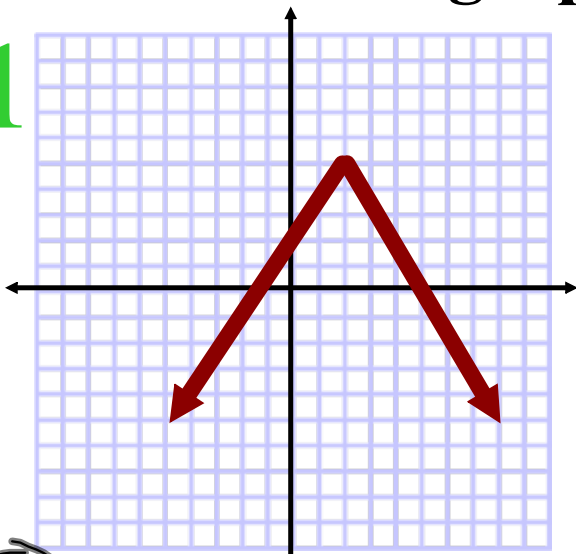


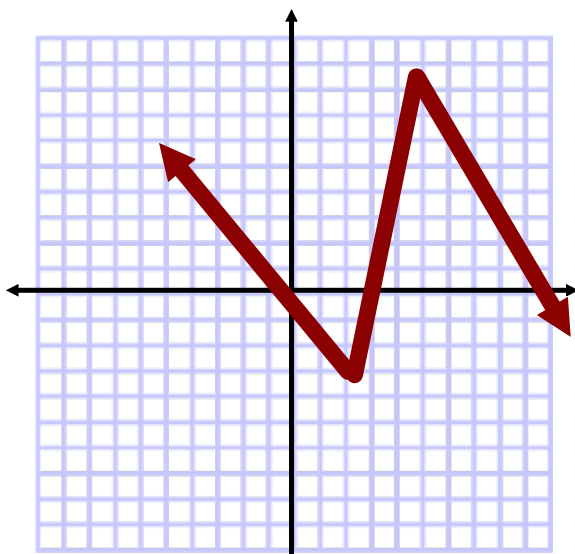
Properties of Linear Relations

Which graph is linear?

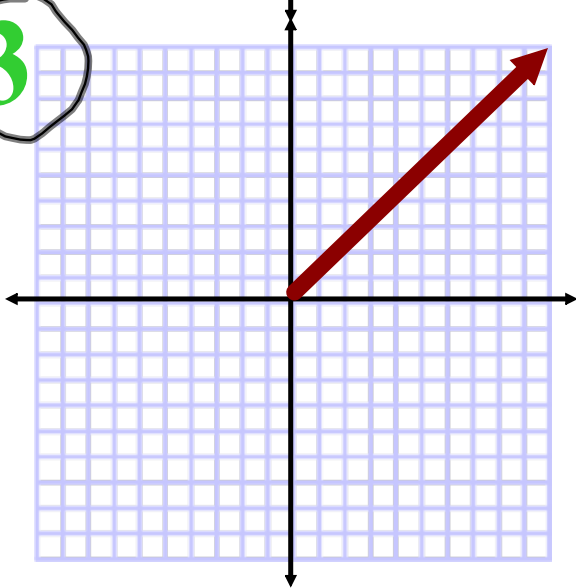
1



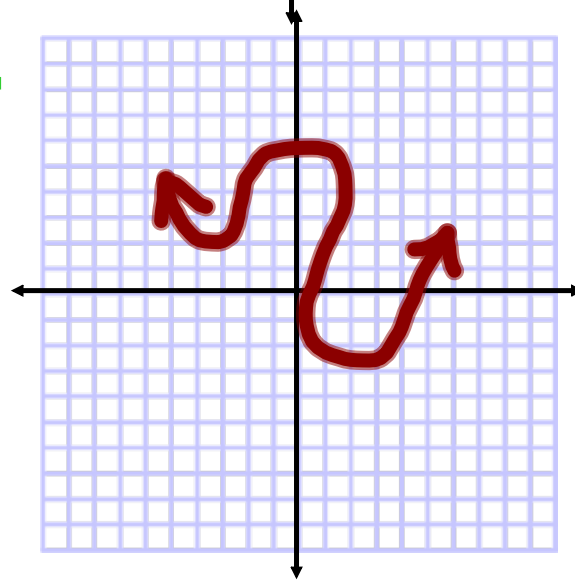
2



3



4





Number of Extra Toppings	Cost (\$)
0	12.00
1	12.75
2	13.50
3	14.25
4	15.00
5	15.75

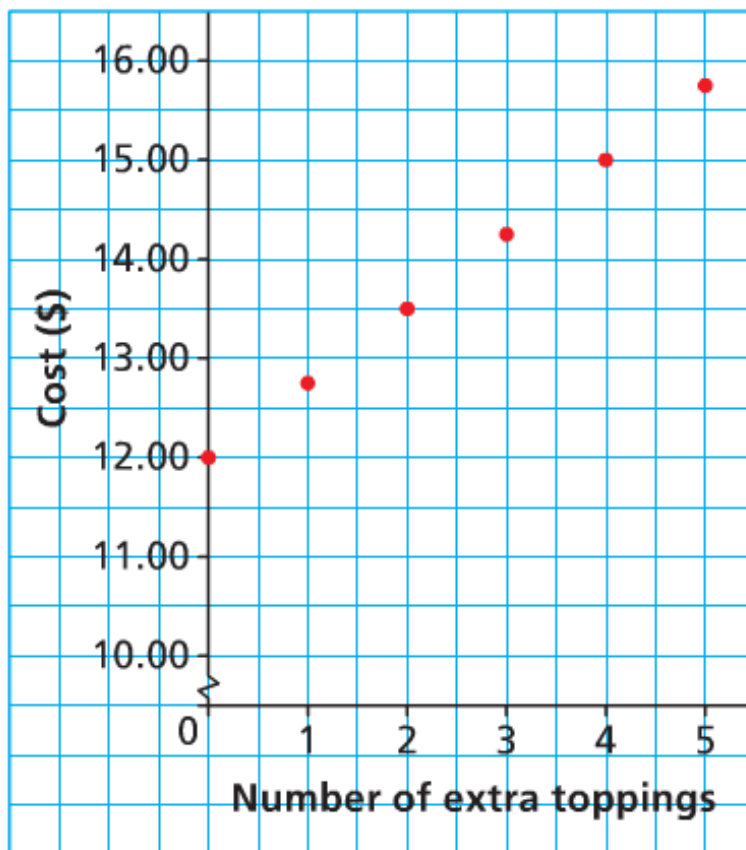
- a) **What patterns do you notice in the table above?**
- b) **Graph the following relation.**

a)

	Number of Extra Toppings	Cost (\$)	
+1 (	0	12.00	) +0.75
+1 (	1	12.75	) +0.75
+1 (	2	13.50	) +0.75
+1 (	3	14.25	) +0.75
+1 (	4	15.00	) +0.75
+1 (	5	15.75	) +0.75

Both sets are increasing by a constant amount !!
Therefore, this is a linear function !!

COST OF a PIZZA



There are many ways to determine if a relation is a linear function!!

A table of values:



Distance (km)	Cost (\$)
0	60
100	80
200	100
300	120
400	140

Independent **Dependent**

	Distance (km)	Cost (\$)	
	0	60	
+100	100	80	+20
+100	200	100	+20
+100	300	120	+20
+100	400	140	+20

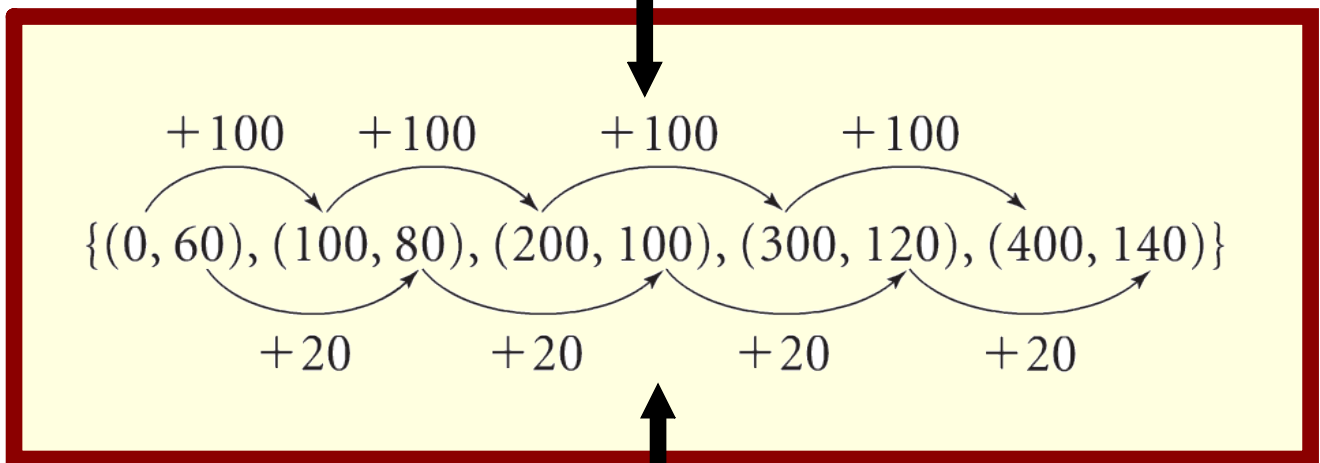
A constant change in the independent results in a constant change in the dependent

Set of Ordered Pairs:

$\{(0, 60), (100, 80), (200, 100), (300, 120), (400, 140)\}$

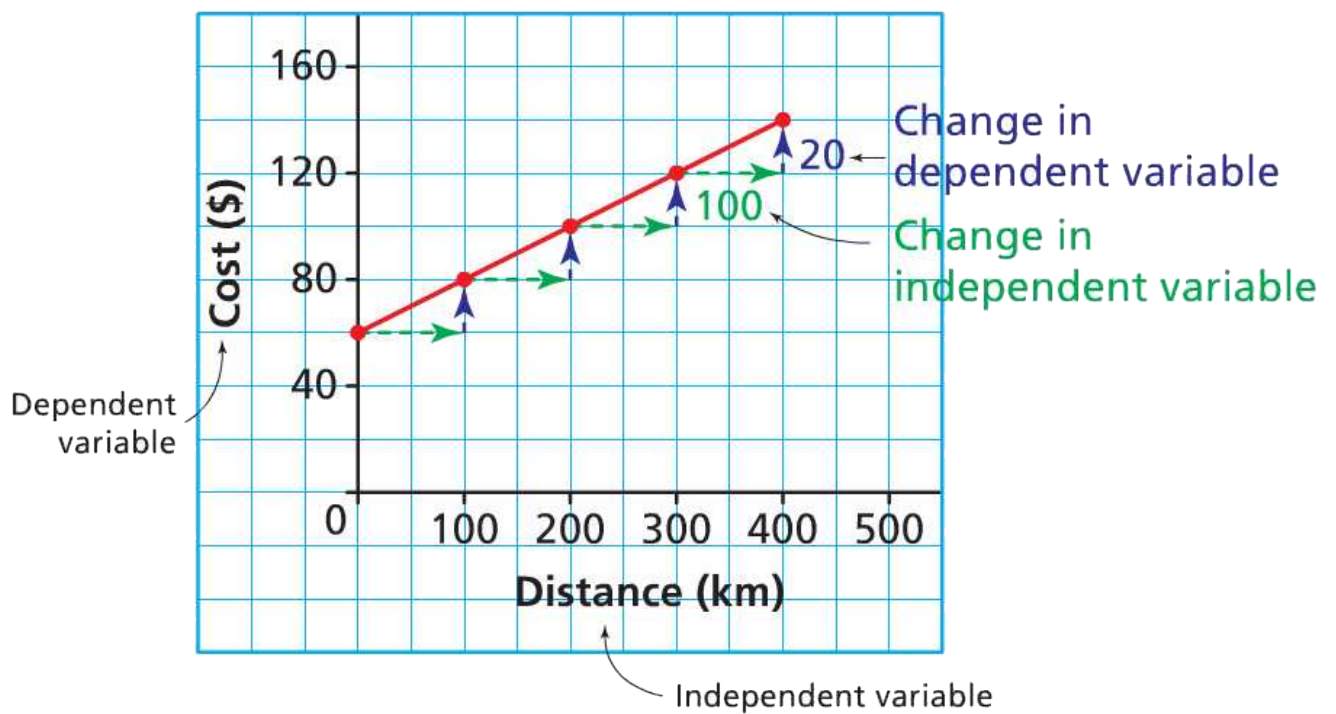


Change in Independent



Change in Dependent

a graph:



Which of the following Represents a Linear Function?

- a) The relation between temperature in degrees Celsius, C , and temperature in degrees Fahrenheit, F

C	F
0	32
5	41
10	50
15	59
20	68

- b) The relation between the current, I amps, and power, P watts, in an electrical circuit

I	P
0	0
5	75
10	300
15	675
20	1200

- c)** The relation between the number of bacteria in a culture, n , and time, t minutes.

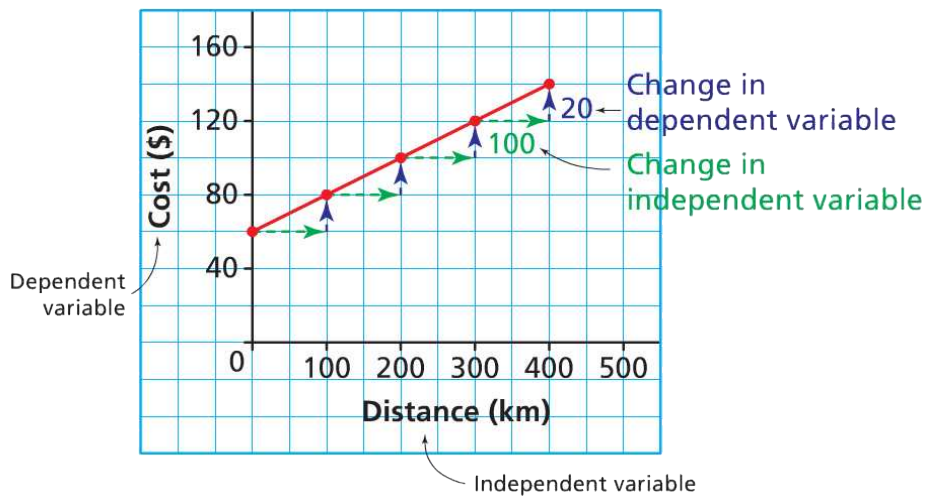
t	n
0	1
20	2
40	4
60	8
80	16
100	32

- d)** The relation between the amount of goods and services tax charged, T dollars, and the amount of the purchase, A dollars

A	T
60	3
120	6
180	9
240	12
300	15

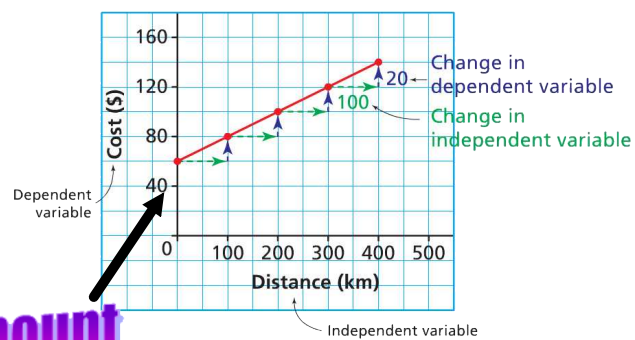
Rate of Change

$$\text{Rate of Change} = \frac{\text{Change in Dependent}}{\text{Change in Independent}}$$



$$\begin{aligned}
 \text{Rate of Change} &= \frac{\text{Change in Dependent}}{\text{Change in Independent}} \\
 &= \frac{\$20}{100\text{km}} \\
 &= \$0.20/\text{km}
 \end{aligned}$$

Writing an Equation



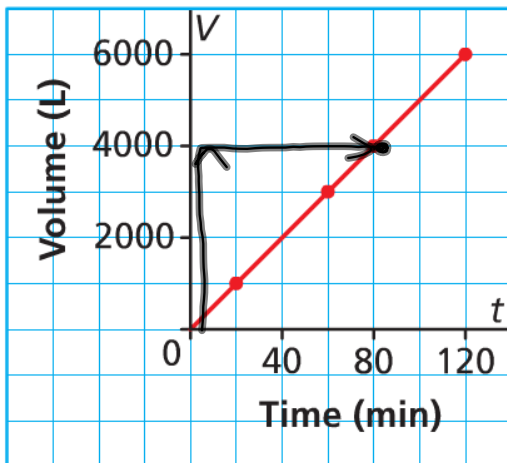
initial amount

$$C = 0.20d + 60$$

↑ initial amount
↑ independent variable
↑ rate of change
↑ dependent variable

Calculate the Rate of Change

a) Graph A
Filling a Water Tank

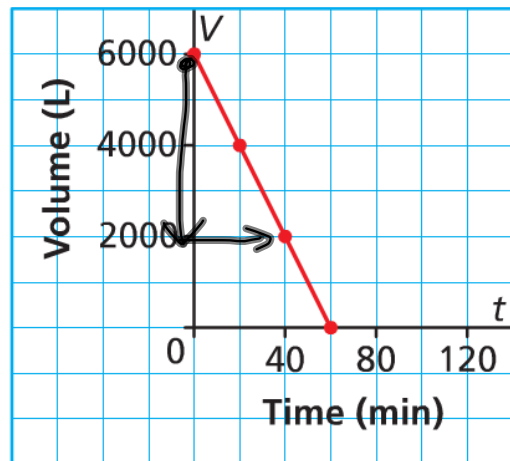


$$\cdot \frac{4000}{80}$$

$$= 50 \text{ L/min}$$

$$V = 50m + 0$$

b) Graph B
Emptying a Water Tank

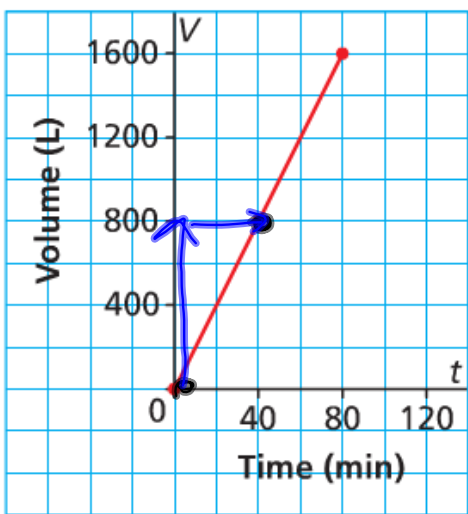


$$\frac{-4000}{40}$$

$$= -100 \text{ L/min}$$

$$V = -100m + 6000$$

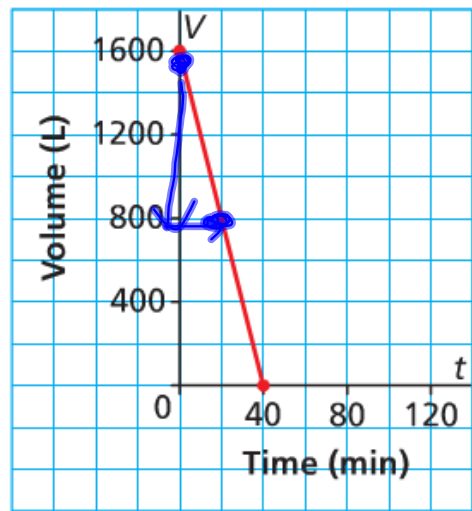
c) Graph A
Filling a Hot Tub



$$\frac{800}{40} = 20 \text{ L/min}$$

$$V = 20m + 0$$

d) Graph B
Emptying a Hot Tub



$$\frac{-800}{20} = -40 \text{ L/min}$$

$$V = -40m + 1600$$

Assignment Page 308

#3, #4, #5, #7