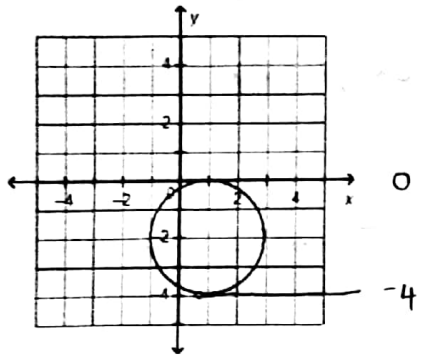
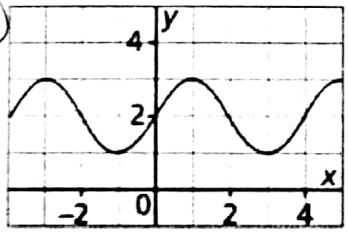
Chapter 5 Relations and Functions **Name** _____

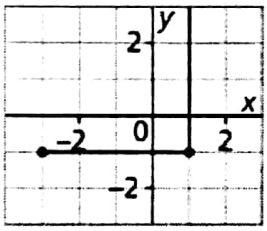
1. Determine the range of the graph.

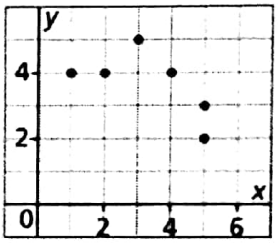


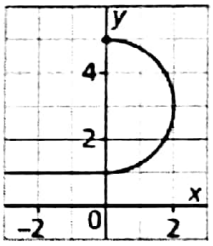
a. $-1 \le x \le 3$
b. $-4 \le y \le 3$
c. $-4 \le y \le 0$
d. $-1 \le y \le 0$

2. Which of these graphs represents a function?

a)


b)


c)


d)


a. a b. b c. c d. d

3. The entry fee for a community fair is \$5 and it costs \$0.75 per ride. If Mac spent a total of \$14.75 at the fair, how many rides did he go on? $14.75 = 0.75x + 5$

a) 3 b) 13 c) 16 d) 6

4. Which set of ordered pairs does not represent a function?

i) $\{(2,5),(3,8),(4,11),(2,-1)\}$

ii) $\{(4,6),(5,-7),(7,9),(8,-10)\}$

iii) $\{(-3,-8),(-1,-6),(-2,5),(0,7)\}$

iv) $\{(7,0),(4,-1),(-6,5),(-8,0)\}$

a. iv b. i c. iii d. ii

5. Identify the domain of this relation.

$\{(8,10),(5,7),(9,-11),(6,-8)\}$

a. $\{-8,7,9,10\}$
b. $\{5,6,8,9\}$
c. $\{-11,-8,7,10\}$
d. $\{5,6,9,10\}$

6. For the function $f(x) = -3x + 8$, determine $f(-2)$.

$-3(-2)+8 = 6+8$

a. 2 b. 7 c. 14 d. 3

7. For the function $f(x) = -3x + 8$, determine x when $f(x) = -25$.

$-25 = -3x + 8$ $-8 \quad -8$

$-33 = -3x$ $x = 11$

a. 83 b. –67 c. 11 d. –11

8. Write $y = 10x - 10$ in function notation.

$f(x) = 10x - 10$

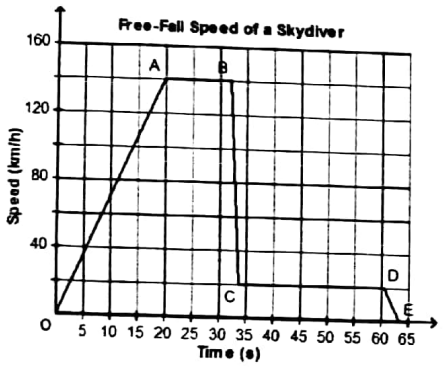
a. $f(x) = 10x - 10$
b. $f(y) = 10x - 10$
c. $f(y) = 10y - 10$
d. $f(x) = 10y - 10$

9. Write $g(x) = -7x - 2.75$ as an equation in two variables.

$g = -7x - 2.75$

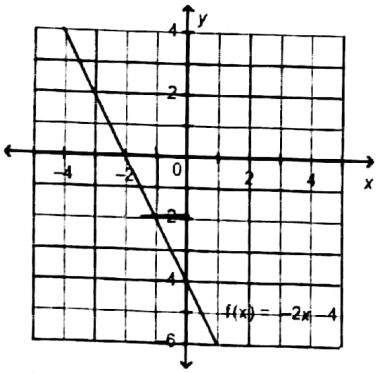
a. $g = -7x - 2.75$
b. $x = -7x - 2.75$
c. $g = -7g - 2.75$
d. $x = -7g - 2.75$

10. This graph shows the free-fall speed of a skydiver as a function of time. Which statement best describes what is happening for line segment BC in the graph?



a. The skydiver landed on the ground.
b. The skydiver jumped out of the plane.
c. The skydiver opened her parachute.
d. The skydiver was free-falling.

11. This is a graph of the function $f(x) = -2x - 4$. Determine the domain value when the range value is –2.



a. 3 b. 1 c. –1 d. 2

12. Which table of values represents a linear relation?

i)

Distance (m)	0	5	10	15	20
Time (s)	0	1	2	3	4

ii)

Time (s)	0	3	6	9	12
Distance (m)	0	10	22	36	52

iii)

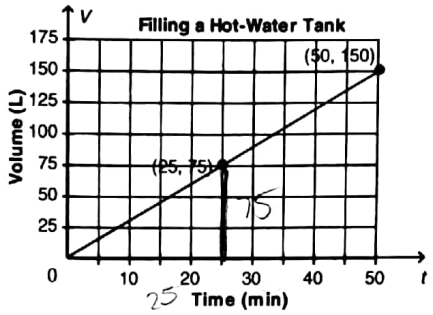
Time (s)	0	1	2	3	4
Speed (m/s)	0	1	2	4	8

iv)

Distance (m)	0	4	16	36	64
Speed (m/s)	0	2	4	6	8

a. i b. iii c. ii d. iv

13. This graph represents a 150-L hot-water tank being filled at a constant rate. Determine the rate of change of the relation.



75 L / 25 min

a. 25 L/min
b. 75 L/min
c. 0.33 L/min
d. 3 L/min

14. Which situation does not represent a linear relation?
a. A hang glider starts her descent at an altitude of 2000 m. She descends at a constant speed to an altitude of 1500 m in 10 min.
b. A population of bacteria triples every hour for 4 h.
c. A taxi service charges a $5 flat fee plus $2 for each kilometre travelled.
d. The cost to print each yearbook is $5. There is a start up fee of $500 to set up the printing press.

15. The distance of line AB given the points A(-2, 5) and B(-4, 8) is:
a. 2.24 units
b. 1.25 units
c. 3.61 units
d. 4.20 units

$d = \sqrt{(-2-(-4))^2 + (5-8)^2}$
$= \sqrt{4+9}$
$= \sqrt{13} \approx$

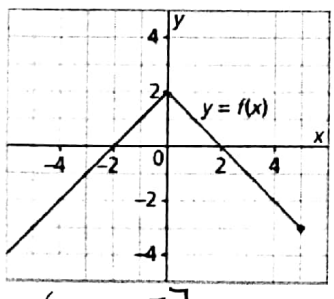
16. The midpoint of points X (-5, 3) and (-7, 5) is:
a. (-5, 4)
b. (-1, 4)
c. (-1, 1)
d. (-6, 4)

$m = \left(\frac{-5+-7}{2}, \frac{3+5}{2}\right)$

Constructed Response

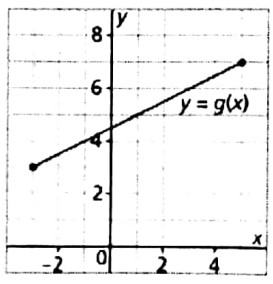
1. Determine the domain and range of the graph of each function.

a)



D: $(-\infty, 5]$
R: $(-\infty, 2]$

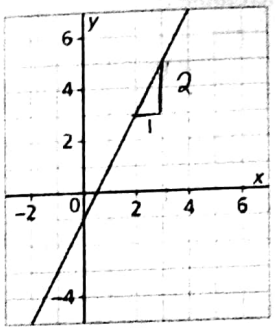
b)



D: $[-3, 5]$
R: $[3, 7]$

2. a) Write the linear equation for the following graph.

$y = 2x - 1$



b) Determine the range value when the domain value is 0.

$= -1$

c) Determine the domain value when the range value is 5.

$= 3$

3. This graph shows the total cost for a house call by an electrician for up to 6 h work. The electrician charges $190 to complete a job. For how many hours did she work?

$C = 40h + 60$

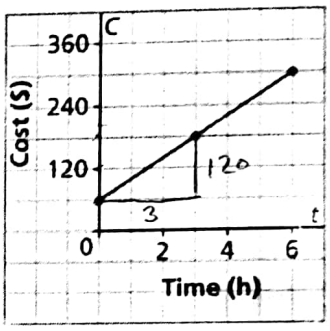
$190 = 40h + 60$ (−60 from each side)

$\frac{130}{40} = \frac{40h}{40}$

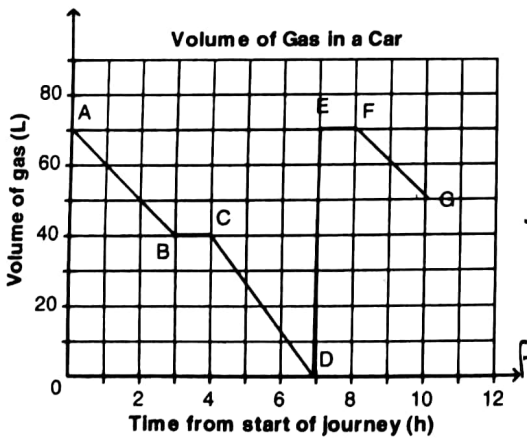
$h = 3.25$

3.25 hours

$m = \frac{120}{3} = 40$



4. This graph shows the volume of gas in a car as a function of time. Describe what is happening in each line segment in the graph.



AB - As I drive for 3 hours I use gas at a steady rate. I used 30L

BC - I stop for an hour → no gas used

CD - Keep travelling. Drive another 3 hours and use the last 40L in my tank

DE - At D I pull up at a gas station & fill up (70L)

EF - I stay there for an hour (lunch?)

FG - Drive another 2 hours using 20L gas

5. Suppose you were to graph the data in this table of values. Would you join the points? Justify your answer.

Number of Pop Bottles, *n*	Refund, *r* ($)
5	1.00
12	2.40
17	3.40
24	4.80
30	6.00

No, discrete. Each pop bottle is a full amount of money. Cannot recycle partial bottles.

6. The set of ordered pairs below represents a linear relation. Determine the value of *n*.

$\{(-2, -1), (3.5, 10), (9, 21), (n, 32), (20, 43)\}$

+5.5 +5.5 +5.5

$n = 14.5$

7. For this table of values:

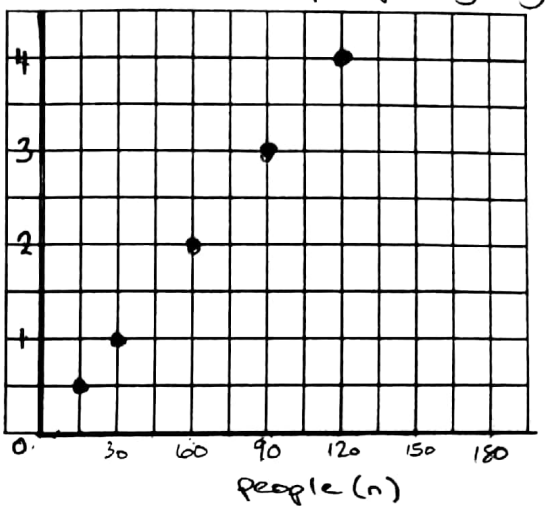
a) Graph the data. Will you join the points? Justify your answer.

No, no partial people

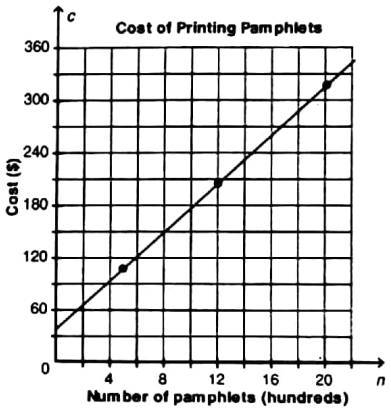
b) Does the graph represent a function? Explain.

People, *n*	Cost, *C* ($)
15	0.50
30	1.00
60	2.00
90	3.00
120	4.00

Cost of people going somewhere



8. The graph represents the cost of printing pamphlets.



a) Identify the dependent and independent variables.

Dep → cost

Ind → # of pamplets

b) Sohan calculated the rate of change as follows:

Change in cost: $\$315 - \$105 = \$210$

Change in number of pamphlets:
2000 pamphlets – 500 pamphlets = 1500 pamphlets

Rate of change: $\frac{1500 \text{ pamphlets}}{\$210} = \$7.14 / \text{pamphlet}$

Did he calculate the rate of change correctly? Explain.

No, did not. $\frac{\text{Rise}}{\text{Run}} = \frac{\text{cost}}{\text{pamphlet}}$

c) Describe what the rate of change represents.

The increasing cost for # of pamphlets printed.

9. Sketch a graph of the linear function $f(x) = -\frac{2}{5}x + 2$.

Down two right 5

or up 2 left 5