5.2 Partial Variation Worksheet

MPM1D

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1. Identify each relation as a direct variation, a partial variation or neither.

a) $y = 3x$

b) $y = 2x + 1$

c) $C = 20n + 500$

d) $d = 5t$

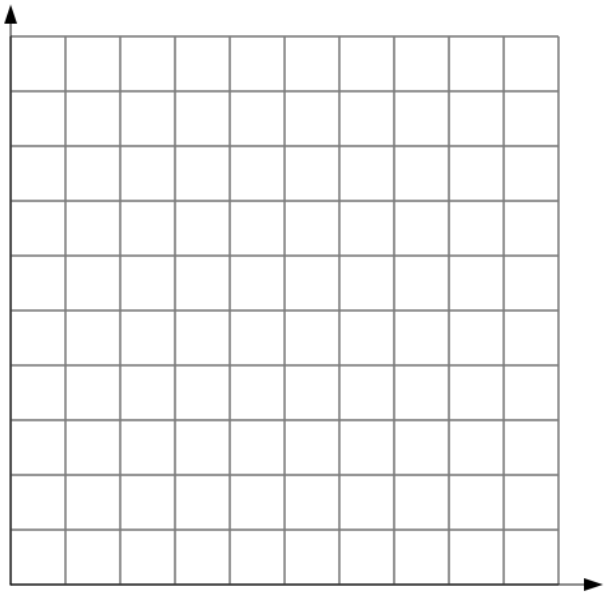
2. a) Complete the table of values given that y varies partially with x.

x	y
0	5
1	10
2	
3	20
4	
	40

b) Identify the initial value of y and the constant of variation from the table.

c) Write an equation relating y and x in the form $y = mx + b$.

d) Graph the relation. Choose an appropriate scale.



e) Describe the graph.

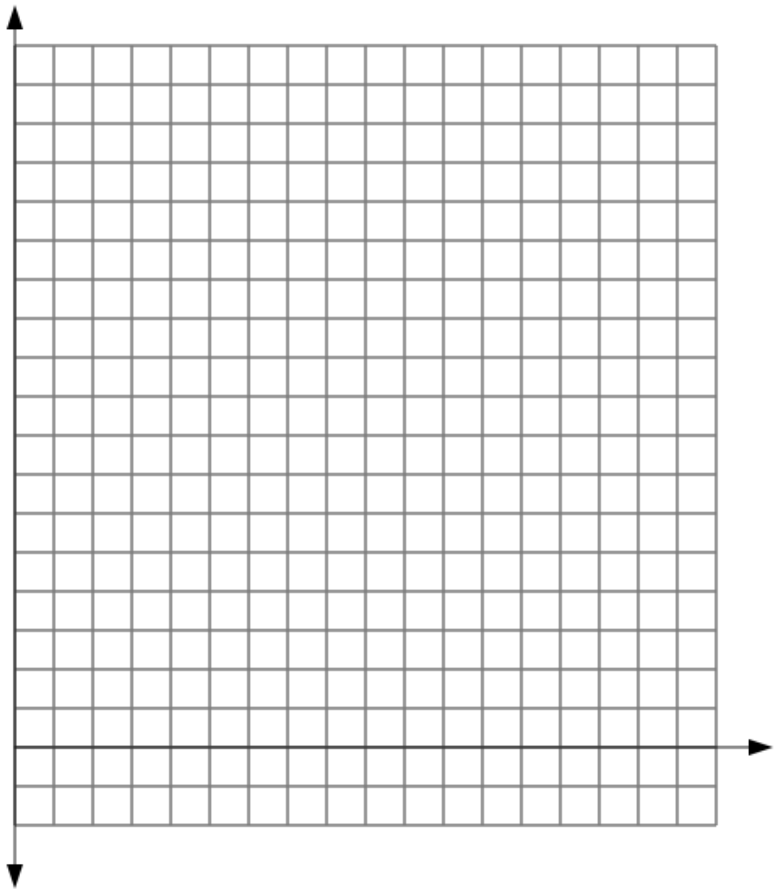
3. a) Complete the table of values given that y varies partially with x.

x	y
0	−2
1	3
2	
3	13
4	
	33

b) Identify the initial value of y and the constant of variation from the table.

c) Write an equation relating y and x in the form $y = mx + b$

d) Graph the relation.



e) Describe the graph.

4. A small pizza costs $7.00 plus $1.50 per topping.

a) Identify the fixed cost and the variable cost of this partial variation.

b) Determine the equation relating the cost, C, in dollars, and the number of toppings, n.

c) Use the equation to determine the cost of a small pizza with five toppings.

5. A class is planning a field trip to an art gallery. The cost of renting a bus is \$250. There is an additional cost of \$4 per student for the entrance fee.

a) Identify the fixed cost and the variable cost of this partial variation.

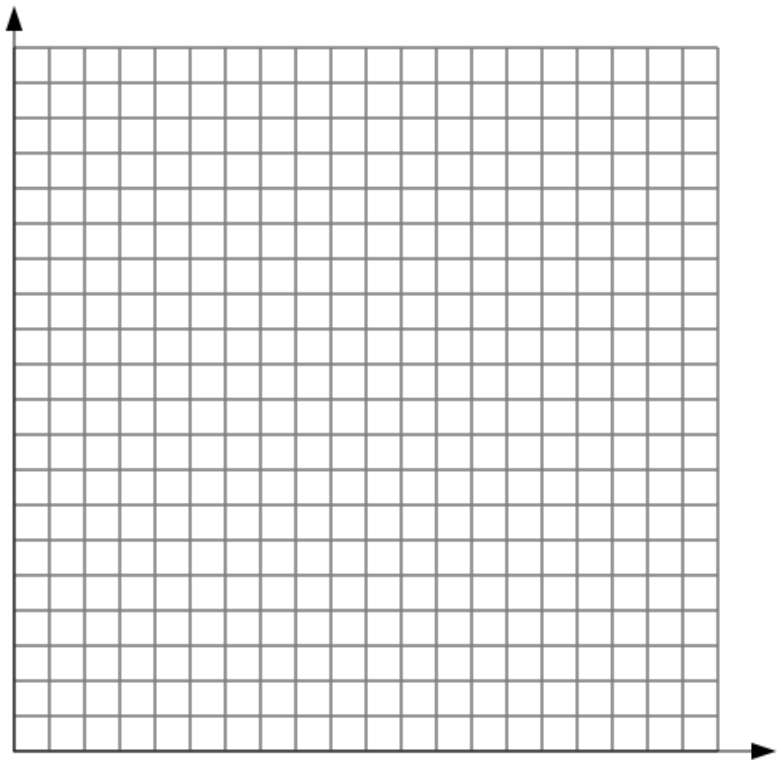
b) Write an equation relating the cost, C, in dollars, and the number of students, n.

c) Use your equation to determine the total cost if 25 students attend.

6. A fitness club offers two types of monthly memberships:

Membership A: $4 per visit
Membership B: A flat fee of $12 plus $2 per visit

a) Graph both relations for 0 to 10 visits.



b) Classify each relation as a direct variation or a partial variation.

c) Write an equation relating the cost and the number of visits for each membership.

d) Compare the monthly membership costs. When is membership A cheaper than membership B? When is membership B cheaper than membership A?

7. The table shows the amount a printing company charges for advertising flyers.

Number of Flyers, n	Cost, C ($)
0	100
100	120
200	140
300	160

a) Identify the fixed cost this company charges for producing the flyers. What do you think this amount might represent?

b) Determine the variable cost for producing one flyer. Explain how you found this.

c) Write an equation representing the price for the flyers.

d) Write an equation representing the price for the flyers in the form $y = mx + b$.

e) How many flyers can be produced for $280?

8. At the surface of a lake, a scuba diver experiences 102.4 kPa of pressure. As the diver descends, the pressure increases by 101.3 kPa for every 10 m.

a) Write an equation that relates the pressure experienced by a diver and the depth that the diver has descended.

b) Divers must be aware of nitrogen narcosis, which occurs when too much nitrogen dissolves in the blood. Narcosis becomes possible when the diver is exposed to a pressure of about 400 kPa. At what depth does the danger from narcosis begin?

Answers

1. a) Direct variation: the equation is of the form $y = kx$.
b) Partial variation: the equation is of the form $y = mx + b$.
c) Partial variation: the equation is of the form $y = mx + b$.
d) Direct variation: the equation is of the form $y = kx$.

2. a)

x	y
0	5
1	10
2	15
3	20
4	25
7	40

b) 5, 5 **c)** $y = 5x + 5$
d) Graphs may vary.
e) The graph is a straight line that intersects the y-axis at (0, 5). The y-values increase by 5 as the x-values increase by 1.

3. a)

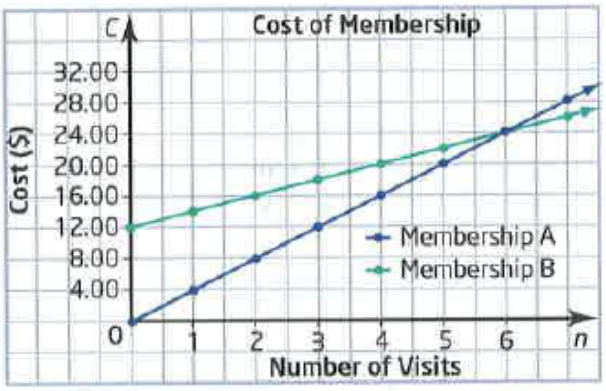
x	y
0	-2
1	3
2	8
3	13
4	18
7	33

b) -2, 5 **c)** $y = 5x - 2$
d) Graphs may vary.
e) The graph is a straight line that intersects the y-axis at (0, -2). The y-values increase by 5 as the x-values increase by 1.

4. a) \$7.00, \$1.50 × number of toppings
b) $C = 1.50n + 7.00$ **c)** \$14.50

5. a) \$250, \$4 × number of students
b) $C = 4n + 250$ **c)** \$350

6. a)



b) A: direct variation; B: partial variation
c) In both cases, C represents the cost of membership and n represents the number of visits.
A: $C = 4n$; B: $C = 2n + 12$
d) Membership A is cheaper when fewer than six visits are made. Membership B is cheaper when more than six visits are made. They cost the same when six visits are made.

7. a) The fixed cost is \$100 and could represent, for example, the cost of paper, ink, and overhead.
b) From the table, it costs \$20 to print 100 flyers, so the variable cost to print one flyer is \$20 ÷ 100 or \$0.20.
c) $C = 0.2n + 100$
d) \$300 **e)** 900 flyers

8.

a) $P = 10.13d + 102.4$, where P is the pressure, in kilopascals, and d is the depth below the lake's surface, in metres.