

Math 10-C Relations & Functions Assignment List

Name: _____

KEY

C1&C2: Intro to Graphing / Graphing Relations

- Graphing Stories Video Graphs and Assignment
- Text pg. 115: 1 (Sketch instead of describe), 3ab, 9
- Graphing Relations Assignment
- C2 Quick Check - Graphing Relations

C3: Interpret Graphs

- Interpret Graphs Assignment
- C3 Quick Check - Interpret Graphs

C4: Domain & Range Notation

- Domain & Range Assignment
- Domain & Range Notation Assignment
- Text pg. 123: 4, 1

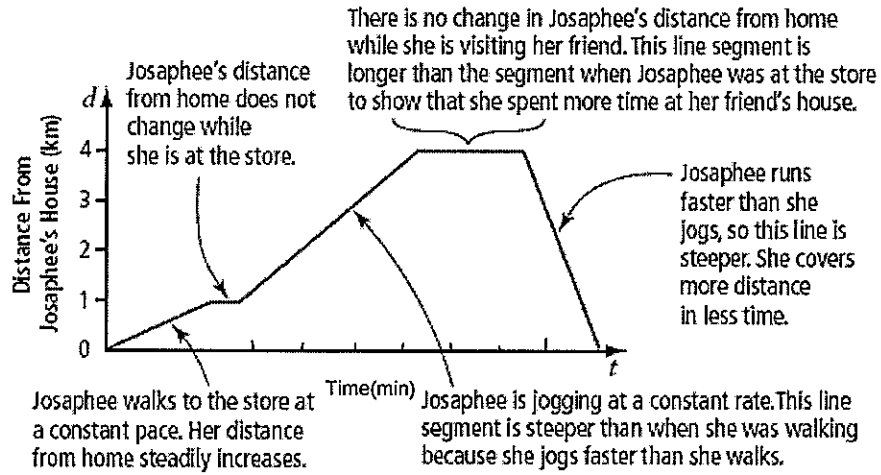
C5: Functions

- Text pg. 128: 1
- Function Notation Assignment
- Text pg. 128: 2-8
- C5 Quick Check - Functions

Relations & Functions Quiz

M10C Graphing Stories Assignment

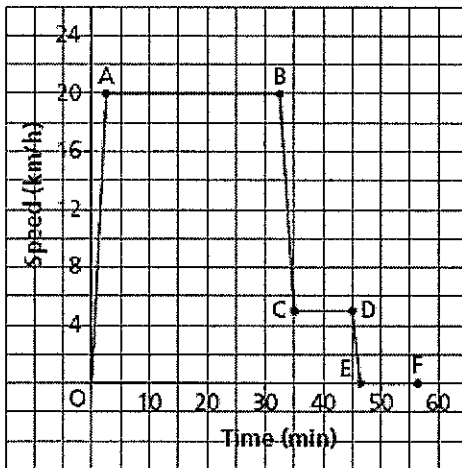
Question #1 Solution



M10C Graphing Stories Assignment

Question #2 Solution

Samuel's Bicycle Ride



Segment	Journey
OA	Samuel's speed increases from 0 to 20 km/h, so the segment goes up to the right.
AB	Samuel cycles at approximately 20 km/h for 30 min. His speed does not change, so the segment is horizontal.
BC	Samuel's speed decreases to 5 km/h, so the segment goes down to the right.
CD	Samuel cycles uphill at approximately 5 km/h for 10 min. His speed does not change, so the segment is horizontal.
DE	Samuel slows down to 0 km/h, so his speed decreases and the segment goes down to the right.
EF	Samuel remains stopped at 0 km/h for 10 min, so the segment is horizontal.

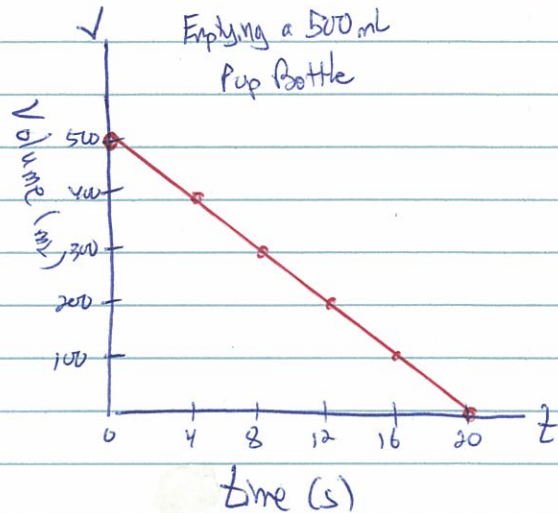
MIOC - Graphing Relations Assignment

KEY

1. $V =$ volume of pop in container (mL)
 $t =$ time (s)

$$V = 500 - 25t$$

t (s)	V (mL)	
0	500	(0, 500)
4	400	(4, 400)
8	300	(8, 300)
12	200	(12, 200)
16	100	(16, 100)
20	0	(20, 0)



a) Independent var. = time

b) Dependent var. = Volume

c) Volume depends on time

d) Any real # greater than or equal to 0 and less than or equal to 20. (Domain)

e) Any real # greater than or equal to 0 and less than or equal to 500. (Range)

f) Continuous.

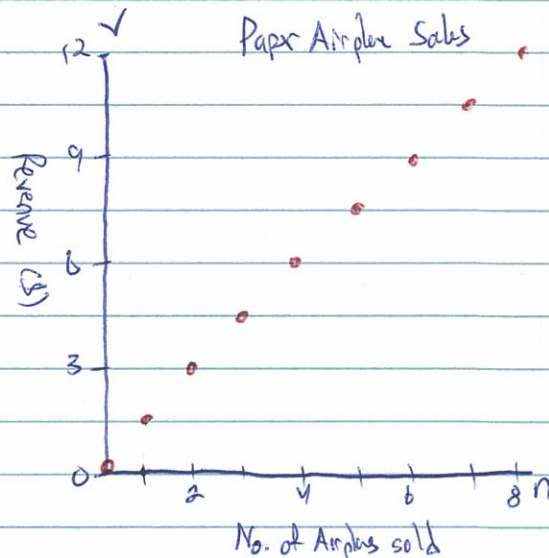
M10C - Graphing Relations Assignment

KEY

2. $R = \text{revenue } (\$)$
 $n = \text{number of airplanes sold}$

$$R = 1.50n$$

n	$R(\$)$	
0	0	(0,0)
1	1.50	(1,1.50)
2	3	(2,3)
3	4.50	(3,4.50)
4	6	(4,6)
5	7.50	(5,7.50)
6	9	(6,9)
7	10.50	(7,10.50)
8	12	(8,12)



a) Independent var. = number of airplanes sold

b) Dependent var. = Revenue

c) Revenue depends on number of airplanes sold

d) All whole #'s greater than or equal to 0 and less than or equal to 8. (Domain)

e) Multiples of \$1.50 greater than or equal to \$0 and less than or equal to \$12. (Range)

f) Discrete.

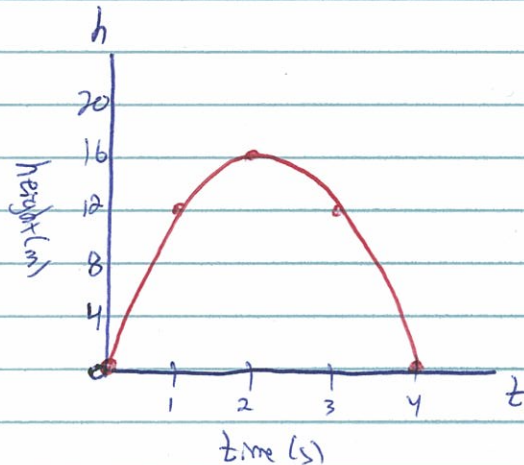
M10C - Graphing Relations Assignment

KEY

3. $h =$ height of football (m)
 $t =$ time (s)

$$h = -4t^2 + 16t$$

t (s)	h (m)	
0	0	(0,0)
1	12	(1,12)
2	16	(2,16)
3	12	(3,12)
4	0	(4,0)



$$h = -4(0)^2 + 16(0) = 0$$

$$h = -4(1)^2 + 16(1) = 12$$

$$h = -4(2)^2 + 16(2) = 16$$

$$h = -4(3)^2 + 16(3) = 12$$

$$h = -4(4)^2 + 16(4) = 0$$

a) Independent var. = time

b) Dependent var. = height

c) height depends on time

d) Any real # greater than or equal to 0 and less than or equal to 4. (Domain)

e) Any real # greater than or equal to 0 and less than or equal to 16. (Range)

f) Continuous.

M10C Quick Check C2
Graphing Relations

/ 8

Name: KEY

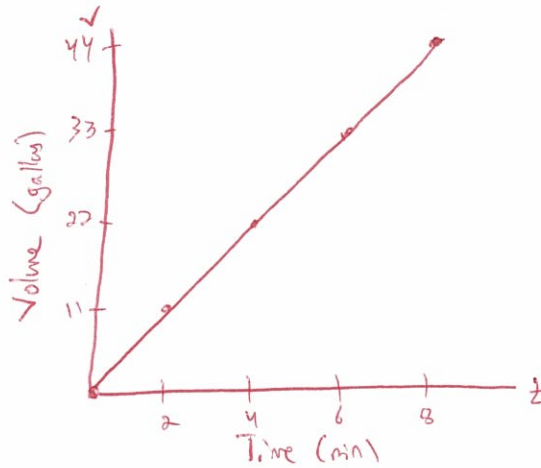
1. You are filling up a bath tub at a rate of 5.5 gallons / minute. The bath tub has a maximum volume of 44 gallons. Express the relationship of the volume of water in the bath tub as time passes as a table of values and a graph.

in gallons, v, in min, t,

Table of Values [1 mark]

t (min)	v (gallons)
0	0
1	5.5
2	11
3	16.5
4	22
5	27.5
6	33
7	38.5
8	44

Graph [1 mark]



a. What is the independent variable? time

b. What is the dependent variable? volume

c. Complete the statement:

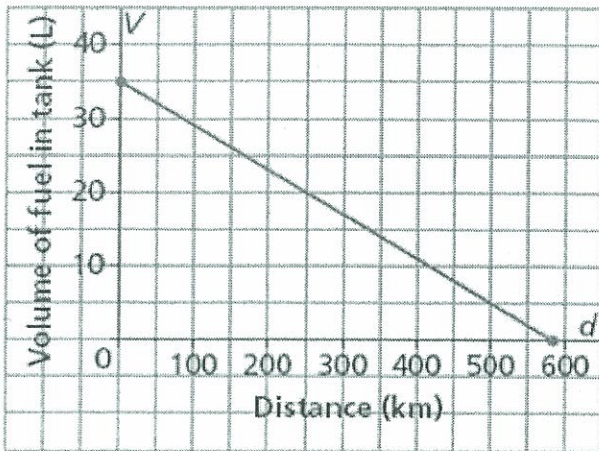
volume depends on time.

d. What is the domain? All real #'s greater than or equal to 0 and less than or equal to 8.
 $\{t \mid 0 \leq t \leq 8, t \in \mathbb{R}\}$ $[0, 8]$

e. What is the range? All real #'s greater than or equal to 0 and less than or equal to 44.
 $\{v \mid 0 \leq v \leq 44, v \in \mathbb{R}\}$ $[0, 44]$

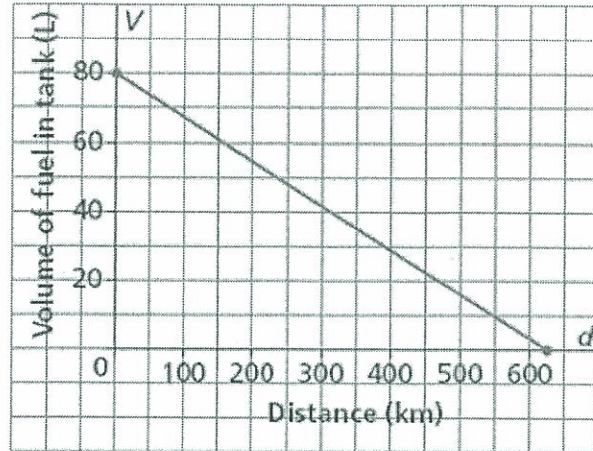
f. Is the data discrete or continuous? continuous

Fuel Consumption of a Smart Car



Pearson pg. 321

Fuel Consumption of an SUV



Pearson pg. 321

1. What is the x-intercept for the graph of the smart car and for the graph of the SUV. What do the x-intercepts mean in the context of the problem?

Smart Car

x-int = 580 km

The smart car can travel 580 km on 35L.

SUV

x-int = 625 km

The SUV can travel ~~525~~ 625 km on 80L.

2. What is the y-intercept for the graph of the smart car and for the graph of the SUV. What do the y-intercepts mean in the context of the problem?

Smart Car

y-int = 35L

The Initial amount of fuel in tank.

SUV

y-int = 80L

The initial amount of fuel in tank.

3. What is the domain and range for the graph of the smart car in words and in set notation?

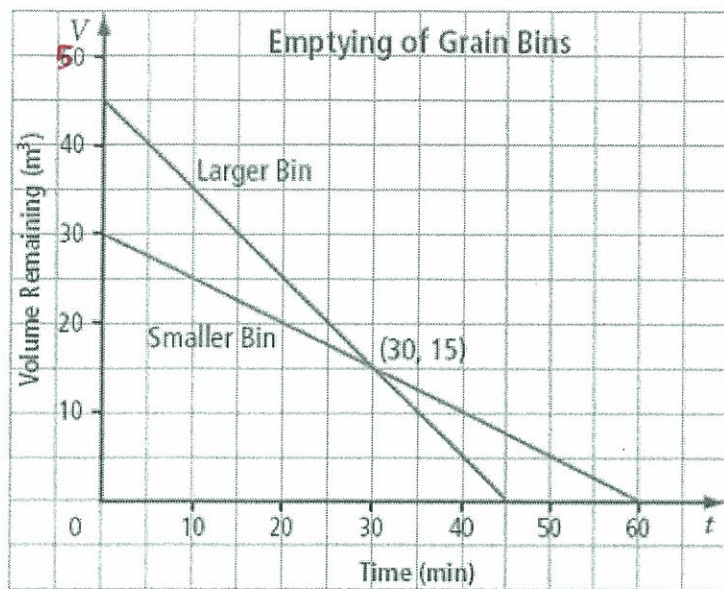
D: All real #'s greater than or equal to 0 and less than or equal to 580.
 $\{d \mid 0 \leq d \leq 580, d \in \mathbb{R}\}$

R: All real #'s greater than or equal to 0 and less than or equal to 35.
 $\{v \mid 0 \leq v \leq 35, v \in \mathbb{R}\}$

4. What is the domain and range for the graph of the SUV in words and in interval notation?

D: All real #'s greater than or equal to 0 and less than or equal to 625.
 $[0, 625]$

R: All real #'s greater than or equal to 0 and less than or equal to 80.
 $[0, 80]$



1. What is the y-intercept for the graph of the larger bin and what does it mean in the context of the problem?

$V\text{-int} = 45 \text{ m}^3$ The larger bin starts with a volume of 45 m^3 .

2. What is the x-intercept for the graph of the smaller bin and what does it mean in the context of the problem?

$t\text{-int} = 60 \text{ min}$ The smaller bin takes 60 min to empty.

3. Which bin emptied the fastest? The larger bin.

4. What is the domain of the larger bin in words and in set notation?

D: All real #'s greater than or equal to 0 and less than or equal to 45.

$$\{t \mid 0 \leq t \leq 45, t \in \mathbb{R}\}$$

5. What is the range of the smaller bin in words and in interval notation?

R: All real #'s greater than or equal to 0 and less than or equal to 30.

$$[0, 30]$$

CY - Domain + Range Assignment

KEY

1. a) $D: \{1, 2, 3, 4, 5, 6\}$ b) $D: \{0, 1, 2, 3\}$
 $R: \{40, 80, 120, 160, 200, 240\}$ $R: \{0, 0.50, 1.00, 1.50\}$

c) $D: \{1, 4, 9, 16, 25, 36, 49, 64, 81, 100\}$
 $R: \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

d) $D: \{-8, -5, -2, 1, 4\}$ e) $D: \{-4, 0, 1, 2, 3\}$
 $R: \{-8, -4, 0, 4, 8\}$ $R: \{-1, 0, 1, 4, 5, 6, 7\}$

2. a) $D: \{d \mid 0 \leq d < 20, d \in \mathbb{R}\}$ b) $D: \{n \mid 0 \leq n \leq 40, n \in \mathbb{R}\}$
 $R: \{c \mid 0 \leq c < 40, c \in \mathbb{R}\}$ $R: \{c \mid 8 \leq c \leq 44.80, n \in \mathbb{R}\}$

c) $D: \{x \mid 2 \leq x \leq 8, x \in \mathbb{R}\}$ d) $D: \{x \mid x \in \mathbb{R}\}$
 $R: \{y \mid 1 \leq y \leq 7, y \in \mathbb{R}\}$ $R: \{y \mid y \in \mathbb{R}\}$

e) $D: \{x \mid x \geq -4, x \in \mathbb{R}\}$ f) $D: \{x \mid -2 \leq x \leq 2, x \in \mathbb{R}\}$
 $R: \{y \mid y \geq 0, y \in \mathbb{R}\}$ $R: \{y \mid -5 \leq y \leq -1, y \in \mathbb{R}\}$

g) $D: \{x \mid x < 1, x \in \mathbb{R}\}$ h) $D: \{x \mid x \in \mathbb{R}\}$
 $R: \{y \mid y < -1, y \in \mathbb{R}\}$ $R: \{y \mid y \leq 7, y \in \mathbb{R}\}$

3. a) $D: [0, 20)$ b) $D: [0, 40]$ c) $D: [2, 8]$
 $R: [0, 40)$ $R: [8, 44.80]$ $R: [1, 7]$

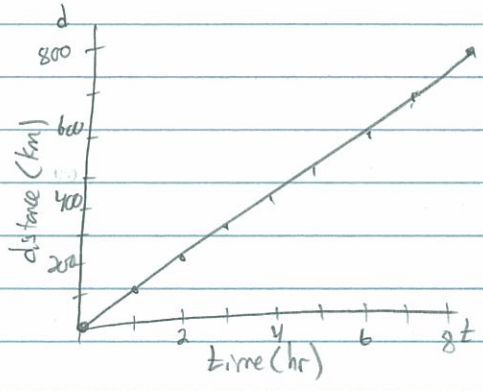
d) $D: (-\infty, \infty)$ e) $D: [-4, \infty)$ f) $D: [-2, 2]$
 $R: (-\infty, \infty)$ $R: [0, \infty)$ $R: [-5, -1]$

g) $D: (-\infty, 1)$ h) $D: (-\infty, \infty)$
 $R: (-\infty, -1)$ $R: (-\infty, 7]$

4.

t (hr)	d (km)
0	0
1	100
2	200
3	300
4	400
⋮	
8	800

$d = 100t$

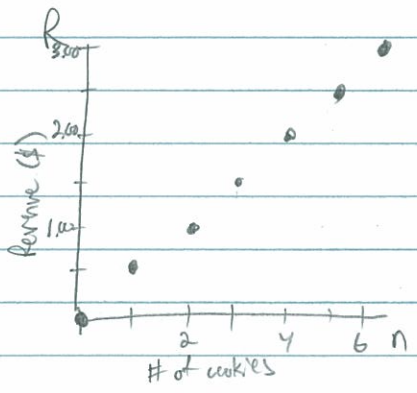


- a) Independent var : time
- b) Dependent var : distance
- c) distance depends on time
- d) $D: \{t \mid 0 \leq t \leq 8, t \in \mathbb{R}\}$
- e) $R: \{d \mid 0 \leq d \leq 800, d \in \mathbb{R}\}$
- f) continuous

5.

n	R (\$)
0	0
1	0.50
2	1.00
3	1.50
4	2.00
5	2.50
6	3.00

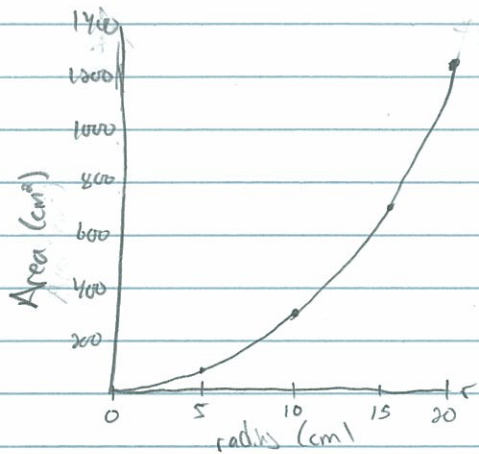
$R = 0.50n$



- a) Independent var : # of cookies
- b) Dependent var : Revenue
- c) Revenue depends on # of cookies
- d) $D: \{0, 1, 2, 3, 4, 5, 6\}$
- e) $R: \{0, 0.50, 1.00, 1.50, 2.00, 2.50, 3.00\}$
- f) discrete.

6.

r	A
0	0
1	3.14
2	12.57
3	28.27
4	50.27
5	78.57
:	
10	314.16
15	706.86
20	1256.64



- a) Independent var: radius
- b) Dependent var: Area
- c) Area depends on radius
- d) D: [0, 20]
- e) R: [0, 1256.64]
- f) Continuous

Math 10-C Graphing Relations

Name: KEY

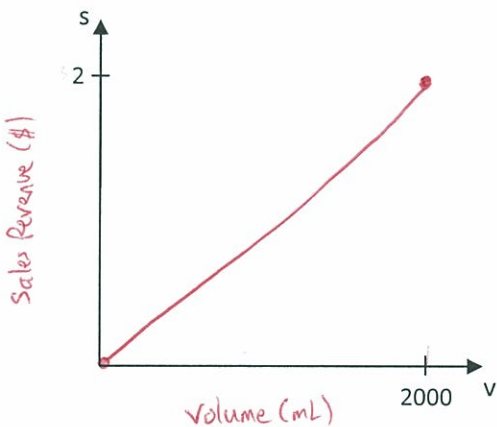
Domain & Range ~~Notation~~ *Assignment*

7. For each problem, draw a graph of the situation using the indicated domain. Then state the range using the same notation used for the domain.

a) 1. You are selling lemonade at a price of \$0.25 / 250mL. Draw a graph of your sales revenue, s , based on the volume of lemonade sold, v , in mL.

Case #1

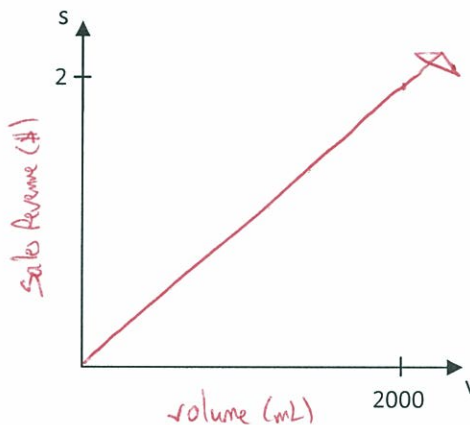
Domain: $\{v | 0 \leq v \leq 2000, v \in R\}$



Range: $\{s | 0 \leq s \leq 2, s \in R\}$

Case #2

Domain: $\{v | v \geq 0, v \in R\}$

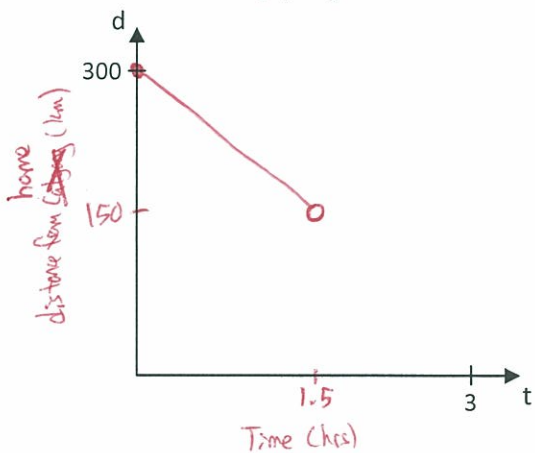


Range: $\{s | s \geq 0, s \in R\}$

b) 2. Calgary is about 300km from your house. You are driving home from Calgary at a speed of 100 km/h. Draw a graph of your distance from home, d , in km based on the time spent travelling, t , in hours.

First Part of Trip

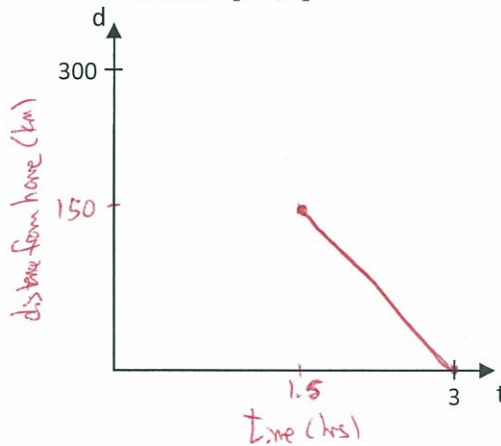
Domain: $[0, 1.5]$



Range: $(150, 300]$

Second Part of Trip

Domain: $[1.5, 3]$

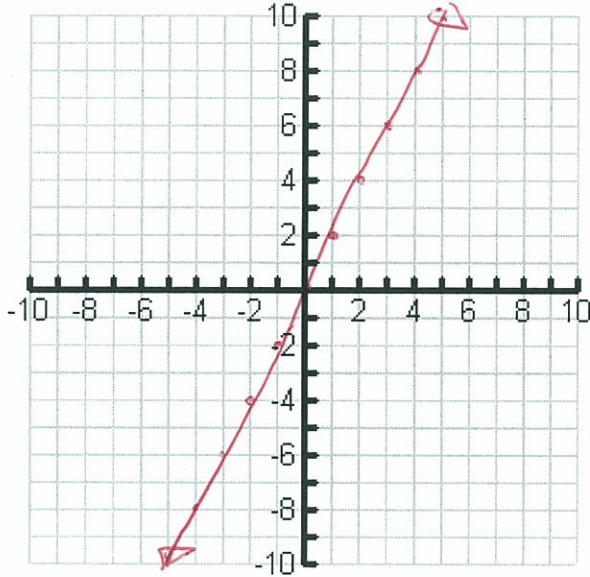


Range: $[0, 150]$

c) 3. $y = 2x$

Case #1

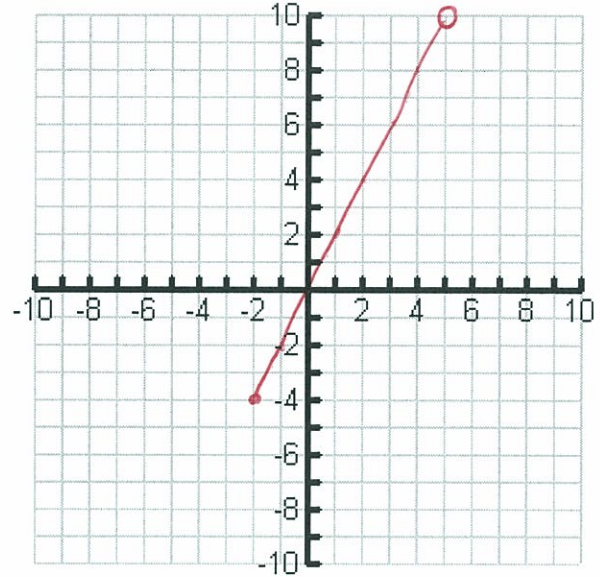
Domain: $\{x \mid x \in \mathbb{R}\}$



Range: $\{y \mid y \in \mathbb{R}\}$

Case #2

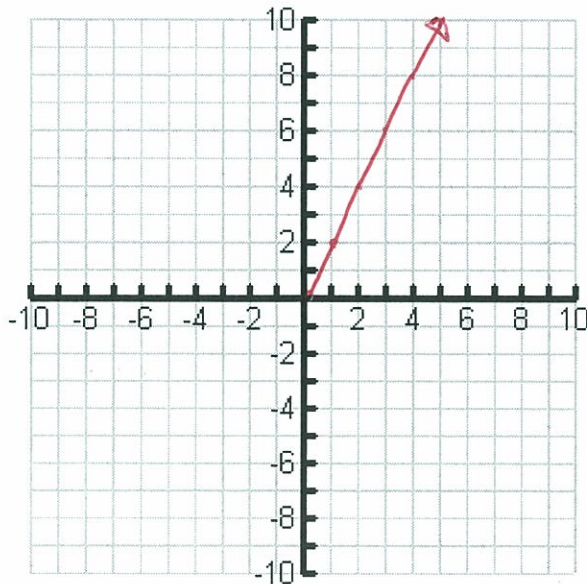
Domain: $[-2, 5)$



Range: $[-4, 10)$

Case #3

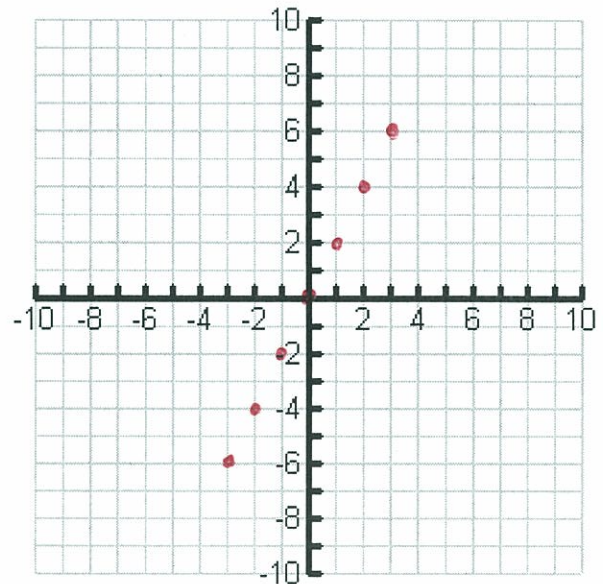
Domain: $[0, \infty)$



Range: $[0, \infty)$

Case #4

Domain: $\{-3, -2, -1, 0, 1, 2, 3\}$



Range: $\{-6, -4, -2, 0, 2, 4, 6\}$

Math 10-C Domain & Range Notation Assignment

Name: KEY

Each table contains the domain for a graph expressed in words, set notation and interval notation. Complete each table. The first one has been done for you.

1.	Words:	All real #'s greater than or equal to 4 and less than 8.
	Set Notation:	$\{x 4 \leq x < 8, x \in R\}$
	Interval Notation:	$[4, 8)$

2.	Words:	All real #'s greater than or equal to -3 and less than or equal to 2.
	Set Notation:	$\{x -3 \leq x \leq 2, x \in R\}$
	Interval Notation:	$[-3, 2]$

3.	Words:	All real #'s greater than or equal to 3.
	Set Notation:	$\{x x \geq 3, x \in R\}$
	Interval Notation:	$[3, \infty)$

4.	Words:	All real #'s less than 5.
	Set Notation:	$\{x x < 5, x \in R\}$
	Interval Notation:	$(-\infty, 5)$

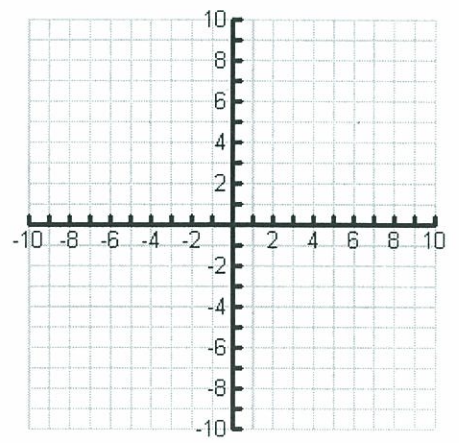
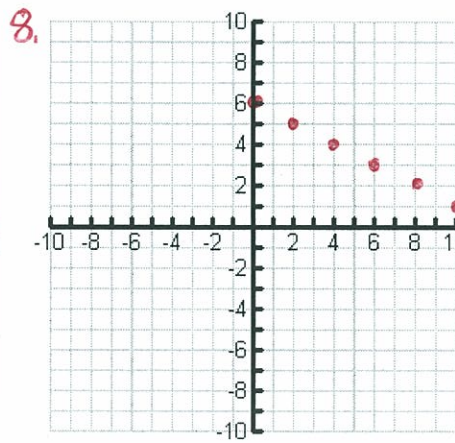
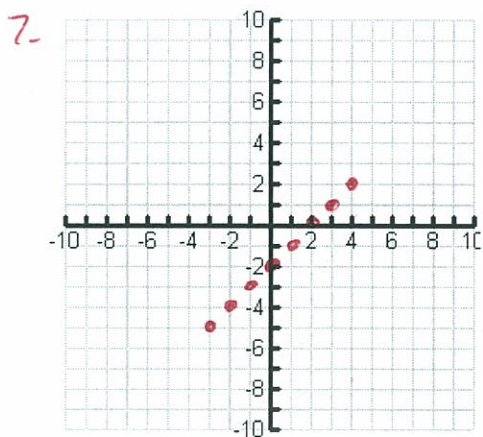
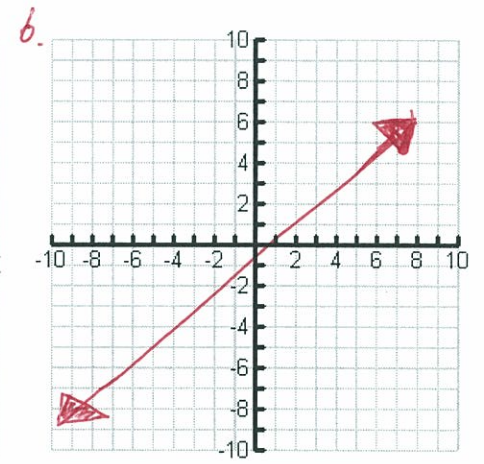
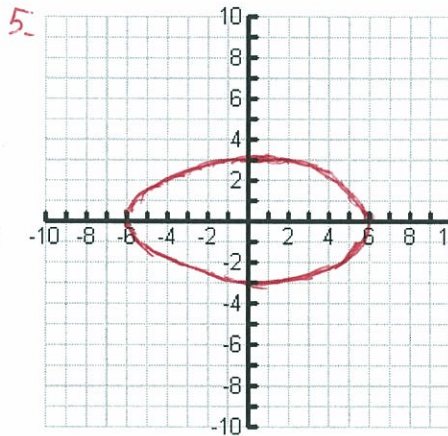
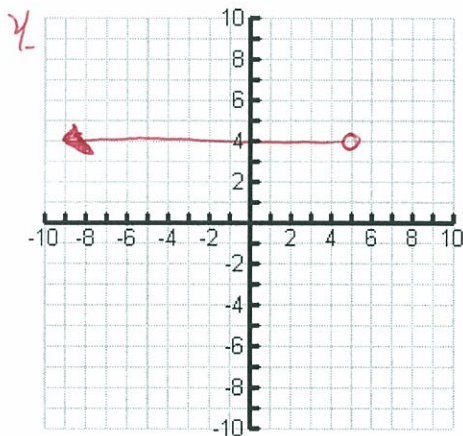
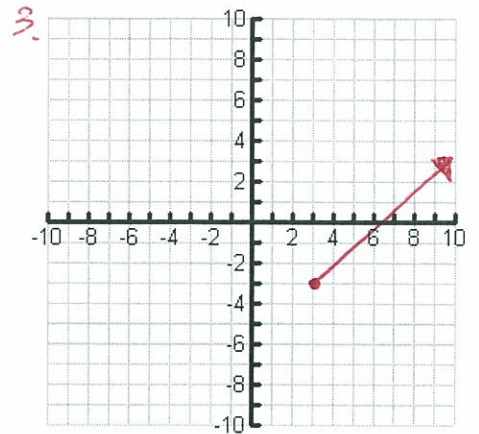
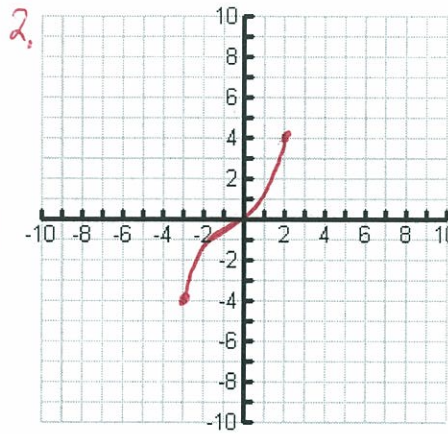
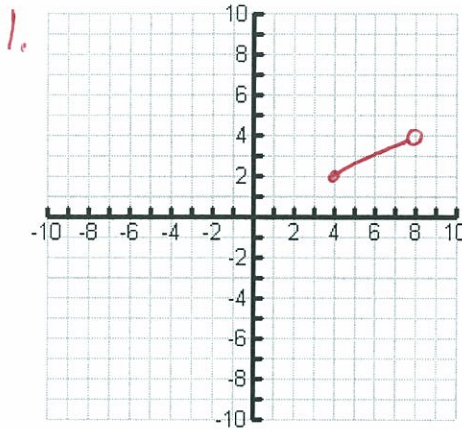
5.	Words:	All real #'s greater than or equal to -6 and less than or equal to 6.
	Set Notation:	$\{x -6 \leq x \leq 6, x \in R\}$
	Interval Notation:	$[-6, 6]$

6.	Words:	All real #'s.
	Set Notation:	$\{x x \in R\}$
	Interval Notation:	$(-\infty, \infty)$

7.	Words:	All whole #'s greater than or equal to -3 and less than or equal to 4.
	List:	$\{-3, -2, -1, 0, 1, 2, 3, 4\}$

8.	Words:	All even whole #'s greater than or equal to 0 and less than or equal to 10.
	List:	$\{0, 2, 4, 6, 8, 10\}$

For each of the tables on the previous page, draw a graph that matches the given domain.

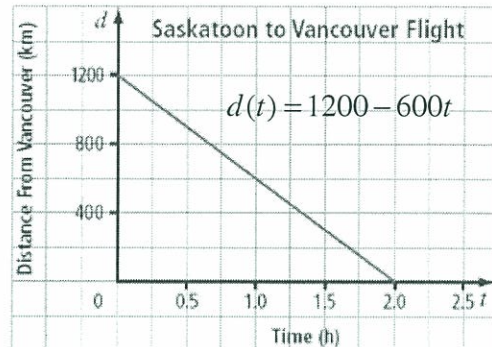


State the range for each graph.

Math 10-C Function Notation Assignment
C5 - Functions

Name: KEY

1. An airplane flies directly from Saskatoon, SK, to Vancouver, BC. The graph shows the relationship between the distance from Vancouver, d , in kilometres, and the flying time, t , in hours.



MHR pg. 367

For each of the following, fill in the blanks and explain what the solution means in the context of the problem.

a) $d(0) = \underline{1200}$

Distance is 1200 km when time is 0.

b) $d(1) = \underline{600}$

Distance is 600 km after 1 hr.

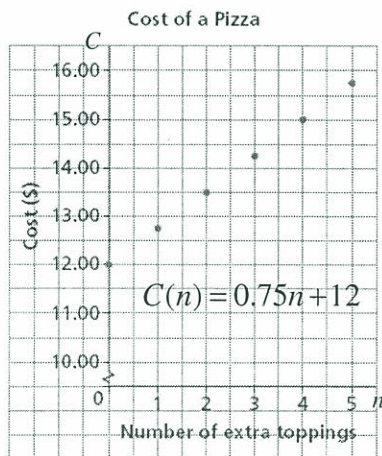
c) $d(t) = 900, t = \underline{0.5}$

After 0.5 h the distance is 900 km

d) $d(t) = 0, t = \underline{2}$

After 2 h the distance is 0 km.

2. The cost of a pizza based on the number of extra toppings is given by the graph below. For each of the following, fill in the blanks and explain what the solution means in the context of the problem.



Pearson pg. 300

a) $C(0) = \underline{12}$

Cost is \$12 with 0 additional toppings

b) $C(4) = \underline{15}$

Cost is \$15 with 4 additional toppings

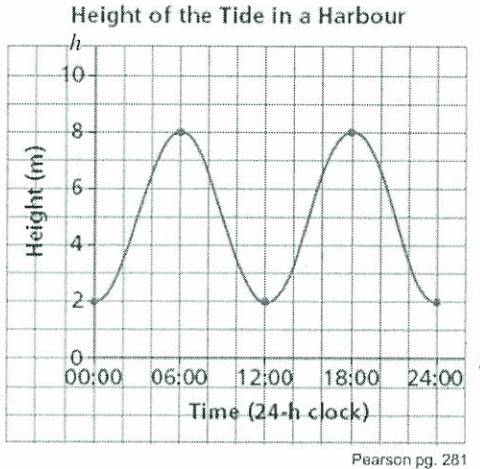
c) $C(n) = \$14.~~00~~_{25}, n = \underline{3}}$

Three additional toppings will cost \$14.25 total.

d) $C(n) = \$15.75, n = \underline{5}$

Five additional toppings will cost \$15.75 total.

3. The height of tide in a harbor is shown by the graph below. For each of the following, fill in the blanks and explain what the solution means in the context of the problem.



a) $h(0) = 2$

Height is 2m at 00:00.

b) $h(18) = 8$

Height is 8m at 18:00.

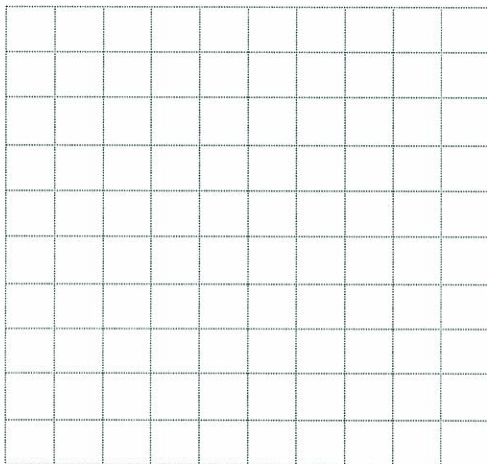
c) $h(t) = 8, t = 6, 18$

At 06:00 and 18:00 the height is 8m.

d) $h(t) = 5, t = 3, 9, 15, 21$

At 03:00, 09:00, 15:00 and 21:00 the height is 5m.

4. Create your own problem similar the #1-3. Sketch your own graph of a scenario, create some questions involving function notation and solve them. Exchange with a partner.



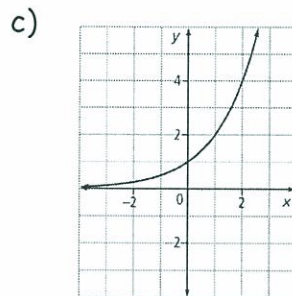
1. Determine whether each relation is a function (F) or is not a function (NF). For each question circle F if it is a function or NF if it is not a function. (MHR BLM 6.4)

a) $(4, 1), (5, -2), (6, -5), (7, -8), (6, -11), (5, -14), (4, -17)$ F or **NF**

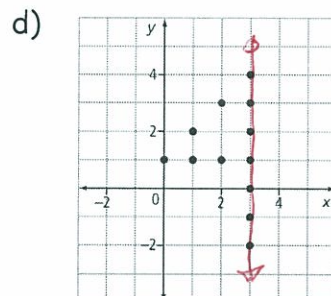
b)

x	Y
-2	-2
-1	4
0	-8
1	16
2	-32

F or NF



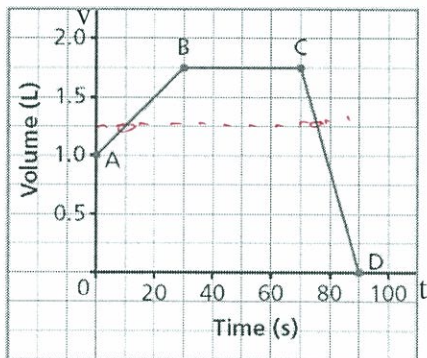
F or NF



F or **NF**

2. The volume of water in a watering can, V , in litres in relation to time, t , in seconds is shown by the graph below. Use the graph to fill in the blanks.

Volume of Water in a Watering Can



Pearson pg. 279

a) $V(0) = \underline{1.0 \text{ L}}$

b) $V(30) = \underline{1.75 \text{ L}}$

c) $V(t) = 0, t = \underline{90 \text{ s}}$

d) $V(t) = 1.25, t = \underline{10 \text{ s}, 75 \text{ s}}$

3. The function $C(n) = 25n$ describes the number of calories, C , in n crackers. Solve the following and explain what the solution means in the context of the problem.

a) $C(12) = 25(12)$

$= \underline{300 \text{ calories}}$

12 crackers have 300 calories.

b) Determine n when $C(n) = 475$

$475 = 25n$

$\underline{n = 19 \text{ crackers}}$

19 crackers have 475 calories.

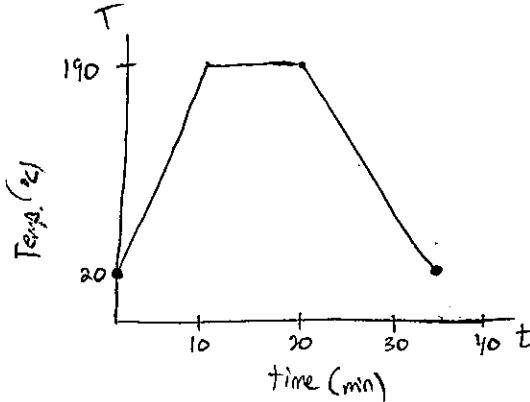
M10-C Relations and Functions
Quiz C1-C5

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Name: KEY
Date: _____

1. An oven is turned on at a room temperature of 20°C and it takes 10 min to reach a temperature of 190°C . A tray of cookies is placed in the oven to bake for 10 min. The oven is then turned off and returns to room temperature after 15 min.

- a. Sketch a graph of the temperature of the oven as a function of time. [2]



- b. What is the domain and range for this problem? [1]

$D: [0, 35]$

$R: [20, 190]$

2. For each relation, state the domain and range. [1 mark each]

- a. The cost for you and up to 4 of your friends to attend a concert at \$10 a ticket.

$D: \{1, 2, 3, 4, 5\}$

$R: \{10, 20, 30, 40, 50\}$

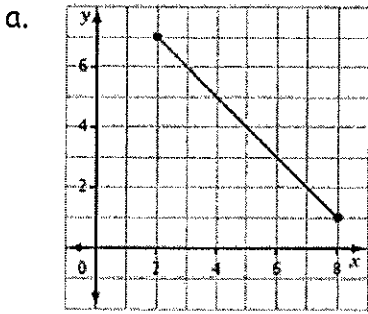
- b. The distance you drive in 3 hours if you travel at an average speed of 60 km/h.

$D: [0, 3]$

$R: [0, 180]$

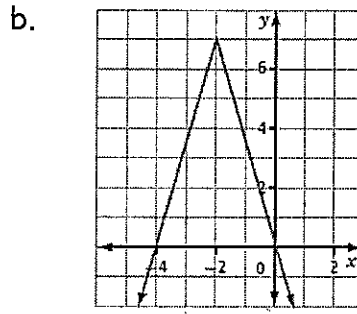
18

3. For each relation, state the domain and range. [1 mark each]



$D: [2, 8]$

$R: [1, 7]$



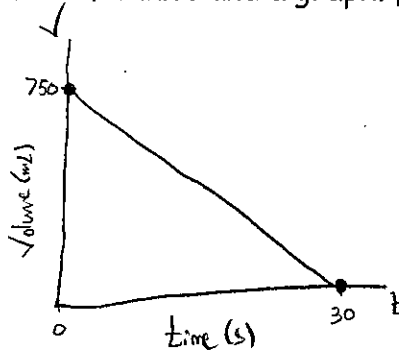
$D: \{x \mid x \in \mathbb{R}\}$

$R: \{y \mid y \leq 7, y \in \mathbb{R}\}$

4. You are emptying a full pop bottle at a rate of 25 mL/s as given by the equation $V = 750 - 25t$, where V is the volume of pop in the bottle in mL and t is the amount of time passed in seconds. The domain for this scenario is $\{t \mid 0 \leq t \leq 30, t \in \mathbb{R}\}$

a. Express the relationship between the volume of pop in the bottle and the time passed as a table of values and a graph. [2]

t	V
0	750
1	725
2	700
\vdots	\vdots
30	0



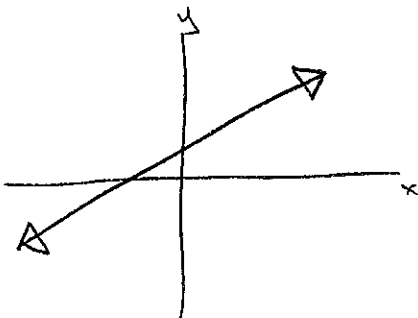
b. What is the domain and range for this problem? [1]

$D: [0, 30]$

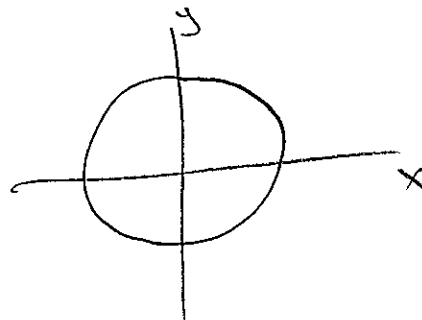
$R: [0, 750]$

5. Draw a graph of a relation that is a function and a graph of a relation that is not a function. [2]

Function

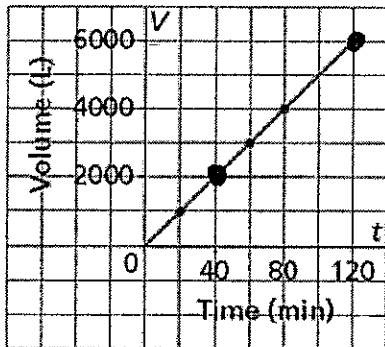


Not a Function



6. The following graph shows volume, V , as a function of time, t , when a water tank is being filled. This function may be modelled by the equation $V(t) = 50t$.

Filling a Water Tank



- a. For the above function, the value of $V(40)$ is 2000.
- b. If $V(t) = 6000$ in the above graph, then the value of t is 120.
- c. What is the domain and range of the above function?

$$D: [0, 120]$$

$$R: [0, 6000]$$

7. For a single membership to WORKOUT Health Club, you pay a \$35 initiation fee upon enrollment and then \$25 a month. The cost of belonging to the club is represented by the function $C(m) = 25m + 35$.

- a. Determine $C(10)$. Explain what your solution means. [2]

$$C(10) = 25(10) + 35$$

$$= 250 + 35$$

$$= \boxed{\$285}$$

The cost for 10 months is \$285.

- b. Determine m if $C(m) = \$185$. Show your work. [2]

$$C(m) = 25m + 35$$

$$185 = 25m + 35$$

$$150 = 25m$$

$$\boxed{6 = m}$$

The cost is \$185 for 6 months.