

CHAPTER 5 Modelling With Graphs
 5.2 Partial Variation
 Partial Variation: Equations and Graphs

Example:

a) Jay leaves 20 m^3 of water in his pool over the winter. In the spring, he fills the pool using a garden hose. The volume of water versus time is shown in the table. Assuming that the relation is a partial variation, complete the missing entries in the table.



b) Identify the fixed volume and the constant of variation.

c) Write the equation that relates volume to time.

d) How long will it take to fill the pool to a volume of 80 m^3 ?

Time (h)	Volume (m^3)
0	20
2	30
4	40
6	
8	

e) Sketch a graph of V versus t .

Solution:

a) The completed table is shown.

b) The fixed volume is 20 m^3 .

The constant of variation is $\frac{30 - 20}{2 - 0} = 5 \frac{\text{m}^3}{\text{h}}$.

Time (h)	Volume (m^3)
0	20
2	30
4	40
6	50
8	60

c) The equation is $V = 5t + 20$.

d) $80 = 5t + 20$ The pool will take 12 h to fill to 80 m^3 .

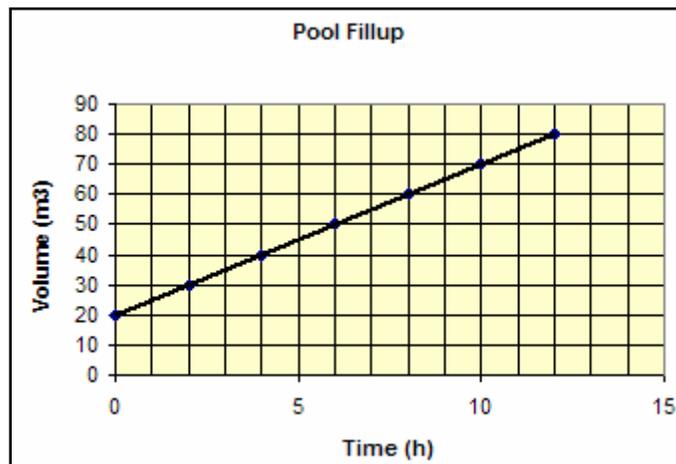
$$80 - 20 = 5t + 20 - 20$$

$$60 = 5t$$

$$\frac{60}{5} = \frac{5t}{5}$$

$$12 = t$$

e) The graph is shown.



Practice:

1. a) While vacationing on a Caribbean island, Nikomo rented a moped to do some sightseeing. Rental costs were posted as shown in the table, although the hot sun had caused some of the paint to flake off the sign. Assuming that the relation is a partial variation, complete the missing entries in the table.



b) Identify the fixed cost and the constant of variation.

c) Write the equation that relates cost to time.

d) How long can Nikomo rent the moped for \$75?

e) Sketch a graph of V versus t .

Time (h)	Cost (\$)
1	15
2	25
3	35
4	
5	

Answers:

1. a) The completed table is shown.

b) The fixed cost is \$5. The variable cost is \$10 per hour.

c) The equation is $C = 10t + 5$.

d)

$$C = 10t + 5$$

$$75 = 10t + 5$$

$$75 - 5 = 10t + 5 - 5$$

$$70 = 10t$$

$$\frac{70}{10} = \frac{10t}{10}$$

$$7 = t$$

Nikomo can rent the moped for 7 h for \$75.

e) The graph is shown.

Time (h)	Cost (\$)
1	15
2	25
3	35
4	45
5	55

