gallons of water flow from the hose during a period of 250 minutes?

d) The average swimming pool holds about 17,300 gallons of water. Suppose such a pool has already been filled one quarter of its volume. Write an equation that describes the volume of water in the pool if, at time 0 minutes, we use the hose described above to start filling the pool.

e) Approximately how many hours will it take to finish filling the pool?

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Total volume of water in gallons (y)	44	110	220	308

a) Describe the function in terms of volume and time.

The total volume of water that flows from a hose is a function of the number of minutes the hose is left on.

b) Write the rule for the volume of water in gallons, y, as a linear function of time, x, given in minutes.

$$y = \frac{44}{10}x$$
$$y = 4.4x$$

c) What number does the function assign to 250? That is, how many gallons of water flow from the hose during a period of 250 minutes?

$$y = 4.4(250)$$
$$y = 1\,100$$

In 250 minutes, 1,100 gallons of water flow from the hose.

d) The average swimming pool holds about 17,300 gallons of water. Suppose such a pool has already been filled one quarter of its volume. Write an equation that describes the volume of water in the pool if, at time 0 minutes, we use the hose described above to start filling the pool.

$$\frac{1}{4}(17\,300) = 4\,325$$
$$y = 4.4x + 4\,325$$

e) Approximately how many hours will it take to finish filling the pool?

$$17\,300 = 4.4x + 4\,325$$
$$12\,975 = 4.4x$$
$$\frac{12\,975}{4.4} = x$$
$$2\,948.8636\ldots = x$$
$$2\,949 \approx x$$

$$\frac{2\,949}{60} = 49.15$$

It will take about 49 hours to fill the pool with the hose.