

Unit 5: Linear Relations I (Chapter 5 in textbook!)

Day 5 - Partial Variation

Today we will...

1. Define partial variation. → linear graph with a y-intercept not equal to 0
2. Determine how to identify problems involving partial variation. (line that does not go through the origin)
3. Differentiate between direct and partial variation.

through origin (no initial value) → not through origin (non-zero initial value).

Ex. 1 A medium pizza costs \$7 plus \$1.50 per topping.

a) Identify the fixed cost and the variable cost.

#7 ← y-intercept / initial value → #1.50/topping ← constant of variation / slope / rate of change

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

$$C = 7 + 1.5n$$

c) Use the equation to determine the cost of a medium pizza with 6 toppings.

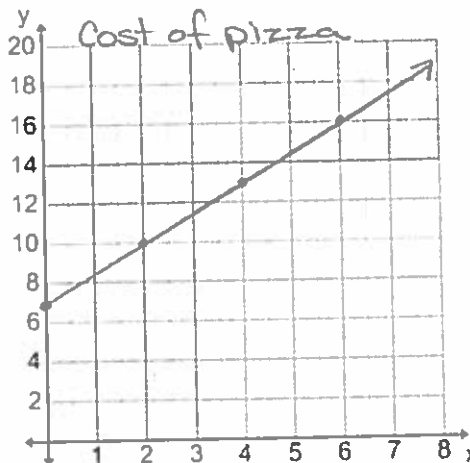
$$C = 7 + 1.5(6) = 7 + 9 = 16$$

∴ the pizza would cost \$16

d) Graph this partial variation relation.

x	y
0	7
2	10
4	13
6	16

Cost (\$)



Number of toppings.

Ex. 2 a) Copy and complete the table of values given that y varies partially with x.

Δx	x	y	Δy
	0	10	2
1	1	12	2
1	2	14	2
1	3	16	2
1	4	18	2
1	5	20	2

b) Identify the initial value of y and the constant of variation (i.e. slope!).

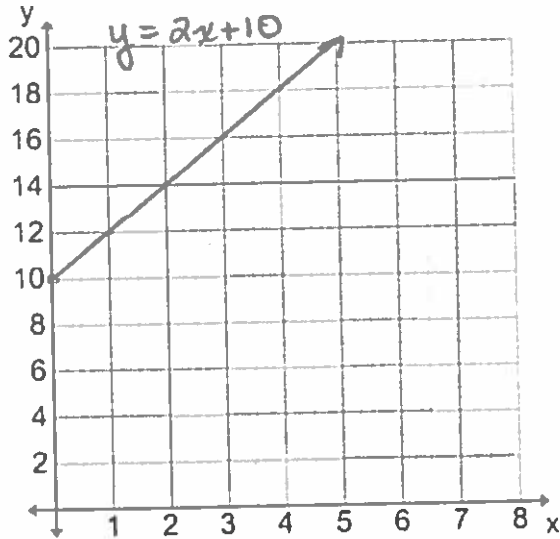
value of y when x=0. → the initial value of y is 10 → the constant of variation is 2 (m = $\frac{\Delta y}{\Delta x}$)

c) Write the equation in the form of $y = mx + b$.

$$y = 2x + 10$$

constant of variation (slope) ← initial value of y.

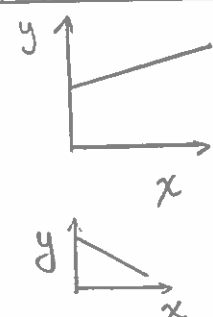
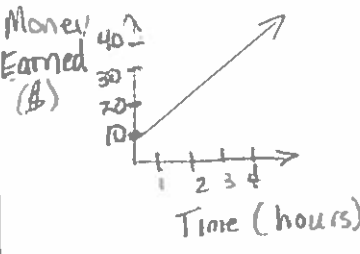
d) Graph the relation.



e) Describe the graph

- linear
- partial variation (starts at 10 on the y-axis)
- increasing (sloping up from left to right)
- constant rate of change

Summarizing Partial Variation:

	Looks Like...	Example
Equation	$y = mx + b, b \neq 0$ where b is the fixed value and m is the constant of variation (slope)	$C = 15n + 200$ $C = 3.2g + 10$
Graph	 <p>Does <u>NOT</u> pass through the origin $(0,0)$</p>	

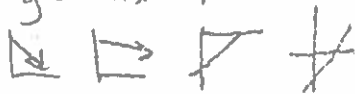
Understanding the Difference - Examples All linear graphs are either partial or direct variation. Non-linear graphs are neither direct nor partial variation.

Partial

A catering company charges \$200 and \$25/person
Budget Rentals charges \$0.10/km plus \$100 deposit

$C = 1 + 0.25g$

$y = -2x + 7$



Neither (non-linear)

$y = x^2$

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

$y = \sqrt{x}$



Direct

Dan earns \$9/hour

$y = 5x$

$D = 80t$

