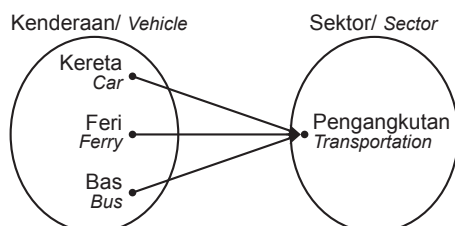


1. Rajah anak panah / Arrow diagram



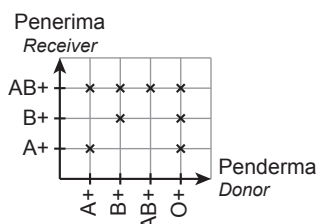
Pasangan tertib / Ordered pair

$\{(A, \text{Renang})\}$

$\{(B, \text{Futsal}), (B, \text{Hoki}), (C, \text{Ragbi})\}$

$\{(A, \text{Swimming}), (B, \text{Futsal}), (B, \text{Hockey}), (C, \text{Rugby})\}$

Graf / Graph



2. (a) Jenis hubungan/ fungsi

Types of relation/ function

Fungsi banyak kepada satu

Many-to-one function

Justifikasi / Justification

Setiap nilai P hanya mempunyai satu nilai Q yang sepadan. Apabila $P = -1$ dan 3 , $Q = 3$ dan apabila $P = 0$ dan 2 , $Q = 2$.

Each value of P has only one corresponding value of Q . When $P = -1$ and 3 , $Q = 3$ and when $P = 0$ and 2 , $Q = 2$.

(b) Jenis hubungan/ fungsi

Types of relation/ function

Hubungan satu kepada banyak

One-to-many relation

Justifikasi / Justification

Terdapat nilai-nilai x yang mempunyai dua nilai y yang sepadan.

There are values of x which have two corresponding value of y .

(c) Jenis hubungan/ fungsi

Types of relation/ function

Fungsi satu kepada satu

One-to-one function

Justifikasi / Justification

Setiap nilai x hanya mempunyai satu nilai y yang sepadan. Nilai-nilai y adalah berbeza.
Each value of x has only one corresponding value of y . The values of y are different.

(d) Jenis hubungan/ fungsi

Types of relation/ function

Hubungan banyak kepada banyak

Many-to-many relation

Justifikasi / Justification

Terdapat sekurang-kurangnya satu objek mempunyai lebih dari satu imej dan lebih dari satu objek mempunyai imej yang sama.
There are at least one object has more than one image and more than one object has the same image.

3. (a) Domain = $\{1, 2, 3, 4\}$

Domain

Kodomain = $\{1, 8, 27, 64\}$

Codomain

Objek = $1, 2, 3, 4$

Object

Imej = $1, 8, 27, 64$

Image

Julat = $\{1, 8, 27, 64\}$

Range

(b) Domain = $\{4, 5, 6, 7\}$

Domain

Kodomain = $\{16, 25, 36, 49, 64\}$

Codomain

Objek = $4, 5, 6, 7$

Object

Imej = $16, 25, 36, 49$

Image

Julat = $\{16, 25, 36, 49\}$

Range

(c) Domain = $\{-4, 0, 4\}$

Domain

Kodomain = $\{0, 10, 20\}$

Codomain

Objek = $-4, 0, 4$

Object

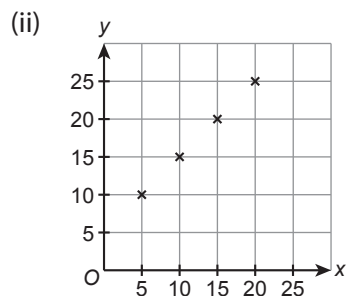
Imej = $0, 10, 20$

Image

Julat = $\{0, 10, 20\}$

Range

4. (a) (i) $\{(5, 10), (10, 15), (15, 20), (20, 25)\}$

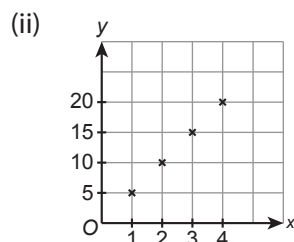


(iii)

E	5	10	15	20
F	10	15	20	25

- (iv) $10 = 5 + 5$
 $15 = 10 + 5$
 $20 = 15 + 5$
 $25 = 20 + 5$
 $\therefore y = x + 5$ atau/ or $f(x) = x + 5$

- (b) (i) $\{(1, 5), (2, 10), (3, 15), (4, 20)\}$



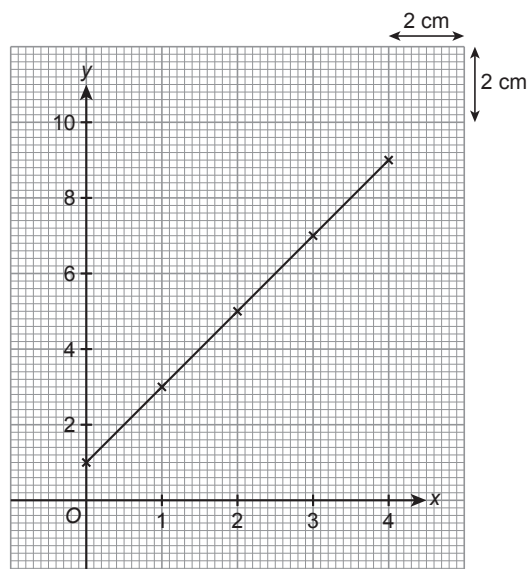
(iii)

U	1	2	3	4
V	5	10	15	20

- (iv) $5 = 1(5)$
 $10 = 2(5)$
 $15 = 3(5)$
 $20 = 4(5)$
 $\therefore y = 5x$ atau/ or $f(x) = 5x$

5. (a)

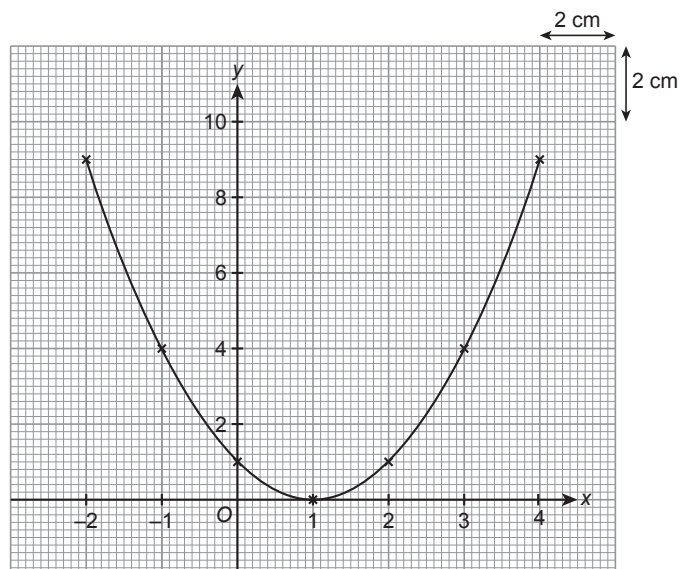
x	0	1	2	3	4
y	1	3	5	7	9



$$\begin{aligned} x=0, y &= 2(0) + 1 = 1 \\ x=1, y &= 2(1) + 1 = 3 \\ x=2, y &= 2(2) + 1 = 5 \\ x=3, y &= 2(3) + 1 = 7 \\ x=4, y &= 2(4) + 1 = 9 \end{aligned}$$

(b)

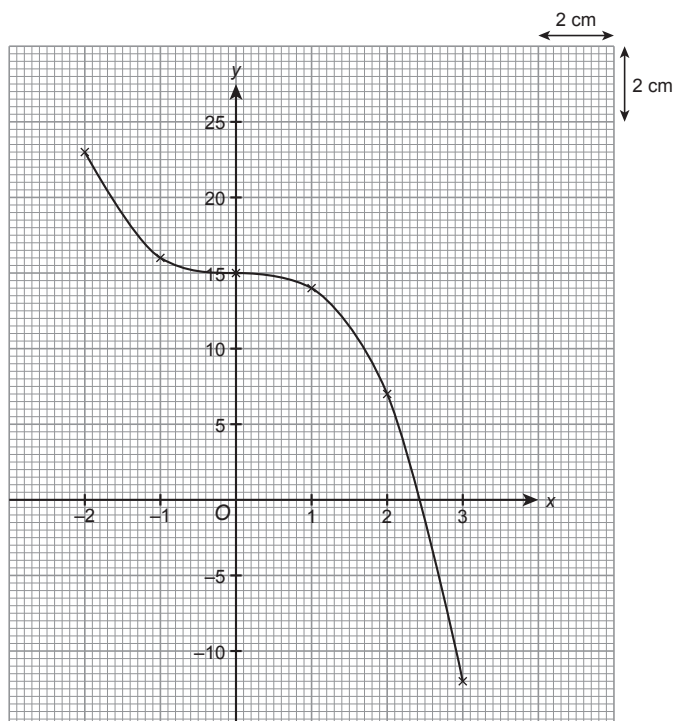
x	-2	-1	0	1	2	3	4
y	9	4	1	0	1	4	9



$$\begin{aligned} x=-2, y &= (-2)^2 - 2(-2) + 1 = 9 \\ x=-1, y &= (-1)^2 - 2(-1) + 1 = 4 \\ x=0, y &= 0^2 - 2(0) + 1 = 1 \\ x=1, y &= 1^2 - 2(1) + 1 = 0 \\ x=2, y &= 2^2 - 2(2) + 1 = 1 \\ x=3, y &= 3^2 - 2(3) + 1 = 4 \\ x=4, y &= 4^2 - 2(4) + 1 = 9 \end{aligned}$$

(c)

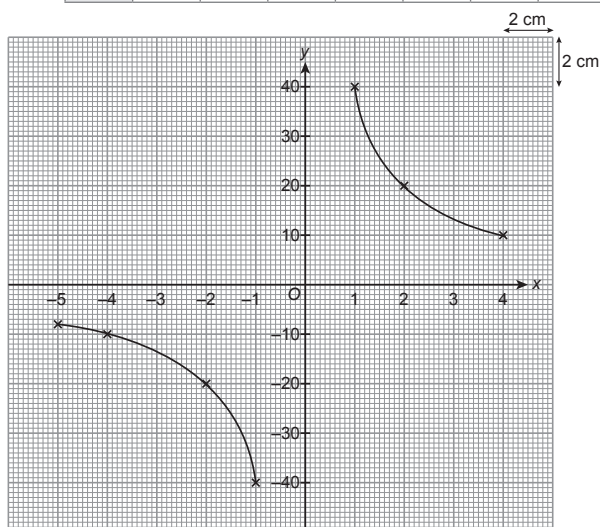
x	-2	-1	0	1	2	3
y	23	16	15	14	7	-12



$$\begin{aligned}x &= -2, y = 15 - (-2)^3 = 23 \\x &= -1, y = 15 - (-1)^3 = 16 \\x &= 0, y = 15 - (0)^3 = 15 \\x &= 1, y = 15 - (1)^3 = 14 \\x &= 2, y = 15 - (2)^3 = 7 \\x &= 3, y = 15 - (3)^3 = -12\end{aligned}$$

(d)

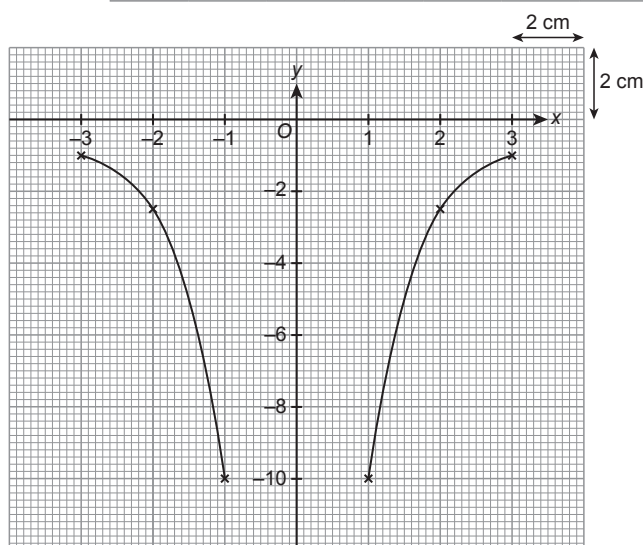
x	-5	-4	-2	-1	1	2	4
y	-8	-10	-20	-40	40	20	10



$$\begin{aligned}x &= -5, y = \frac{40}{-5} = -8 \\x &= -4, y = \frac{40}{-4} = -10 \\x &= -2, y = \frac{40}{-2} = -20 \\x &= -1, y = \frac{40}{-1} = -40 \\x &= 1, y = \frac{40}{1} = 40 \\x &= 2, y = \frac{40}{2} = 20 \\x &= 4, y = \frac{40}{4} = 10\end{aligned}$$

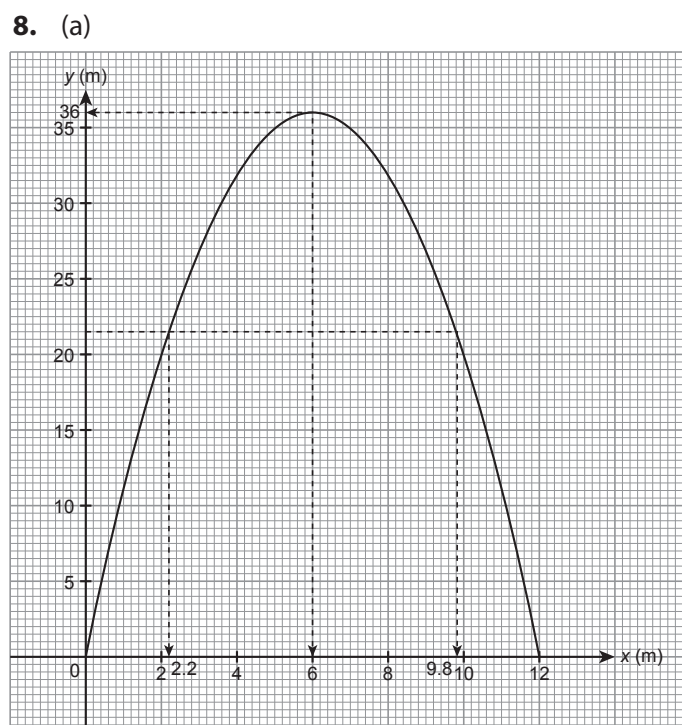
(e)

x	-3	-2	-1	1	2	3
y	-1.1	-2.5	-10	-10	-2.5	-1.1



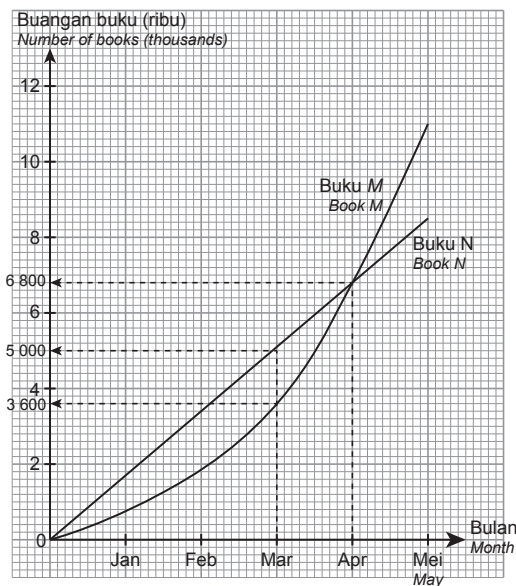
$$\begin{aligned}x &= -3, y = \frac{-10}{(-3)^2} = -1.1 \\x &= -2, y = \frac{-10}{(-2)^2} = -2.5 \\x &= -1, y = \frac{-10}{(-1)^2} = -10 \\x &= 1, y = \frac{-10}{1^2} = -10 \\x &= 2, y = \frac{-10}{2^2} = -2.5 \\x &= 3, y = \frac{-10}{3^2} = -1.1\end{aligned}$$

6. (a) y = 4.4
 (b) y = 14
 (c) x = -2.5 dan/and 2.5
 (d) x = -3.7 dan/and 3.7
7. (a) (i) Daripada graf itu, apabila
 From the graph, when
 $L = 60 \text{ cm}^2$, $x = 3.2 \text{ cm}$
 (ii) Apabila $x = 3.8$, $L = 86 \text{ cm}^2$
 When $x = 3.8$, $L = 86 \text{ cm}^2$
- (b) (i) Isi padu asal air/ Initial volume = 140 ℓ
 Isi padu air dalam tangki selepas mengeluarkan 10 ℓ air
 Volume of water in the tank after remove 10 l of water
 $= 140 - 10 = 130 \text{ ℓ}$
 Apabila/ When $V = 130$, $t = 0.9$
 Masa yang diperlukan/ Time needed
 $= 0.9 \times 60 = 54 \text{ saat/ seconds}$
 (ii) Apabila $t = 4$ minit, $V = 100 \text{ ℓ}$
 From the graph, when $t = 4$ minutes, $V = 100 \text{ ℓ}$



- (i) Apabila $y = 21.5$, $x = 2.2$ dan 9.8
 When $y = 21.5$, $x = 2.2$ and 9.8
 Beza jarak di antara dua tiang
 The difference of the distance between the two pillars
 $= 9.8 - 2.2 = 7.6$ m
- (ii) Daripada graf itu, tinggi maksimum = 36 m
 apabila $x = 6$ m.
 Maka, jarak mengufuk dari sebelah kiri pintu
 gerbang = 6 m.
 From the graph, maximum height = 36 m when $x = 6$ m.
 So, the horizontal distance from the left of the archway
 = 6 m.
- (iii) Tinggi pintu gerbang itu bertambah dan
 mencapai maksimum apabila jarak mengufuk
 dari sebelah kiri pintu gerbang itu ialah 6 m.
 Selepas 6 m dari sebelah kiri pintu gerbang
 itu, tinggi pintu gerbang itu semakin
 berkurangan.
 The height of the archway increases and reaches its
 maximum when horizontal distance from the left of the
 archway is 6 m. After 6 m from the left of the archway, the
 height of the archway decreases.

(b)



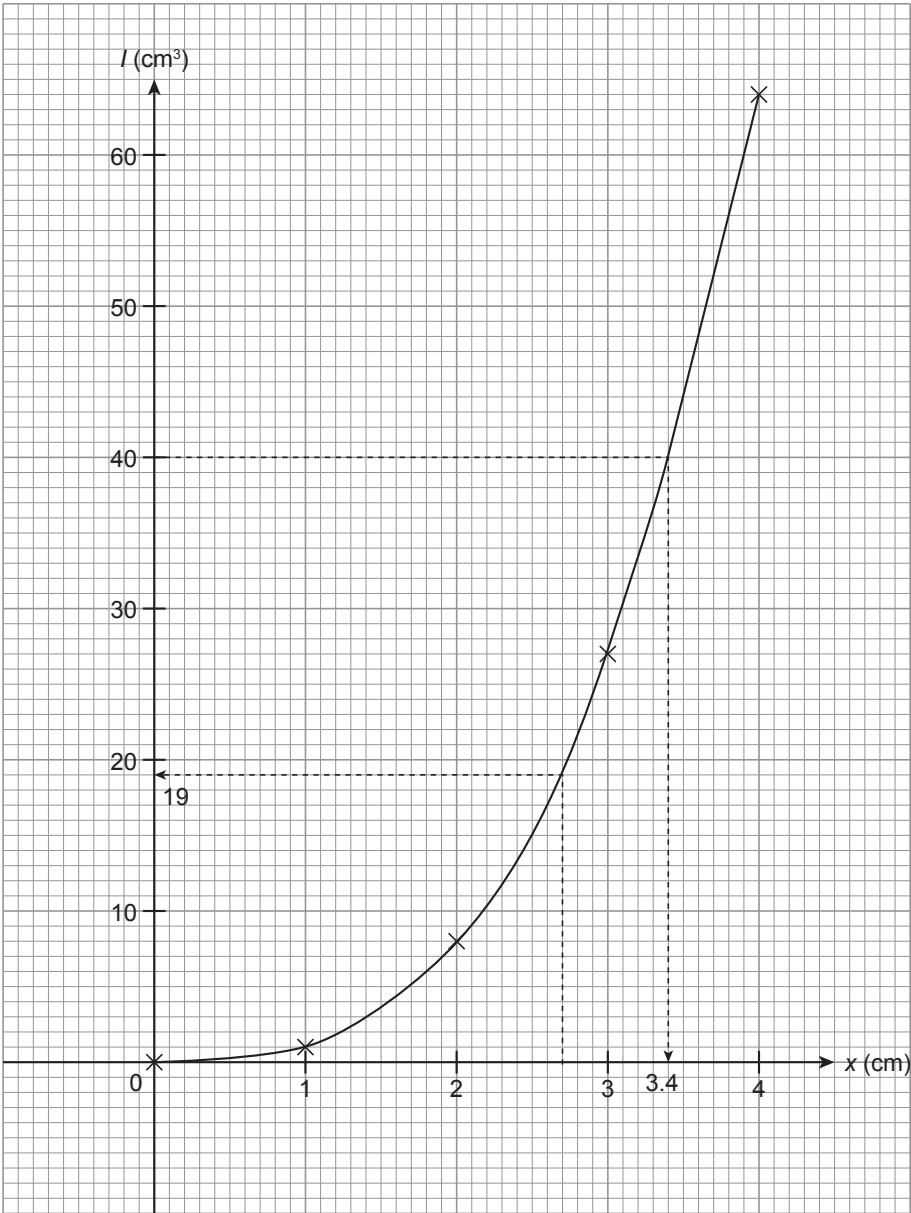
- (i) Berdasarkan graf, bilangan jualan bagi buku
 M ialah 3 600 manakala, buku N ialah 5 000.
 Based on the graph, the number of sales of book M is 3 600
 whereas book N is 5 000.
- (ii) Kedua-dua graf bersilang pada bulan April.
 Maka, bilangan buku yang dijual bagi kedua-
 dua jenis buku adalah sama pada bulan April
 sebanyak 6 800 buah buku.
 Both graphs intersect in April. Thus, the number of books
 sold for both books are the same in April for 6 800 books.
- (iii) Buku N kerana jualan buku tersebut selepas 5
 bulan adalah rendah daripada buku M.
 Book N because the sales of the book after 5 months are
 still lower than book M.



(c) (i) $I = x^3$

(ii)

x	0	1	2	3	4
I	0	1	8	27	64



- (iii) (a) Apabila / When $x = 2.7$ cm, $I = 19$ cm³
(b) Apabila / When $I = 40$ cm³, $x = 3.4$ cm

9. Aktiviti PAK-21

(c) Kad 1/ Card 1:

x	-4	-3	-2	-1	0
y	-5	-4.5	-4	-3.5	-3

Kad 2/ Card 2:

x	-2	-1	0	1	2
y	9	3	1	3	9

Kad 3/ Card 3:

x	-1	0	1	2	3
y	9	4	1	0	1

Kad 4/ Card 4:

x	0	1	2	3	4
y	-7	-4	-3	-4	-7

Kad 5/ Card 5:

x	-1	0	1	2	3
y	11	2	-7	-10	-1

Power PT3

Bahagian

1. Jawapan / Answer: **B**

$$\begin{aligned} 2. \quad y &= 3x^2 - 8 \\ &= 3(-1)^2 - 8 \\ &= 3 - 8 \\ &= -5 \end{aligned}$$

Jawapan / Answer: **C**

$$\begin{aligned} 3. \quad y &= 5 - x \\ \text{Apabila / When } x &= 0 \\ y &= 5 - 0 = 5 \\ (0, 5) \end{aligned}$$

$$\begin{aligned} \text{Apabila / When } y &= 0 \\ 0 &= 5 - x \\ x &= 5 \\ (5, 0) \end{aligned}$$

Jawapan / Answer: **A**

Bahagian

4.

Hubungan satu kepada banyak <i>One-to-many relation</i>	
Hubungan satu kepada satu <i>One-to-one relation</i>	
Hubungan banyak kepada satu <i>Many-to-one relation</i>	
Hubungan banyak kepada banyak <i>Many-to-many relation</i>	

$R = \{(5, 2), (10, 2), (15, 2), (20, 2)\}$
$R = \{(42, 6), (36, 4), (36, 6), (24, 6), (20, 4)\}$
$R = \{(1, 3), (2, 6), (3, 9), (4, 12)\}$
$R = \{(2, 4), (2, 6), (2, 8), (4, 4), (4, 8)\}$

5. (a)

a	4	✓
	8	

b	2	
	4	✓

(b)

x	-2	-1	0	1	2
y	23	13	9	11	19

$$y = 3x^2 - x + 9$$

Apabila / When $x = -2$

$$\begin{aligned} y &= 3(-2)^2 - (-2) + 9 \\ &= 3(4) + 2 + 9 \\ &= 12 + 2 + 9 \\ &= 23 \end{aligned}$$

Apabila / When $x = -1$

$$\begin{aligned} y &= 3(-1)^2 - (-1) + 9 \\ &= 3 + 1 + 9 \\ &= 13 \end{aligned}$$

6.

Plotkan titik (x, y) daripada jadual nilai.
Plot the point (x, y) from the table of values.

3

Sambung titik-titik itu untuk membentuk graf.
Connect the points to form graph.

4

Bina jadual nilai mengikut julat.
Construct a table of values according to the range.

1

Lukis paksi dengan skala yang sesuai.
Draw axes with suitable scale.

2

7. (a)

Fungsi Function	x	y	✓/✗
$y = -x^2 + 7$	3	-8	✗
$y = -2x - 3$	5	-13	✓

$$y = -x^2 + 7$$

Apabila / When $x = 3$

$$\begin{aligned} y &= -3^2 + 7 \\ &= -9 + 7 \\ &= -2 \end{aligned}$$

$$y = -2x - 3$$

Apabila / When $x = 5$

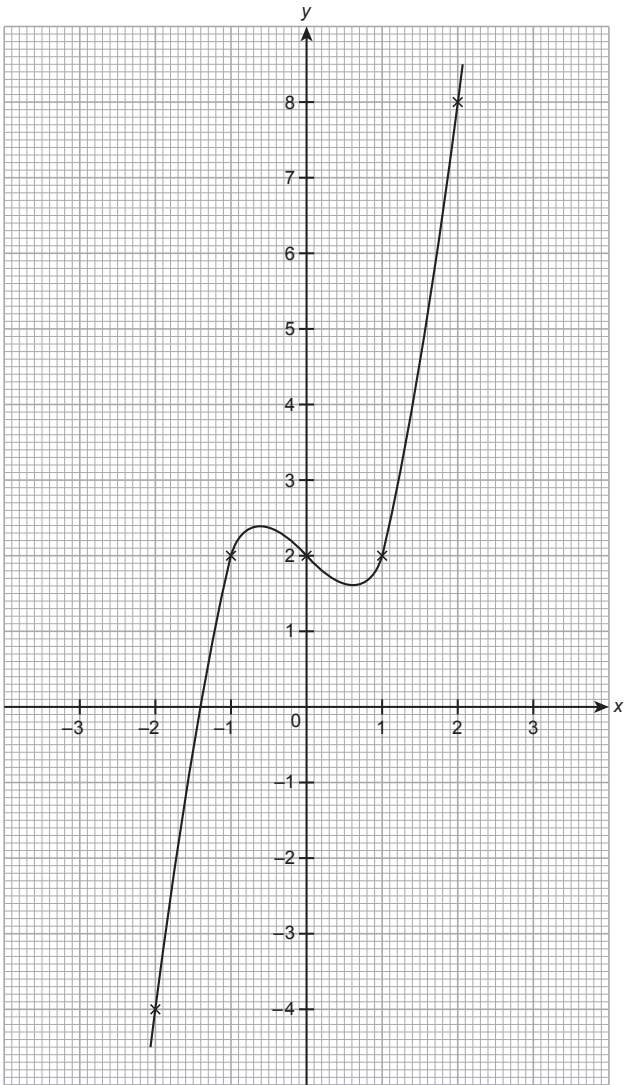
$$\begin{aligned} y &= -2(5) - 3 \\ &= -10 - 3 \\ &= -13 \end{aligned}$$

(b)

Pemboleh ubah bersandar <i>Dependent variable</i>	y
Pemboleh ubah tak bersandar <i>Independent variable</i>	x

Bahagian C

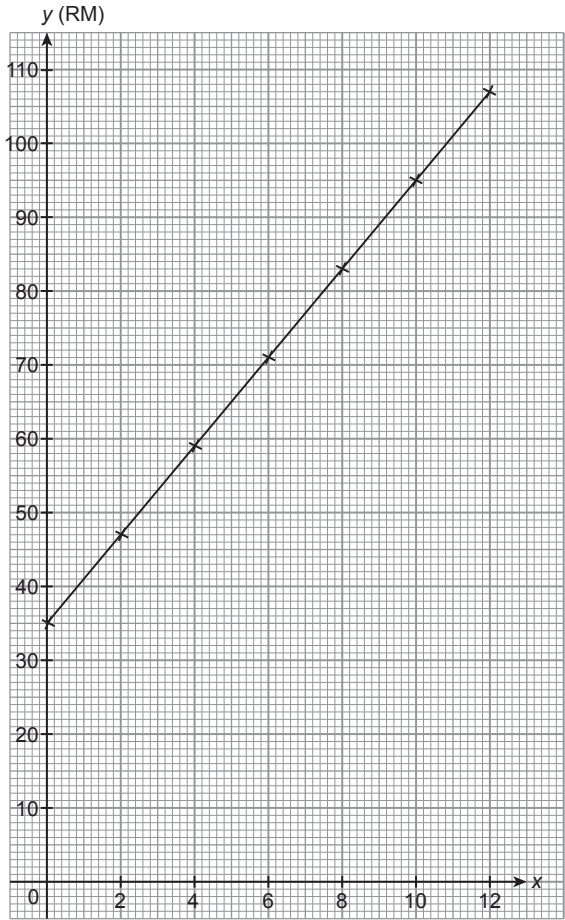
8. (a)



(b) (i)

x	2	4	6	8	10	12
y	47	59	71	83	95	107

(ii)



(iii) Ya. Dia masih menerima gaji sebanyak RM35.
Yes. He still receive his pay RM35.

Power KBAT

(a)

t (s)	0	1	2	3	4	5	6	7
y (m)	1	7	11	13	13	11	7	1

- (b)
- (i) 1.2 s, 5.8 s

(ii) 1 m

(c)

Apabila/ When $y = 0$ m, $t = 7.2$ s

- (d)
- Tinggi batu itu bertambah dan mencapai maksimum selepas 3.5 saat. Selepas 3.5 saat, tinggi batu itu semakin berkurangan.

The height of the stone increases and reaches maximum height at 3.5 seconds. After 3.5 seconds, the height of the stone decreases.

