Yakin

JAWAPAN DAN ULASAN

MATEMATIK

Dwibahasa

KERTAS 1

1 **B**

$3x^2 + 8x - 3 = 0$

$(3x - 1)(x + 3) = 0$

$3x - 1 = 0$ $\qquad$ $x + 3 = 0$

$x = \frac{1}{3}$ $\qquad$ $x = -3$

2 **B**

$6x^2 - 7x - 49 = 0$

$(2x - 7)(3x + 7) = 0$

3 **D**

$-2(6y + 3) < 3(4 - 2y)$

$-12y - 6 < 12 - 6y$

$-12y + 6y < 12 + 6$

$-6y < 18$

$y > \frac{18}{(-6)}$

$y > -3$

4 **A**

Logam berbentuk sfera = 30

Sphere-shaped metals

Isi padu sfera $= \frac{4}{3}\pi r^3$

Volume of sphere

$= 30 \times \frac{4}{3} \times \frac{22}{7} \times 35^3$

$= 5\ 390\ 000$

Isi padu kon $= \frac{5\ 390\ 000}{70}$

Volume of cone

$= 77\ 000$

$= 7.7 \times 10^4$

5 **D**

$0.17056 = 1.7056 \times 10^{-1}$

$= m \times 10^n$

$m = 1.7056$, $n = -1$

6 **A**

$\angle ABD = \frac{180° - 58°}{2}$

$= 61°$

$\angle ABD = \angle EBC = 61°$

$\angle FEC = \angle ECB = 92°$

$x = 180° - 61° - 92°$

$= 27°$

7 **A**

$4(4^x) = 2^3(\sqrt{4})$

$2^2(2^{2x}) = 2^3(2^1)$

$2 + 2x = 3 + 1$

$x = \dfrac{4 - 2}{2}$

$= 1$

8 **A**

$\angle ODC = \dfrac{180° - 100°}{2}$

$= 40°$

$\angle CBD = \dfrac{100°}{2}$

$= 50°$

$\angle DCB = \angle DBE = 70°$

$\angle OCB = 70° - 40°$

$= 30°$

$\angle CDB = 180° - 70° - 50°$

$= 60°$

$y = 60° - 40°$

$= 20°$

9 **D**

Bergerak ke kanan 3 petak/*Move to right* 3 *boxes* = 3

Bergerak ke atas 1 petak/*Move to above* 1 *box* = 1

Translasi/*Translation* $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$

10 **B**

7, 3, 4, 9, 2, 1, r

Mod/*Mode* = 4

$r = 4$

11 **D**

$\left(\dfrac{5 \times 4x}{4x \times 4x}\right) - \dfrac{10 - x}{16x^2} = \dfrac{20x}{16x^2} - \dfrac{10 - x}{16x^2}$

$= \dfrac{20x - (10 - x)}{16x^2}$

$= \dfrac{20x - 10 + x}{16x^2}$

$= \dfrac{21x - 10}{16x^2}$

12 **B**

$3y \leq 15$

$y \leq \dfrac{15}{3}$

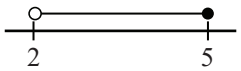
$y \leq 5$

$19 - 4y < 11$

$-4y < 11 - 19$

$y > \dfrac{-8}{-4}$

$y > 2$



$\therefore y = 3, 4, 5$

13 D

$U = \{L, O, V, E\}$

Subset $= 2^n$

$n = 4$

$\therefore 2^4 = 16$

14 A

$2a^2 - 5a - 3 = 0$

$2a + 1 \rightarrow +a$

$a - 3 \rightarrow \dfrac{-6a}{-5a}$

$(2a + 1)(a - 3) = 0$

15 B

$$343\sqrt{c^6} = (9a + 6bc)^3$$

$$\sqrt{c^6} = \frac{(9a + 6bc)^3}{343}$$

$$c^6 = \left[\frac{(9a + 6bc)^3}{343}\right]^2$$

$$c = \left[\frac{(9a + 6bc)^6}{343^2}\right]^{\frac{1}{6}}$$

$$c = \frac{9a + 6bc}{343^{\frac{1}{3}}}$$

$$c = \frac{9a + 6bc}{7}$$

$$7c = 9a + 6bc$$

$$7c - 6bc = 9a$$

$$c(7 - 6b) = 9a$$

$$c = \frac{9a}{7 - 6b}$$

16 D

Satu sudut pedalaman pentagon/*An interior angle of pentagon* $= \dfrac{(5 - 2) \times 180°}{5}$

$= 108°$

$x = \dfrac{180° - 108°}{2}$

$= 36°$

Satu sudut heksagon/*An angle of hexagon* $= \dfrac{(6 - 2) \times 180°}{6}$

$= 120°$

$y = 120° - 108°$

$= 12°$

$y + x = 12° + 36°$

$= 48°$

17 C

Isi padu tin/*Volume of a can* $= \pi \times 8^2 \times 14$

$= 896\pi$

Isi padu sup cendawan di dalam periuk/*Volume of a mushroom soup in a pot*

$= 892\pi \times 2$

$= 1\,792\pi$

Isi padu sup cendawan di dalam setiap mangkuk/*Volume of a mushroom soup in a bowl*

$= \dfrac{1\,792\,\pi}{16}$

$= 112\pi$

18 A

Luas kawasan berlorek = luas trapezium *ABCD* – luas segi tiga *ABE*

Area of shaded region = area of trapezium ABCD – area of triangle ABE

$AE = \sqrt{13^2 - 12^2}$

$= 5$

Luas kawasan berlorek/*Area of the shaded region*

$= \left[\dfrac{1}{2} \times (14+16) \times 13\right] - \left[\dfrac{1}{2} \times 12 \times 5\right]$

$= 195 - 30$

$= 165$

19 C

$$\frac{8^{2m-4} \times 4^{m+1}}{2^{14m-7} \times 64^{-m}} = \frac{(2^3)^{2m-4} \times (2^2)^{m+1}}{2^{14m-7} \times (2^6)^{-m}}$$

$$= \frac{2^{6m-12} \times 2^{2m+2}}{2^{14m-7} \times 2^{-6m}}$$

$$= \frac{2^{6m-12+2m+2}}{2^{14m-7+(-6m)}}$$

$$= \frac{2^{8m-10}}{2^{8m-7}}$$

$$= 2^{8m-10-(8m-7)}$$

$$= 2^{8m-10-8m+7}$$

$$= 2^{-3}$$

$$= \frac{1}{2^3}$$

$$= \frac{1}{8}$$

20 B

$m_{PS} = \dfrac{3}{4}$

$T(-8, y_1)$

$P(0, y_2)$

$R(-8, -2)$

$$\frac{y_2 - 0}{0 - (-8)} = \frac{3}{4}$$

$$y_2 = 6$$

$PS = TR$

$\sqrt{(6-0)^2 + [0-(-8)]^2} = \sqrt{[y_1-(-2)]^2 + [-8-(-8)]^2}$

$100 = (y+2)^2$

$y + 2 = 10$

$y = 8$

$T(-8, 8)$

21 B

Mangga : Epal = 7 : 5

Mango : *Apple*

Epal/*Apples* = 15 Mangga tidak elok/*Rotten mangoes* = 5

5 bahagian/*parts* = 15

7 bahagian/*parts* $= \frac{15}{5} \times 7$

$= 21$

$\therefore$ Mangga/*Mangoes* = 21

Mangga yang elok/*Good mangoes* = 21 – 5

= 16

22 A

A : Kuasa tertinggi/*Highest exponent* = 2
Bilangan pemboleh ubah/*Number of variables* = 1 (Benar/*True*)

B : Bilangan pemboleh ubah/*Number of variables* = 2
(Tidak berkenaan/*Not applicable*)

C : Kuasa tertinggi/*Highest exponent* = −2
(Tidak berkenaan/*Not applicable*)

D : Kuasa tertinggi/*Highest exponent* = 1

23 A

$I_5 = 265_8$

$265_8 = (2 \times 8^2) + (6 \times 8^1) + (5 \times 8^0)$

$= 128 + 48 + 5$

$= 181$

5	181		
5	36	baki/*remainder*	1
5	7	baki/*remainder*	1
5	1	baki/*remainder*	2
5	0	baki/*remainder*	1

$= 1\,211_5$

$\therefore \varpi I = 1\,211$

24 D

$\left(\frac{-6a^3b^{-\frac{1}{6}}}{c^2}\right)^3 \times b^{\frac{1}{2}}c^3 = \frac{(-6)^3a^9b^{-\frac{1}{2}}}{c^6} \times b^{\frac{1}{2}}c^3$

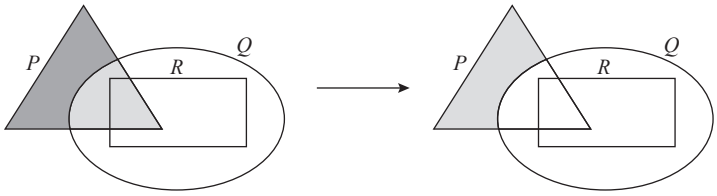
$= \frac{-216a^9}{c^3}$

25 A

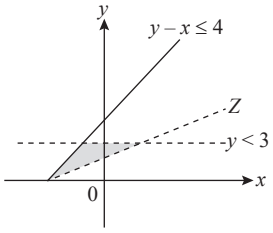
Jika p, maka q.
If p, then q.
p = antejadian/*antecedent*
q = akibat/*consequent*
Akibat/*Consequent*: $n = 343$

26 C

$P \cap (Q \cup R)'$:



27 B



$$m_Z = \frac{2-0}{0-(-4)}$$
$$= \frac{1}{2}$$

$y = mx + c$

$$y = \frac{1}{2}x + 2$$

$$Z: y > \frac{1}{2}x + 2$$
$$2y > x + 4$$

28 B

Kadar perubahan laju = kecerunan
Rate of change of speed = gradient

$$\frac{v-20}{14-8} = 1\frac{2}{3}$$
$$v = \left(\frac{5}{3} \times 6\right) + 20$$
$$= 30 \text{ m s}^{-1}$$

29 C

Min/*Mean* = 10

$$\frac{(10+x) + 5x + 6 + 9 + 14 + (2x+5)}{6} = 10$$
$$8x + 44 = 60$$
$$x = \frac{60-44}{8}$$
$$x = 2$$

$10 + x = 10 + 2$
$= 12$
$5x = 5(2)$
$= 10$
$2x + 5 = 2(2) + 5$
$= 9$
Data: 6, 9, 9, 10, 12, 14
Median $= \frac{9 + 10}{2} = 9.5$
Mod/*Mode* = 9
$9.5 + 9 = 18.5$

30 B
Epal/*Apples* = 40
Limau/*Limes* = 24
Manggis/*Mangosteen* = 16
Kebarangkalian/*Probability* $= \frac{40 + 16}{40 + 24 + 16}$
$= \frac{56}{80}$
$= \frac{7}{10}$

31 D
$7 + 5 = 12$ biji bola biru/*blue balls*
$7 + 5 = 12$ biji bola merah jambu/*pink balls*
Bilangan bola hijau/*Number of green balls* $= x + 6$

Kebarangkalian bola hijau/*Probability of green balls* $= \frac{1}{3}$
$\frac{x + 6}{12 + 12 + x + 6} = \frac{1}{3}$
$\frac{x + 6}{30 + x} = \frac{1}{3}$
$3x + 18 = 30 + x$
$3x - x = 30 - 18$
$2x = 12$
$x = 6$

32 B
$a \propto \frac{b}{c}$
$a = \frac{6}{5}$, $b = 4$, $c = 20$
$a = k\frac{b}{c}$
$\frac{6}{5} = k\left(\frac{4}{20}\right)$
$k = 6$
$a = \frac{6b}{c}$, $a = \frac{3}{2}$, $b = 7$
$\frac{3}{2} = \frac{6(7)}{c}$
$c = \frac{42 \times 2}{3}$
$= 28$

33 A

$A \propto \sqrt[3]{F}$, $A = 56$, $F = 512$

$A = k\sqrt[3]{F}$

$56 = k\sqrt[3]{512}$

$k = 7$

$A = 7\sqrt[3]{F}$, $F = 9\ 261$

$A = 7\sqrt[3]{9\ 261}$

$A = 147$

34 D

$$4(y - 2) - (1 - 2y)^2 = 0$$
$$4y - 8 - (1 - 4y + 4y^2) = 0$$
$$4y - 8 - 1 + 4y - 4y^2 = 0$$
$$-4y^2 + 8y - 9 = 0$$

35 D

Secara umumnya, tujuan mendapatkan insurans adalah seperti berikut:

In general, the purpose of obtaining insurance is as follows:

- Sebagai bantuan kewangan kepada keluarga sekiranya anda hilang upaya, menghidapi penyakit kritikal atau meninggal dunia.
  As a financial assistance to the family in the event of your disability, critical illness or death.
- Mengurus perbelanjaan hidup, hutang dan komitmen sekiranya anda tidak mampu bekerja.
  Manage living expenses, debts and commitments if you are unable to work.
- Bayaran perbelanjaan perubatan rawatan yang tinggi.
  Payment of high medical treatment expenses.
- Sebagai pampasan terhadap kerugian yang dialami.
  As compensation for losses suffered.

36 C

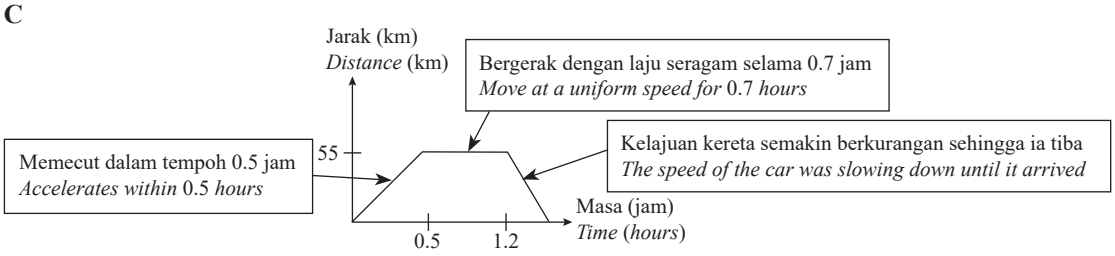
$$\begin{bmatrix} 2 & 1 \\ 3 & -5 \end{bmatrix} - M = \begin{bmatrix} 2 & 3 \\ -1 & 6 \end{bmatrix}$$

$$M = \begin{bmatrix} 2 & 1 \\ 3 & -5 \end{bmatrix} - \begin{bmatrix} 2 & 3 \\ -1 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 2-2 & 1-3 \\ 3-(-1) & -5-6 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & -2 \\ 4 & -11 \end{bmatrix}$$

37 C



38 **A**

$SR = \sqrt{10^2 - 6^2}$

$= 8$

$\sin y = -\frac{8}{10}$

$= -\frac{4}{5}$

39 **B**

Pinjaman/*Loan* $= \frac{90}{100} \times 360\,000$

$= \text{RM}324\,000$

Jumlah ansuran/*Amount of installment* $= 25 \times 12 \times 1\,836$

$= \text{RM}550\,800$

Faedah/*Interest* $= \text{RM}550\,800 - \text{RM}324\,000$

$= \text{RM}226\,800$

$25 \times \frac{x}{100} \times 324\,000 = 226\,800$

$x = 2.8$

40 **B**

n kos/$\cos\theta = \frac{1}{2}$

$\theta = 60°$

$\tan 60° = \frac{x}{y}$

$x = y \tan 60°$

KERTAS 2

Bahagian A

***Section* A**

1

$$-\frac{2}{3-5y} = \frac{y}{3-2y}$$

$$-2(3-2y) = y(3-5y)$$

$$-6 + 4y = 3y - 5y^2$$

$$5y^2 + 4y - 3y - 6 = 0$$

$$5y^2 + y - 6 = 0$$

$$(5y + 6)(y - 1) = 0$$

$5y + 6 = 0$

$5y = -6$

$y = -\frac{6}{5}$

$y - 1 = 0$

$y = 1$

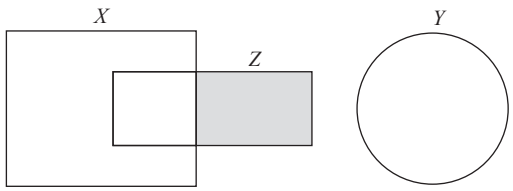
2 (*a*) (i) Bukan pernyataan
Not a statement

(ii) Pernyataan
Statement

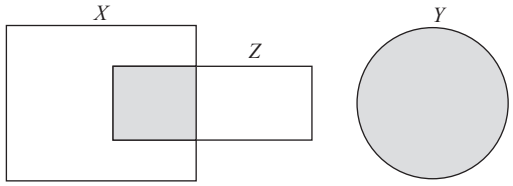
(*b*) Jika $M \cup N = M$, maka $N \subset M$.
If $M \cup N = M$, *then* $N \subset M$.

Jika $N \subset M$, maka $M \cup N = M$.
If $N \subset M$, *then* $M \cup N = M$.

3 (*a*)



(*b*)



4 $2x - 3y = 6$ ..... (1)
$3x - 7y = 19$ ..... (2)
(1) $\times 3 : 6x - 9y = 18$ ..... (3)
(2) $\times 2 : 6x - 14y = 38$ ..... (4)
(3) $-$ (4) : $5y = -20$
$y = -4$
$6x - 9(-4) = 18$
$6x + 36 = 18$
$6x = -18$
$x = -3$

5 (*a*) (i) $V = \{J, K, L, M, N, O\}$
$n(V) = 6$

(ii) $E = \{(J, K), (J, M), (M, L), (L, N), (K, N), (N, O), (M, O), (M, N)\}$
$n(E) = 8$

(iii) $2 \times n(E) = 16$

(*b*) Terima semua gambar rajah pokok yang sesuai.
Accept all suitable tree diagrams.

6 (*a*) Kadar perubahan laju/*Rate of change of speed* $= \dfrac{(40 - 0)}{5 - 0}$ m s^{-2}

$= \dfrac{40}{5}$ m s^{-2}

$= 8$ m s^{-2}

(*b*) Jarak/*Distance* $= \left(\dfrac{1}{2} \times 5 \times 40\right) + \left[\dfrac{1}{2} \times (u + 40) \times 8\right] + (u \times 7)$

$392 \text{ m} = 100 + (4u + 160) + 7u$
$392 \text{ m} = 260 + 11u$
$132 \text{ m} = 11u$
$u = 12 \text{ m s}^{-1}$

7 (*a*) {(J, 1), (J, 2), (J, 3), (J, 4), (E, 1), (E, 2), (E, 3), (E, 4), (S, 1), (S, 2), (S, 3), (S, 4)}

(*b*) $\frac{1}{3} \times \frac{2}{4} = \frac{2}{12} = \frac{1}{6}$

8 Isi padu piramid/*Volume of pyramid* $= \frac{1}{3} \times (5 \times 5) \times 12$

$= 100 \text{ cm}^3$

Isi padu kuboid/*Volume of cuboid* $= p \times l \times t$

$= 5 \times 5 \times t$

$= 25t$

Isi padu gabungan pepejal/*Volume of the composite solid* $= 100 + 25t$

$400 = 100 + 25t$

$25t = 300$

$t = 12$ cm

9 (*a*) $y = mx + c$, $m = -2$

$6 = -2(8) + c$

$6 = -16 + c$

$c = 22$

∴ Persamaan garis lurus *ST* ialah $y = -2x + 22$.

The equation of the straight line ST is $y = -2x + 22$.

(*b*) $y = mx + c$

$0 = -2(x) + 22$

$2x = 22$

$x = 11$

∴ Pintasan-*x* bagi garis lurus *JK* ialah $x = 11$.

x-intercept of the straight line JK is $x = 11$.

10 (*a*) Perimeter seluruh rajah/*Perimeter of the whole diagram*

$= \left(\frac{120°}{360°} \times 2 \times \frac{22}{7} \times 14\right) + 7 + 7 + \left(\frac{240°}{360°} \times 2 \times \frac{22}{7} \times 7\right)$

$= 29.33 + 7 + 7 + 29.33$

$= 72.66$ cm

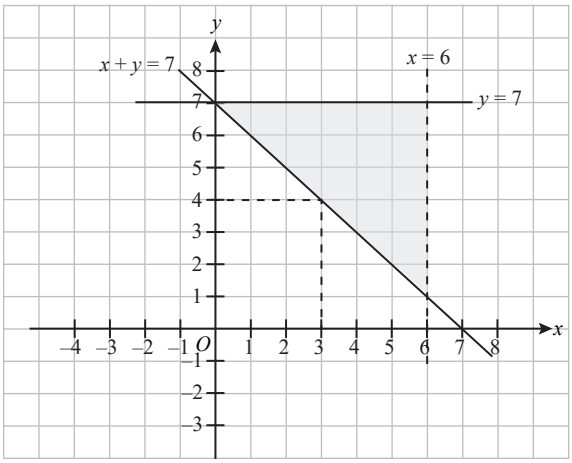
(*b*) Luas kawasan berlorek/*Area of the shaded region*

$= \frac{240°}{360°} \times \frac{22}{7} \times 7^2$

$= 102.67 \text{ cm}^2$

Bahagian B
***Section* B**

11 (*a*) (i)



(*a*) (ii) $y = 4$

(*b*) (i) $x + y = 7$
$12x + 8y = 68$

(ii) $\begin{pmatrix} 1 & 1 \\ 12 & 8 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 7 \\ 68 \end{pmatrix}$

$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{8 - 12}\begin{pmatrix} 8 & -1 \\ -12 & 1 \end{pmatrix}\begin{pmatrix} 7 \\ 68 \end{pmatrix}$

$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{-4}\begin{pmatrix} 56 - 68 \\ -84 + 68 \end{pmatrix}$

$\begin{pmatrix} x \\ y \end{pmatrix} = -\frac{1}{4}\begin{pmatrix} -12 \\ -16 \end{pmatrix}$

$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

Jumlah buku matematik = 3
Total of mathematics books

Jumlah buku sains = 4
Total of science books

12 (*a*) (i)

Kelas 5T *Class* 5T						Kelas 5R *Class* 5R						
9	8	3	3	2	4	8	9	9	9			
		5	2	0	5	2	3	4	4	5	5	9
9	7	5	5	0	6	3	5					
	9	8	3	0	7	3	5	7	8			
				5	8	0	3					
			2	0	9	0						

Kekunci : 2 | 4 | 8 bermaksud 42 kg bagi kelas 5T dan 48 kg bagi kelas 5R.
Key : 2 | 4 | 8 *means* 42 kg *for class* 5T *and* 48 kg *for class* 5R.

(ii) Kelas 5T mempunyai serakan yang lebih besar kerana julat jisim murid bagi kelas 5T adalah lebih besar berbanding kelas 5R (50 > 42).
Class 5T *has a great dispersion because the range of the mass of pupils in class* 5T *is larger compared to class* 5R (50 > 42).

(*b*) 169 170 172 173 175 175 176 177 178 179 180 183

Q_1 Q_2 Q_3

(i) $\text{Median} = \dfrac{175 + 176}{2}$

$= 175.5$

(ii) Julat antara kuartil/*Interquartile range*

$Q_1 = \dfrac{172 + 173}{2}$ $\qquad$ $Q_3 = \dfrac{178 + 179}{2}$

$= 172.5$ $\qquad$ $= 178.5$

$Q_3 - Q_1$
$= 178.5 - 172.5$
$= 6$

13 (*a*) Simpanan bulanan
Monthly savings

$= \dfrac{15}{100} \times 6\,850$

$=$ RM1 027.50

(*b*)

Pendapatan dan Perbelanjaan *Income and Expenses*	**Pelan Kewangan** *Financial Plan* **(RM)**	**Aliran Tunai Sebenar** *Actual Cash Flow* **(RM)**
Pendapatan bersih Encik Kumaran *Net income Mr. Kumaran*	6 850	6 850
Jumlah perndapatan bulanan *Total monthly income*	6 850	6 850
Tolak simpanan dana kecemasan *Minus savings for emergency fund*	1 027.50	1 027.50
Baki pendapatan *Income balance*		5 822.50
Tolak perbelanjaan tetap bulanan ***Minus monthly fixed expenses***		
Ansuran pinjaman perumahan *Housing loan instalment*	1 350	1 350
Ansuran pinjaman kereta *Car loan instalment*	600	600
Jumlah perbelanjaan tetap bulanan *Total monthly fixed expenses*		1 950
Tolak perbelanjaan tidak tetap bulanan ***Minus monthly variable expenses***		
Barang runcit dan bil utiliti *Groceries and utility bills*	450	450
Petrol	300	300
Anak-anak *Children*	200	200
Makanan *Food*	1 000	1 000
Ibu bapa *Parents*	600	600
Jumlah perbelanjaan tidak tetap bulanan *Total monthly variable expenses*		2 550
Pendapatan lebihan *Surplus of income*		1 322.50

(*c*) Simpanan dalam 6 bulan/*Savings in 6 months* = RM1 322.50 × 6
= RM7 935

RM7 935 > RM4 500
Jadi, matlamat jangka pendek boleh dicapai/*Hence, short term goal can be achieved.*
Simpanan dalam 5 tahun/*Savings in 5 years* = RM1 322.50 × 12 × 5
= RM79 350
Simpanan bersih/*Net savings* = RM79 350 – RM4 500
= RM74 850
10% duit pendahuluan/10% *down payment* = RM49 500
RM74 850 > RM49 500
Jadi, matlamat jangka panjang boleh dicapai.
Hence, long term goal can be achieved.

14 (*a*) $\begin{bmatrix} 3 & 2 & p \\ -3 & 4 & 0 \end{bmatrix}\begin{bmatrix} -1 & 2 \\ 2 & q \\ 5 & -4 \end{bmatrix} = \begin{bmatrix} -9 & r \\ 11 & 14 \end{bmatrix}$

$$\begin{bmatrix} -3+4+5p & 6+2q-4p \\ 3+8 & -6+4q \end{bmatrix} = \begin{bmatrix} -9 & r \\ 11 & 14 \end{bmatrix}$$

$1 + 5p = -9$
$5p = -10$
$p = -2$

$-6 + 4q = 14$
$4q = 20$
$q = 5$

$6 + 2(5) - 4(-2) = r$
$6 + 10 + 8 = r$
$r = 24$

$p = -2, q = 5, r = 24$

(*b*) (i) $AA^{-1} = I$

$$\frac{1}{m} = \frac{1}{4(-3) - 4(-5)}$$
$$= \frac{1}{-12 + 20}$$
$$= \frac{1}{8}$$
$\therefore m = 8$

(ii) $4x + 4y = -4$
$-5x - 3y = -1$

$$\begin{bmatrix} 4 & 4 \\ -5 & -3 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -4 \\ -1 \end{bmatrix}$$
$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{-12-(-20)}\begin{bmatrix} -3 & -4 \\ 5 & 4 \end{bmatrix}\begin{bmatrix} -4 \\ -1 \end{bmatrix}$$
$$= \frac{1}{8}\begin{bmatrix} 12+4 \\ -20+(-4) \end{bmatrix}$$
$$= \frac{1}{8}\begin{bmatrix} 16 \\ -24 \end{bmatrix}$$
$$= \begin{bmatrix} 2 \\ -3 \end{bmatrix}$$

$\therefore x = 2, y = -3$

15 (*a*) (i) Transformasi **G** ialah pantulan pada garis $x = 1$.
Transformation **G** *is a reflection in the line* $x = 1$.

(ii) Transformasi **F** ialah pembesaran pada pusat $T(4, 8)$ dengan faktor skala 3.
Transformation **F** *is an enlargement at center* $T(4, 8)$ *with a scale factor of* 3.

(*b*) Luas *PQRST*/*Area of PQRST* = 30 cm^2
Luas *ABCDT*/*Area of ABCDT* = $3^2 \times 30$
$= 9 \times 30$
$= 270$ cm^2

Luas kawasan berlorek/*Area of the shaded region*
$= 270 - 30$
$= 240 \text{ cm}^2$

Bahagian C
***Section* C**

16 (*a*) (i)

Jisim (kg) *Mass* **(kg)**	**Kekerapan** *Frequency*
40 – 49	4
50 – 59	6
60 – 69	5
70 – 79	8
80 – 89	6
90 – 99	6

(ii) 70 – 79

(iii)

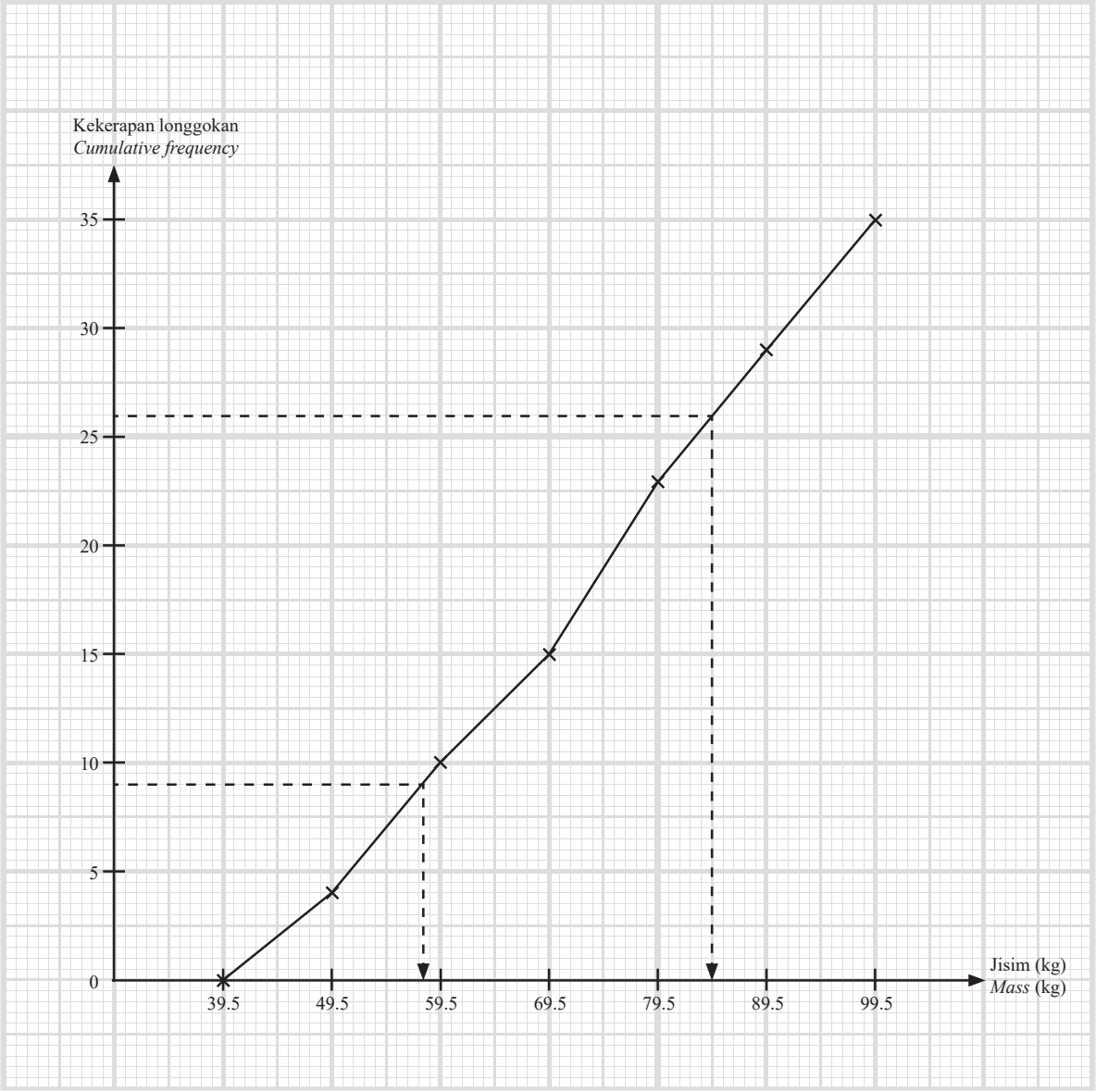
Jisim (kg) *Mass* **(kg)**	**Kekerapan,** f *Frequency,* f	**Titik tengah,** x *Midpoint,* x	fx	fx^2
40 – 49	4	44.5	178	7 921
50 – 59	6	54.5	327	17 821.5
60 – 69	5	64.5	322.5	20 801.25
70 – 79	8	74.5	596	44 402
80 – 89	6	84.5	507	42 841.5
90 – 99	6	94.5	567	53 581.5
	$\Sigma f = 35$		$\Sigma f = 2\,497.5$	$\Sigma fx^2 = 187\,368.75$

Sisihan piawai/*Standard deviation*

$$= \sqrt{\frac{187\,368.75}{35} - \left(\frac{2\,497.5}{35}\right)^2}$$
$= 16.173$

(*b*) (i)

Jisim (kg) *Mass* **(kg)**	**Sempadan atas** *Upper boundary*	**Kekerapan** *Frequency*	**Kekerapan longgokan** *Cumulative frequency*
30 – 39	39.5	0	0
40 – 49	49.5	4	4
50 – 59	59.5	6	10
60 – 69	69.5	5	15
70 – 79	79.5	8	23
80 – 89	89.5	6	29
90 – 99	99.5	6	35



(ii) $Q_1 = \frac{1}{4} \times 35 = 8.75 \approx 9$

Daripada graf, $Q_1 = 58$
From the graph

$Q_3 = \frac{3}{4} \times 35 = 26.25 \approx 26$

Daripada graf, $Q_3 = 84.5$
From the graph

Julat antara kuartil = $Q_3 - Q_1$
Interquartile range

$= 84.5 - 58$
$= 26.5$

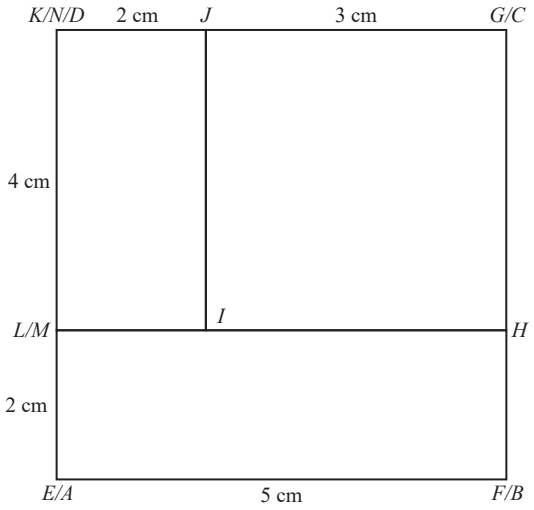
(iii) Bilangan murid dalam selang kelas 90 – 99 = 6 murid

Number of pupils in the interval class 90 – 99 = 6 *pupils*

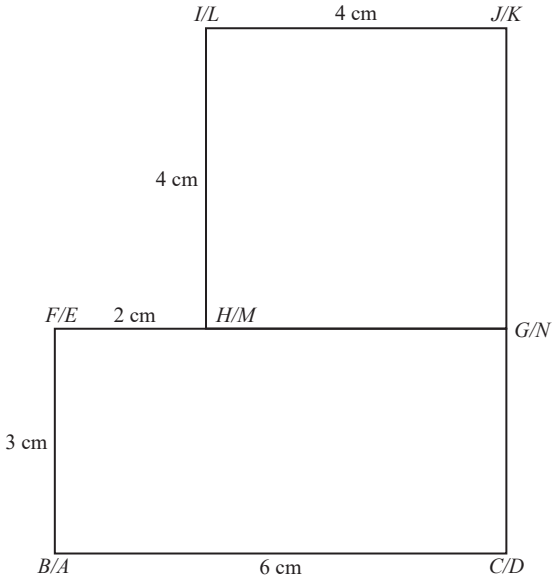
Kekerapan/*Frequency* $= \frac{2}{6}$

$= \frac{1}{3}$

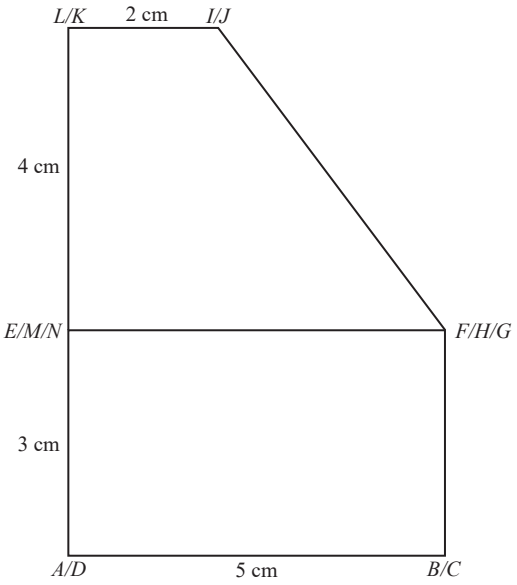
17 (*a*) (i)



(ii)



(iii)



(*b*) Luas permukaan kadbod/*Surface area of the cardboard*
$= 21 \text{ cm} \times 29.7 \text{ cm}$
$= 623.7 \text{ cm}^2$

Luas permukaan kuboid/*Surface area of the cuboid*
$= 2(3 \times 5) + 2(5 \times 6) + 2(3 \times 6)$
$= 30 + 60 + 36$
$= 126 \text{ cm}^2$

Luas permukaan prisma/*Surface area of the prism*
$= (4 \times 2) + (4 \times 4) + 2\left[\frac{1}{2} \times (2 + 5) \times 4\right] + 2(5 \times 4)$
$= 8 + 16 + 28 + 40$
$= 92 \text{ cm}^2$

Luas permukaan/*Surface area*
$= 126 + 92$
$= 218 \text{ cm}^2$

Ya, kerana luas permukaan model tersebut ialah 218 cm^2 manakala luas permukaan kadbod ialah 623.7 cm^2.
Yes, because the surface area of the model is 218 cm^2 *while the surface area of the cardboard is* 623.7 cm^2.

KERTAS MODEL SIJIL PELAJARAN MALAYSIA 2025 (SET 2)

KERTAS 1

1 **C**

$0.04\underset{+1}{3}7$ ← Nilai 7 lebih besar daripada 5. Maka, +1 pada 3.
The value of 7 *is larger than* 5. *Hence,* +1 *on* 3.

$= 0.044$

2 **A**

$5.\underset{\text{Nilai 3 lebih kecil daripada 5. Maka, tiada perubahan pada nilai 4.}}{4}35$ ←
The value of 3 *is smaller than* 5. *Hence, there is no change on the value of* 4.

$= 5.4$

$5.4 \times 4 = 21.6$

$21.6 = 2.16 \times 10$

3 **A**

Batu/*Stones* – 210 kg

Meja/*Table* – 70% batu/*stones*

Kerusi/*Bench* – 30% batu/*stones*

$\frac{30}{100} \times 210 \text{ kg} = 63 \text{ kg}$

$\frac{63 \text{ kg}}{100} = 21 \text{ kg}$ untuk sebiji kerusi/*of a bench*

4 **C**

$$\begin{array}{r} 1\,0\,2\,1\,1\,2\,0_{3} \\ +\quad 2\,0\,1\,1\,1\,0\,0_{3} \\ \hline 1\,0\,1\,0\,2\,2\,2\,0_{3} \end{array}$$

5 **B**

$360° - 145° = 215°$

$x = 900° - 100° - 215° - 90° - 90° - 175° - 135°$

$= 95°$

6 **C**

1	0	0	1	0_2
2^1	2^0	2^2	2^1	2^0
$(1 \times 2^1) + (0 \times 2^0) = 2$		$(0 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) = 2$		

$22_8 \neq 21_8$

7 **A**

Sudut pedalaman heksagon/*Interior angle of hexagon* $= \frac{(6-2) \times 180°}{6}$

$= 120°$

$s = 120°$

$r = 120° - 90°$

$= 30°$

$2r + s = 2(30°) + 120°$

$= 180°$

8 B

$\angle BED = \angle BDE = 70°$

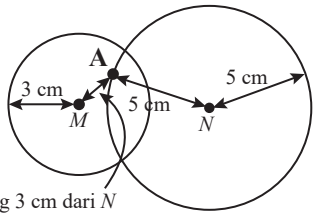
$\angle DBE = 180° - 70° - 70°$

$= 40°$

$x = 2 \times 40°$

$= 80°$

9 A



Kurang 3 cm dari *N*

Less than 3 cm *from N*

10 B

Bergerak ke kiri sebanyak 3 unit. Kemudian, bergerak ke atas sebanyak 4 unit.

Move left by 3 *units. Then, move up by* 4 *units.*

11 D

Perak = 21 helai/*pieces*

Selangor = x

Kedah = y

Jumlah bendera/*Total of flags* = 45 helai/*pieces*

Selangor: $\frac{1}{3} = \frac{x}{45}$

$x = \frac{1}{3} \times 45$

$x = 15$

Kedah: $\frac{1}{5} = \frac{y}{45}$

$y = \frac{1}{5} \times 45$

$y = 9$

12 C

Kuning/*Yellow* = x

Hijau/*Green* = 25

Hijau/*Green*: $\frac{1}{5} \overset{\times 25}{=} \frac{25}{x}$ ($\times 25$)

$(5 \times 25) - 25 = 100$ biji bola/*balls*

13 A

$(2m - 1)^2 - (m - 2)(2m + 3)$

$= 4m^2 - 4m + 1 - (2m^2 + 3m - 4m - 6)$

$= 4m^2 - 4m + 1 - 2m^2 - 3m + 4m + 6$

$= 2m^2 - 3m + 7$

14 B

$$\frac{3p-1}{\sqrt{q}} = \frac{2}{p}$$

$$\frac{(3p-1)p}{2} = \sqrt{q}$$

$$\sqrt{q} = \frac{3p^2-p}{2}$$

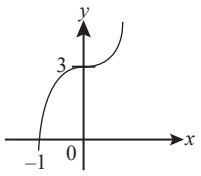
$$q = \left(\frac{3p^2-p}{2}\right)^2$$

15 A

$y = x^3 + 3$

Pintasan-y = 3

y-intercept



16 C

11 , (25), 25 , 27 , (30), 45

Q_1 Median Q_3

Julat antara kuartil/*Interquartile range* = $Q_3 - Q_1$

= 30 – 25

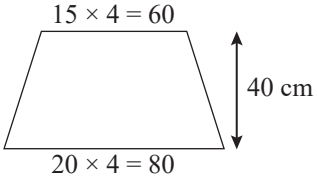
= 5

17 A

Mod/*Mode* = Bilangan murid paling ramai/*The largest number of pupils*

Mod/*Mode* = 0 hari/*day*

18 C



Luas/*Area* = $\frac{1}{2} \times 40 \times (60 + 80)$ cm^2

= 2 800 cm^2

19 B

$\sqrt{13^2 - 5^2} = 12$

$\sqrt{12^2 + 35^2} = 37$

kos/*cos* $\theta = \frac{35}{37}$

20 A

$5 \times 3 = 15$

$3 \times 3 = 9$

$\sqrt{15^2 - 9^2} = 12$

$\tan y = \frac{12}{9}$

$= \frac{4}{3}$

21 **A**

$C \rightarrow D \rightarrow A$

500 m + 900 m = 1 400 m

22 **A**

Bucu/*Vertex* = 5

Tepi/*Mode* = 7

Darjah/*Degree* = 2 × 7 = 14

23 **A**

$3x - 24 = 1 - 2x$

$3x + 2x = 1 + 24$

$5x = 25$

$x = \frac{25}{5}$

$= 5$

24 **A**

Perjalanan dari Gurun ke Shah Alam = Luas bawah graf

Journey from Gurun to Shah Alam = Area under a graph

$= \frac{1}{2} \times 110 \times (1.5 + 0.4)$

$= 104.5$

Perjalanan dari Gurun ke Shah Alam = Luas bawah graf

Journey from Shah Alam to Gurun = Area under a graph

$\frac{1}{2} \times 90 \times [2 + (2 - t)] = 104.5$

$2 + (2 - t) = 2.322$

$t = 1.68$

25 **D**

$2x + 5 > 11$

$2x > 11 - 5$

$x > \frac{6}{2}$

$x > 3$

$3x - 10 \leq 5$

$3x \leq 5 + 10$

$x \leq \frac{15}{3}$

$x \leq 5$

$x = 4, 5$

26 **B**

$8^{2x} = 4^{x-1}$

$(2^3)^{2x} = (2^2)^{x-1}$

$2^{6x} = 2^{2x-2}$

$6x = 2x - 2$

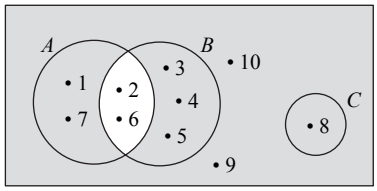
$4x = -2$

$x = -\frac{1}{2}$

27 A

$$\frac{\cancel{(x-3)}\,(x+7)}{\cancel{x+5}} \times \frac{\cancel{x+5}}{(x+4)\,\cancel{(x-3)}} = \frac{x+7}{x+4}$$

28 D

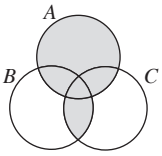


$(A \cap B)' = \{1, 3, 4, 5, 7, 8, 9, 10\}$

$n = 8$

29 C

$A \cup (B \cap C)$



30 C

(8, 4), (0, 0)

$$m = \frac{4-0}{8-0}$$

$$= \frac{1}{2}$$

$m_{AB} = m_{CD}$

(4, −1), (0, y)

$$\frac{1}{2} = \frac{y-(-1)}{0-4}$$

$$\frac{1}{2} = \frac{y-(-1)}{0-4}$$

$$\frac{1}{2} = \frac{y+1}{-4}$$

$y = -3$

$\therefore C(0, -3)$

31 D

$3x + y = 7$

$y = -3x + 7$

$y = -3(0) + 7$

$y = 7$

Pintasan-y/y-*intercept* = 7

32 B

$$P \propto \frac{Q}{\sqrt{M}}$$

$$P = \frac{kQ}{\sqrt{M}}$$

33 D

$R(x, 0)$

$S(10, -5)$

$m = -5$

$$-5 = \frac{0 - (-5)}{x - 10}$$

$$x - 10 = \frac{0 + 5}{-5}$$

$$x - 10 = \frac{5}{-5}$$

$$x = -1 + 10$$

$$x = 9$$

34 C

$m \propto n^2$

$m = kn^2$

$1 = k(1)^2$

$k = 1$

$m = n^2$

$2 = j^2$

$j = \sqrt{2}$

35 B

$$2\begin{bmatrix} 2 & m \\ -1 & 9 \end{bmatrix} - \begin{bmatrix} 0 & -3 \\ 4 & 4 \end{bmatrix} = \begin{bmatrix} 4 & 11 \\ n & 4 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 2m \\ -2 & 18 \end{bmatrix} - \begin{bmatrix} 0 & -3 \\ 4 & 4 \end{bmatrix} = \begin{bmatrix} 4 & 11 \\ n & 4 \end{bmatrix}$$

$2m - (-3) = 11$

$2m = 11 - 3$

$$m = \frac{8}{2}$$

$= 4$

$-2 - 4 = n$

$n = -6$

36 A

$$\begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 2(1) + -3(0) & 2(0) + -3(1) \\ 4(1) + 1(0) & 1(0) + 1(1) \end{bmatrix}$$

$$= \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}$$

37 D

$S \rightarrow R \rightarrow Q \rightarrow P \rightarrow T$

38 B

RM200 × $\frac{6}{100}$ ÷ 12 bulan/*months* × 8 bulan/*months* = RM8

RM200 + RM8 = RM208

39 B

(RM3 800 × 12) – RM5 200 – RM2 000 = RM38 400

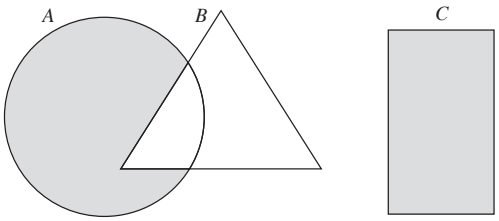
40 **C**

$6.54 \times \frac{140\,000}{1\,000} = \text{RM}915.60$

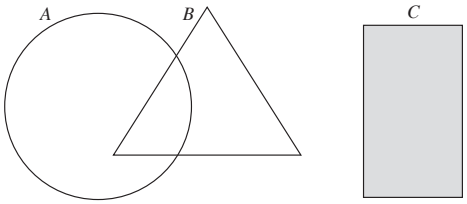
KERTAS 2

Bahagian A
***Section* A**

1 (*a*)



(*b*)



2 (*a*) $\angle CHD$

(*b*) $\tan \angle CHD = \frac{4}{9}$

$= 24°$

3 $2(3x + x - 1) = 22$

$4x - 1 = 11$

$x = \frac{12}{4}$

$x = 3$

Luas/*Area* $= 3(3)\text{ cm} \times (3 - 1)\text{ cm}$

$= 9\text{ cm} \times 2\text{ cm}$

$= 18\text{ cm}^2$

4 $\frac{22}{7} \times 9^2 \times t - 3(16) = 3\,007$

$254.57t = 3\,055$

$t = 12\text{ cm}$

5 $23x + 31y = 309$

$66x - 23y = 103$

$23x + 31y = 309$

$x = \frac{309 - 31y}{23}$

$66\left(\frac{309 - 31y}{23}\right) - 23y = 103$

$20\,394 - 2\,046y - 529y = 2\,369$

$-2\,575y = -18\,025$

$y = 7$

$x = \frac{309 - 31(7)}{23}$

$x = 4$

$\therefore x = 4, y = 7$

6 (*a*) $x > y$ jika dan hanya jika $y - x > 0$.
$x > y$ *if and only if* $y - x > 0$.
(*b*) Benar/*True*
(*c*) Sebilangan/*Some*
(*d*) Antejadian/*Antecedents*: $7x = 14$
Akibat/*Consequences*: $x = 2$

7 (*a*) $m_{OA} = \dfrac{-2 - 0}{3 - 0}$

$= \dfrac{-2}{3}$

$m_{OA} = m_{BC} = \dfrac{-2}{3}$

$y = mx + c$

$13 = \dfrac{-2}{3}(6) + c$

$c = 17$

$\therefore y = \dfrac{-2}{3}x + 17$

(*b*) $y = \dfrac{-2}{3}x + 17$

Jika/*If* $y = 0$

$0 = \dfrac{-2}{3}x + 17$

$x = \dfrac{51}{2}$

DE: $y = \dfrac{51}{2}$

8 $x + y = 23$
$2x + 8y = 82$

$$\begin{bmatrix} 1 & 1 \\ 2 & 8 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 23 \\ 82 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{1(8) - 1(2)}\begin{bmatrix} 8 & -1 \\ -2 & 1 \end{bmatrix}\begin{bmatrix} 23 \\ 82 \end{bmatrix}$$

$$= \frac{1}{6}\begin{bmatrix} 8(23) + (-1)(82) \\ -2(23) + 1(82) \end{bmatrix}$$

$$= \frac{1}{6}\begin{bmatrix} 184 - 82 \\ -46 + 82 \end{bmatrix}$$

$$= \frac{1}{6}\begin{bmatrix} 102 \\ 36 \end{bmatrix}$$

$$= \begin{bmatrix} 17 \\ 6 \end{bmatrix}$$

9 (*a*) {(K, 2), (K, 0), (K, 0), (K, 5), (I, 2), (I, 0), (I, 0), (I, 5), (R, 2), (R, 0), (R, 0), (R, 5), (A, 2), (A, 0), (A, 0), (A, 5)}

(*b*) (i) $\dfrac{4}{16} = \dfrac{1}{4}$

(ii) $\dfrac{6}{16} = \dfrac{3}{8}$

10 (*a*) Persamaan/*Equation* 1:

$2x + 3y + x + 2y - 1 = 33$

$3x + 5y = 34$

Persamaan/*Equation* 2:

$x + 2y - 1 = 3(3x - y)$

$x + 2y - 1 = 9x - 3y$

$5y - 8x = 1$

(*b*) Persamaan/*Equation* 1 − Persamaan/*Equation* 2:

$$\begin{array}{rrrrr} & 5y & + & 3x & = & 34 \\ - & 5y & - & 8x & = & 1 \\ \hline & & & 11x & = & 33 \\ & & & x & = & 3 \end{array}$$

$3x + 5y = 34$

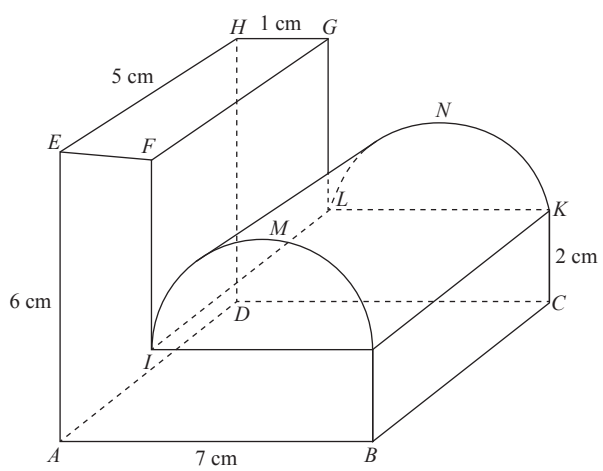
$$y = \frac{34 - 3x}{5}$$

$$= \frac{34 - 3(3)}{5}$$

$= 5$

Bahagian B
***Section* B**

11 (*a*)



(*b*) $(6 \times 5 \times 1) + (6 \times 5 \times 2) + \left(\frac{1}{2} \times \frac{22}{7} \times 3^2 \times 5\right)$

$= 30 \text{ cm}^3 + 60 \text{ cm}^3 + 70.71 \text{ cm}^3$

$= 160.71 \text{ cm}^3$

12 (*a*)

Batang *Stem*	Daun *Leaf*							
14	2	2	5	6				
15	3	5	6	6	7	7		
16	2	4	5	6	6	6	6	6
17	0	0						

Kekunci: 14 | 2 bermaksud 142 cm

Key: 14 | 2 *means* 142 cm

(*b*) (i)

x	f	fx	x^2	fx^2
1	2	2	1	2
2	5	10	4	20
3	4	12	9	36
4	6	24	16	96
5	5	25	25	125

(ii) Min/*Mean* $= \bar{x} = \dfrac{\sum fx}{\sum f}$

$= \dfrac{2 + 10 + 12 + 24 + 25}{2 + 5 + 4 + 6 + 5}$

$= 3.318$

Varians/*Variance* $= \sigma^2 = \dfrac{\sum fx^2}{\sum f} - (\bar{x})^2$

$= \dfrac{2 + 20 + 36 + 96 + 125}{2 + 5 + 4 + 6 + 5} - (3.318)^2$

$= 1.673$

Sisihan piawai/*Standard deviation* $= \sigma = \sqrt{1.673}$

$= 1.293$

13 (*a*) (i) $\tan\theta = \dfrac{3}{4} = \dfrac{6}{JK}$

$JK = \dfrac{6 \times 4}{3}$

$= 8$

$MK = \dfrac{8}{2}$

$= 4$ cm

(ii) $\theta = 180° - 90° - 30°$

$= 60°$

kos/*cos* LMK = −kos/*cos* 60°

$= -0.5$

(*b*) $R(22.5°, 0.707)$

$S(112.5°, -0.707)$

R: $\tan 22.5° = \dfrac{\sin 22.5°}{\text{kos/}cos\ 22.5°}$

$= \dfrac{0.383}{0.924}$

$= 0.415$

R: $\tan 112.5° = \dfrac{\sin 112.5°}{\text{kos/}cos\ 112.5°}$

$= \dfrac{0.924}{-0.383}$

$= 0.242$

14 (*a*) (i) Penjelmaan *X*: Pembesaran pada pusat (8, 2) dengan faktor skala $\frac{1}{2}$.

Transformation X: Enlargement at centre (8, 2) *with scale factor* $\frac{1}{2}$.

(ii) Penjelmaan *Y*: Translasi $\begin{pmatrix} 6 \\ 11 \end{pmatrix}$.

Transformation Y: Translation $\begin{pmatrix} 6 \\ 11 \end{pmatrix}$.

(*b*) $k = \dfrac{\text{Panjang imej/}\textit{Length of image}}{\text{Panjang objek/}\textit{Length of object}} = \dfrac{3}{6} = \dfrac{1}{2}$

Luas imej/*Area of an image* = k^2 × Luas objek/*Area of an object*

$42 = \left(\frac{1}{2}\right)^2 \times$ Luas object/*Area of an object*

Luas objek/*Area of an object* = 168 cm^2

15 (*a*) $P \propto \dfrac{Q^2}{\sqrt[3]{r}}$

$P = \dfrac{KQ^2}{\sqrt[3]{R}}$

(*b*) $\dfrac{2}{9} = \dfrac{k(2)^2}{\sqrt[3]{216}}$

$k = \dfrac{1}{3}$

$j = \dfrac{\frac{1}{3}(3)^2}{\sqrt[3]{8}}$

$j = \dfrac{3}{2}$

(*c*) $p = \dfrac{\frac{1}{3}(25)^2}{\sqrt[3]{27}}$

$p = \dfrac{625}{9}$

Bahagian C
***Section* C**

16 (*a*) (i) $12 + 7 + 8 + x + 2x + 3 + 4x = 51$

$7x + 30 = 51$

$x = 3$

Bilangan murid yang suka menonton dua jenis filem = $7 + 3 + 2x$
Number of pupils who like to watch two types of movies

$= 7 + 3 + 2(3)$

= 16 orang murid/*pupils*

(ii) $3 + x + 2x + 4x$

$= 3 + 3 + 2(3) + 4(3)$

= 24 orang murid/*pupils*

(*b*) (i) Aliran tunai = Pendapatan – Perbelanjaan
Cash flow = Income – Expenses
= (2 700 + 750) – (90 + 300 + 800 + 280 + 550)
= 3 450 – 2 020
= RM1 430
∴ Aliran tunai positif/*Positive cash flow*

(ii) RM13 000 ÷ 4 = RM3 250
Lebihan/*Surplus* RM1 430 + RM80 = RM1 510

Jumlah bulanan yang harus disimpan melebihi jumlah bulanan yang boleh disimpan mengikut corak perbelanjaan Linda.
The monthly amount to be saved exceeds the monthly amount that can be saved according to Linda's spending pattern.

∴ Linda tidak boleh mencapai matlamat kewangannya./*Linda cannot achieve her financial goals.*

(*c*) Kos perubatan selepas deduktibel/*Medical costs after deductible*
= RM30 000 – RM550 = RM29 450

Kos yang ditanggung oleh syarikat insurans/*Costs incurred by the insurance company*

$= \frac{65}{100} \times \text{RM}29\,450 = \text{RM}19\,142.50$

Kos yang ditanggung oleh Cik Hannah/*Costs borne by Miss Hannah*

$= \left(\frac{35}{100} \times \text{RM}29\,450\right) + \text{RM}550 = \text{RM}10\,857.50$

17 (*a*) (i) Julat/*Range* = RM18.90 – RM6.00 = RM12.90
(ii) 9, 11, 12, 13, 18
Median = 12

(*b*) $\frac{22}{7} \times 3.5^2 - \frac{22}{7} \times 2.7^2 = 15.59 \text{ cm}^2$

(*c*) Persamaan/*Equation* 1: $30A + 25B = 1\,750$
Persamaan/*Equation* 2: $60A + 10B = 1\,900$

(Persamaan/*Equation* 1) × 2: $60A + 50B = 3\,500$

$$\begin{array}{rrrrl} & 60A & + & 50B & = 3\,500 \\ - & 60A & + & 10B & = 1\,900 \\ \hline & & & 40B & = 1\,600 \\ & & & B & = \frac{1\,600}{40} \\ & & & & = 40 \end{array}$$

$30A + 25B = 1\,750$

$A = \frac{1\,750 - 25B}{30}$

$= \frac{1\,750 - 25(40)}{30}$

$= 25$

∴ Pakej/*Package A* = RM25, Pakej/*Package B* = RM40

(*d*) Syarikat Insuran *A*/*Insurance Company A*:

Kos perubatan selepas deduktibel/*Medical costs after deductible*
= RM20 000 – RM350 = RM19 650

Kos yang ditanggung oleh syarikat insurans/*Costs borned by the insurance company*

$= \frac{80}{100} \times \text{RM19 650} = \text{RM15 720}$

Kos yang ditanggung oleh pembeli/*Costs borned by the buyer*

$= \left(\frac{20}{100} \times 1\ 9\ 650\right) + \text{RM350} = \text{RM4 280}$

Syarikat Insuran *B*/*Insurance Company B*:

Kos perubatan selepas deduktibel/*Medical costs after deductible*
= RM18 000 – RM1 000 = RM17 000

Kos yang ditanggung oleh syarikat insurans/*Costs borned by the insurance company*

$= \frac{75}{100} \times \text{RM17 000} = \text{RM12 750}$

Kos yang ditanggung oleh pembeli/*Costs borned by the buyer*

$= \left(\frac{25}{100} \times 17\ 000\right) + \text{RM1 000} = \text{RM5 250}$

∴ Syarikat Insuran *A* menawarkan pakej yang lebih berbaloi.
Insurance Company A offers a more worthwhile pacakage.

KERTAS 1

1 **A**

$8.0\underset{+1}{3}76$

Nilai 7 lebih besar daripada 5. Maka, +1 pada 3.
The value of 7 *is larger than* 5. *Hence,* +1 *on* 3.

$= 8.04$

2 **C**

$6.102 \times 10^2 \times 10^{-2} \times 10^7$
$= 6.102 \times 10^{2+(-2)+7}$
$= 6.102 \times 10^7$

3 **B**

$\frac{1}{2} \times (40 + 50) \times 30 \times 10 = 13\,500$

$\frac{13\,500}{3} = 4\,500$

$\frac{22}{7} \times 3.5^2 \times t = 4\,500$

$t = 116.88$ cm

4 **D**

$(2 \times 6^3) + (3 \times 6^2) + (4 \times 6^1) + (5 \times 6^0) = 569$

8	569	
8	71	→ 1
8	8	→ 7
8	1	→ 0
	0	→ 1

$2345_6 \rightarrow 1071_8$

5 **B**

$$\begin{array}{rcccccccc} & & & {\scriptstyle 1} & {\scriptstyle 1} & & {\scriptstyle 1} & & \\ & 1 & 2 & 4 & 2 & 1 & 4 & {}_5 \\ + & & 4 & 1 & 3 & 3 & 1 & 3 & {}_5 \\ \hline & 1 & 0 & 4 & 3 & 0 & 3 & 2 & {}_5 \end{array}$$

6 **D**

$\frac{4^P \times 2^2}{8^P} = 16$

$\frac{2^{2P} \times 2^2}{2^{3P}} = 2^4$

$2^{(2P+2-3P)} = 2^4$

$-P + 2 = 4$

$P = -2$

7 **B**

$\frac{360°}{60} = 6$

Poligon 6 sisi = heksagon
Polygon of 6 *sides = hexagon*

8 **A**

$\angle EBD = \dfrac{(5-2) \times 180°}{5} = 6$

$= 108°$

$x = \dfrac{180° - 108°}{2}$

$= 36°$

$y = 180° - 2(62°)$

$= 56°$

$x + y = 56° + 36°$

$= 92°$

9 **A**

$\angle ABC = 180° - 2(25°)$

$= 130°$

$\angle PRQ = 130° \div 2$

$= 65°$

$x = 360° - 65° - 40° - 230°$

$= 25°$

10 **C**

$\angle PSO = 90°$

$\angle SOP = 180° - 90° - 20°$

$= 70°$

$\angle QOT = 180° - 70°$

$= 110°$

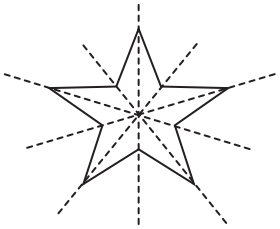
$\angle QTO = \dfrac{180° - 110°}{2}$

$= 35°$

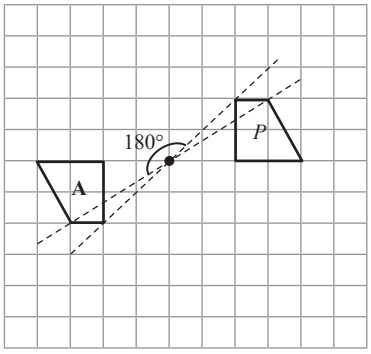
$x = 180° - 35°$

$= 145°$

11 **B**



12 **A**



13 B

$\sqrt{8^2 + 6^2} = 10$

kos/*cos* $\theta = -\frac{6}{10}$

$= -\frac{3}{5}$

14 A

Bentuk bagi graf/*Shape of the graph,* y = kos/*cos* $2x$

15 A

$6\,585 = (5 \times 30 \times 35) + \left(\frac{22}{7} \times r^2 \times 90\right)$

$6\,585 = 5\,250 + 282.857r^2$

$r^2 = 4.72$

$r = 2.172$

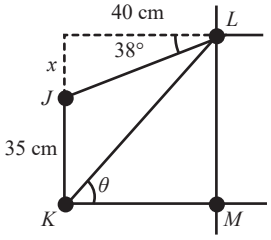
16 B

Akaun pelaburan adalah bukan jenis akaun simpanan.
Investment account is not the type of savings account.

17 A

RM78 000 – RM5 400 – RM1 100 – RM3 000 = RM68 500

18 B



$\tan 38° = \frac{x}{40}$

$x = 31.25$

$\tan \theta = \frac{35 + 31.25}{40}$

$\theta = 59°$

19 C

$\frac{3m}{2m} - \frac{(2 - m) \times 2}{m \times 2} = \frac{3m}{2m} - \frac{4 - 2m}{2m}$

$= \frac{5m - 4}{2m}$

20 D

$5p^2 - 10pq - (9p^2 - 12pq + 4q^2)$

$= 5p^2 - 10pq - 9p^2 + 12pq - 4q^2$

$= -4q^2 - 4p^2 + 2pq$

21 A

Untuk mencari pekali bagi xy, buang xy.
To fine the coefficient of xy, remove the xy.

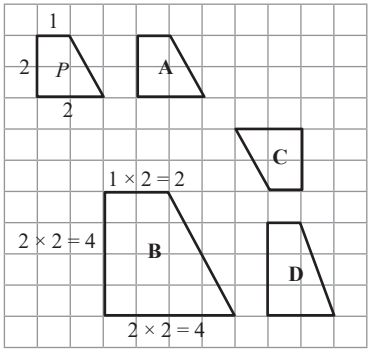
$2 \times \cancel{x} \times x \times \cancel{y} \times y \times y \times z$

$2x^2y^3z \rightarrow 2xy^2z$

22 B

$\frac{4.1}{100} \times 125\,000 \times 6 = \text{RM}30\,750$

23 B



24 A

$9m^2 \times m^3 \times 4m^2 = 36m^7$

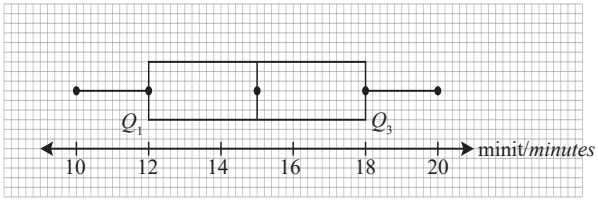
25 B

$4^{3n} \times 4^{-2} = 4^{4n}$

$3n - 2 = 4n$

$-2 = n$

26 A



Julat antara kuartil/*Interquartile range* $= Q_3 - Q_1$

$= 18 - 12$

$= 6$

27 A

$2x + 3 < 7$, $3 - 3x \leq 15$

$x < \frac{7-3}{2}$ $x \geq \frac{15-3}{-3}$

$x < 2$ $x \geq -4$

28 A

Pecutan/*Acceleration* $= \frac{110 - 70}{2}$

$= 20 \text{ km j}^{-2}/\text{km h}^{-2}$

29 C

$\frac{252 + x}{6} = 50.4 + 2.6$

$x = 66$

30 A

$\frac{6 + 3 + 4 + 2 + 1}{2} = 9$

2 biji buku mempunyai kekerapan longgokan sebanyak 9.

2 *books have a cumulative frequency of* 9.

31 C

$y = -3x^2 + 6x$

Gantikan salah satu nilai x atau y daripada titik pada graf iaitu (0, 0) dan (2, 0) ke dalam setiap persamaan pada pilihan jawapan.

Substitute one of the values of x or y from points at the graph which are (0, 0) *and* (2, 0) *into each equation on the answer choices.*

Jika/*If* $x = 0$,

$y = -3(0)^2 + 6(0)$

$y = 0$

$\therefore$ (0, 0)

Jika/*If* $x = 2$,

$y = -3(2)^2 + 6(2)$

$y = 0$

$\therefore$ (2, 0)

32 D

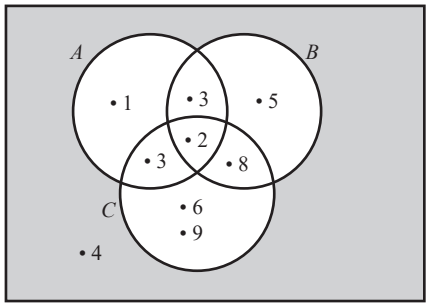
$\xi = \{f, g, h, i, j, k, l, m, n\}$

$(A \cup B) = \{h, k, l, m\}$

$(A \cup B)' =$ selain/*except* $\{h, k, l, m\}$

$= \{f, g, i, j, n\}$

33 A



$(A \cup B \cup C)'$ = kawasan berlorek/*shaded region* = {4}

n mewakili bilangan unsur

n represents the number of elements

$\therefore n(A \cup B \cup C)' = 1$

34 B

$\frac{y}{5} = \frac{x}{2} + 1$

$\frac{y}{5} \times (5) = \frac{x}{2} \times (5) + 1 \times (5)$

$y = \frac{5}{2}x + 5$

$y = \frac{5}{2}(0) + 5$

$y = 5$

35 B

$\frac{7}{13} + \frac{2}{13} = \frac{9}{13}$

36 **A**

$p(3) = 8 - p$

$3p = 8 - p$

$4p = 8$

$p = 2$

37 **A**

$P(A) = \frac{n(A)}{n(S)}$

$P(M \cap B) + P(B \cap M) = \left(\frac{3}{11} \times \frac{8}{10}\right) + \left(\frac{8}{11} \times \frac{3}{10}\right)$

$= \frac{24}{55}$

38 **C**

$\begin{pmatrix} 3 & 15 \\ 12 & -18 \end{pmatrix} - \begin{pmatrix} 7 & 14 \\ -21 & 0 \end{pmatrix} = \begin{pmatrix} -4 & 1 \\ 33 & -18 \end{pmatrix}$

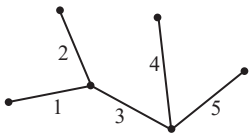
39 **B**

$P(HB' + BH') = \frac{2}{3} \times \frac{1}{5} + \frac{4}{5} \times \frac{1}{3}$

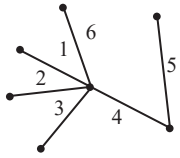
$= \frac{2}{15} + \frac{4}{15}$

$= \frac{2}{5}$

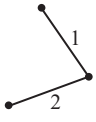
40 **A**



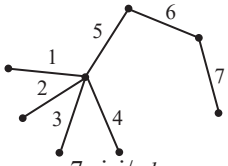
5 sisi/*edges*



6 sisi/*edges*



2 sisi/*edges*



7 sisi/*edges*

KERTAS 2

Bahagian A
***Section* A**

1

$\frac{2}{x+1} + \frac{1}{6} = \frac{15}{5x+1}$

$\frac{2(6)}{(x+1)(6)} + \frac{1(x+1)}{6(x+1)} = \frac{15}{5x+1}$

$\frac{12 + x + 1}{6x + 6} = \frac{15}{5x+1}$

$\frac{13 + x}{6x + 6} = \frac{15}{5x+1}$

$(13 + x)(5x + 1) = 15(6x + 6)$

$65x + 13 + 5x^2 + x = 90x + 90$

$5x^2 - 24x - 77 = 0$

$(5x + 11)(x - 7) = 0$

$5x + 11 = 0$, $x - 7 = 0$

$x = -\frac{11}{5}$ $x = 7$

x ialah nombor positif/*is a positive number,* $\therefore x = 7$

2 $(x + 10)(x + 3) = 78$

$x^2 + 3x + 10x + 30 - 78 = 0$

$x^2 + 13x - 48 = 0$

$(x - 3)(x + 16) = 0$

$x - 3 = 0$, $x + 16 = 0$

$x = 3$ $x = -16$

Jika/*If* $x = 3$,

Panjang/*Length* $= x + 3$

$= 3 + 3$

$= 6$

Lebar/*Width* $= x + 10$

$= 3 + 10$

$= 13$

Jika/*If* $x = -16$,

Panjang/*Length* $= x + 3$

$= -16 + 3$

$= -13$

Lebar/*Width* $= x + 10$

$= -16 + 10$

$= -6$

$\therefore x = 3$ kerana menghasilkan nilai panjang dan lebar yang positif.

$x = 3$ *because it produces positive length and width values.*

Perimeter $= 2(6) + 2(13)$

$= 12 + 26$

$= 38$ cm

3 (*a*) Benar/*True*

(*b*) Semua/*All*

(*c*) Jika x ialah faktor bagi 8, maka x ialah faktor bagi 2.
If x *is a factor of* 8, *then* x *is a factor of* 2.

(*d*) Bilangan angka bererti bagi 0.0843 bukan tiga.
The number of significant figures for 0.0843 *is not three.*

4 (*a*) $10P0111_2 = 127_8$

1			2			7_8		
↓			↓			↓		
0	0	1	0	1	0	1	1	1_2

$10P0111_2 = 1010111_2$

$\therefore P = 1$

(*b*) $102010_3 = 300_{10}$

$(1 \times 3^5) + (2 \times 3^3) + (1 \times 3^1)$
$= 243 + 54 + 3$
$= 300$

$A \quad B \quad C$
300 biji manga/*mangoes* → 3 : 1 : 2

$A = \frac{3}{6} \times 300 = 150$

$B = \frac{1}{6} \times 300 = 50$

$C = \frac{2}{6} \times 300 = 100$

$101_2 = (1 \times 2^2) + (1 \times 2^0)$
$= 4 + 1$
$= 5$

Kemudian/*Next*,
A: 150 – 5 = 145
B: 50 + 5 = 55
C: 100
A : *B* : *C* = 145 : 55 : 100 (÷ 5)
= 29 : 11 : 20

5 (*a*) $18 - x + x + 1 + 20 + x + 2 = 45$
$x = 4$

Murid yang menggemari kedua-dua jenis makanan:
Pupils who love both types of food:
$x + 1 = 4 + 1$
= 5 orang murid/*pupils*

(*b*) $18 - x + 1 = 18 - 4 + 1$
= 15 orang murid/*pupils*

6 (*a*) $B = \frac{1}{2} \times 20 \times 110 = 1\,100$

$C = \frac{1}{2} \times 10 \times (80 + 110) = 950$

$D = (55 - 30)(80) = 2\,000$

$E = \frac{1}{2} \times 80 \times 41 = 1\,640$

Masa ***Time***	**Lokasi** ***Location***	**Jarak dari *A*** ***Distance from A***
9:00 pagi/a.m.	*A*	0 km
9:20 pagi/a.m.	*B*	1 100 km
9:30 pagi/a.m.	*C*	1 100 + 950 = 2 050 km
9:55 pagi/a.m.	*D*	1 100 + 950 + 2 000 = 4 050 km
10:36 pagi/a.m.	*E*	1 100 + 950 + 2 000 + 1 640 = 5 690 km

(*b*) Laju seragam adalah 80 km min^{-1} antara minit ke-30 dan 55.
The uniform speed is 80 km min^{-1} *between the minutes of* 30 *and* 55.

7 $\frac{4(\times 81)}{7(\times 81)} = \frac{4y^2}{567}$

$4y^2 = 4 \times 81$

$4y^2 = 324$

$y = \sqrt{\frac{324}{4}}$

$y = 9$

8 $y \geq 2x$

$y \leq 8$

$y > -2x + 8$

9 (*a*) $P(B \cup M) = P(B) + P(M)$

$= \frac{4}{11} + \frac{2}{11}$

$= \frac{6}{11}$

(*b*) $P(B \cup K)' = 1 - P(B \cup K)$

$= 1 - \left(\frac{4}{11} + \frac{5}{11}\right)$

$= \frac{2}{11}$

10 Aliran tunai = Pendapatan – Perbelanjaan

Cash flow = *Income – Expenditure*

= RM3 200 – (RM520 + RM150 + RM1 800)

= RM730

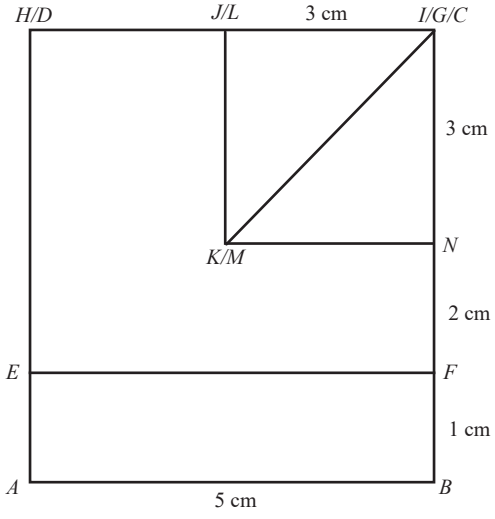
Putri boleh membeli kereta dengan anggaran bayaran sebulan tidak melebihi RM730.

Putri can buy a car with an estimated monthly payment not exceeding RM730.

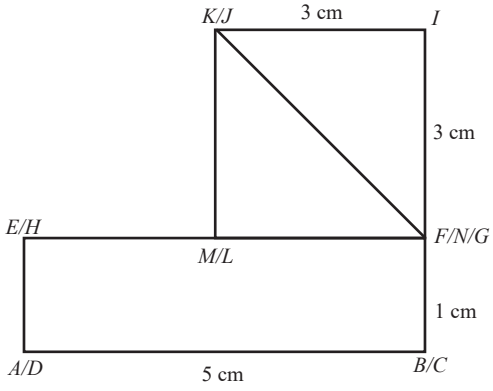
Bahagian B

***Section* B**

11 (*a*)



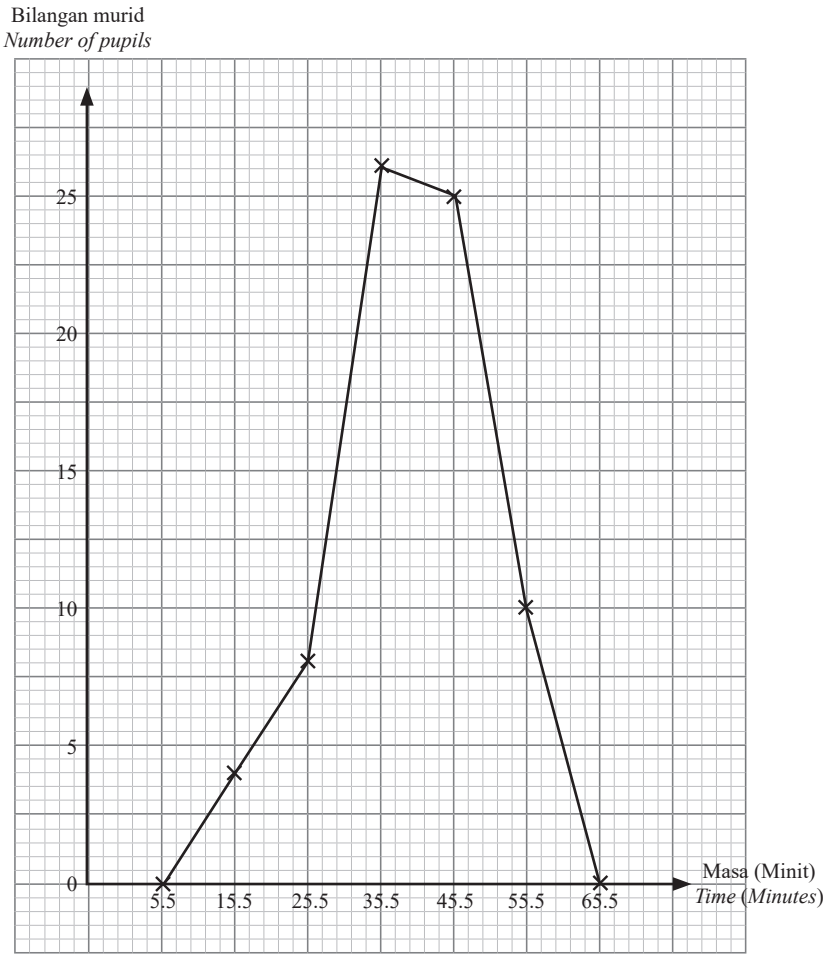
(*b*)



12 (*a*)

Masa (Minit) ***Time* (*Minutes*)**	**Kekerapan** ***Frequency***	**Titik tengah** ***Midpoint***
11 – 20	4	15.5
21 – 30	8	25.5
31 – 40	26	35.5
41 – 50	25	45.5
51 – 60	10	55.5

(*b*)



13 (*a*) (i) $\sin 35° = \frac{RS}{29}$

$RS = \sin 35° \times 29$

$= 16.634$ cm

(ii) $\theta = 180° - 90° - 35°$

$= 55°$

$\sin \angle TSU = \sin 55°$

$= 0.819$

(*b*) $R(135°, -1.414)$

(i) kos/*cos* R = kos/*cos* 135°
$= -0.707$

(ii) $\tan R = \dfrac{\sin 135°}{\text{kos/}cos\ 135°}$
$= -1$

14 (*a*) x = komputer riba/*laptop*
y = tablet
$x + y = 15$
$2\,500x + 1\,850y = 32\,300$
$\begin{bmatrix} 1 & 1 \\ 2\,500 & 1\,850 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 15 \\ 32\,300 \end{bmatrix}$

(*b*) $\begin{bmatrix} x \\ y \end{bmatrix} = \dfrac{1}{1(1\,850) - 1(2\,500)}\begin{bmatrix} 1\,850 & -1 \\ -2\,500 & 1 \end{bmatrix}\begin{bmatrix} 15 \\ 32\,300 \end{bmatrix}$

$= \dfrac{1}{-650}\begin{bmatrix} 1\,850(15) + (-1)(32\,300) \\ -2\,500(15) + (1)(32\,300) \end{bmatrix}$

$= \dfrac{1}{-650}\begin{bmatrix} -4\,550 \\ -5\,200 \end{bmatrix}$

$= \begin{pmatrix} 7 \\ 8 \end{pmatrix}$

$\therefore$ Komputer riba/*Laptops* = 7
Tablet/*Tablets* = 8

15 (*a*) Kos perubatan selepas deduktibel/*Medical costs after deductible*
= RM19 000 – RM1 120 = RM17 880

Kos yang ditanggung oleh syarikat insurans/*Costs borned by the insurance company*
$= \dfrac{80}{100} \times$ RM17 880 = RM14 304

Kos yang ditanggung oleh Zainab/*Costs borned by Zainab*
$= \left(\dfrac{20}{100} \times \text{RM17 880}\right) + \text{RM1 120} = \text{RM4 696}$

(*b*) (i) Jumlah insurans yang harus dibeli/*The amount of insurance that must be purchased*
$= \dfrac{80}{100} \times$ RM570 000 = RM456 000

(ii) Bayaran pampasan/*Compensation payment*
= RM120 000 – RM3 000 = RM117 000

16 (*a*) Isi padu kon + isi padu hemisfera + isi padu silinder
Volume of cone + volume of hemisphere + volume of cylinder
$= \left(\dfrac{1}{3} \times \dfrac{22}{7} \times 3^2 \times 5\right) + \left(\dfrac{2}{3} \times \dfrac{22}{7} \times 3^2\right) + \left(\dfrac{22}{7} \times 3^2 \times 8\right) = 292.286\ \text{cm}^3$

(*b*) Silinder + air = $\dfrac{22}{7} \times 25^2 \times 32 = 62\,857.14$
Cylinder + water
Silinder + air + bola = $\dfrac{22}{7} \times 25^2 \times 37 = 72\,678.57$
Cylinder + water + ball
Isi padu bola = 72 678.57 – 62 857.14 = 9 821.43
Volume of ball
$\dfrac{4}{3} \times \dfrac{22}{7} \times r^3 = 9\,821.43$
$r = 13.28$ cm

(*c*) (i) Cukai dasar/*Base tax* = RM150
Cukai atas baki/*Tax on the next balance* = (RM35 000 – RM20 000) × 3%
= RM450
Cukai pendapatan/*Income tax*
= RM150 (cukai dasar/*base tax*) + RM450 (cukai atas baki/*tax on the next balance*) – RM150 (zakat) – RM400 (rebat cukai/*tax rebate*)
= RM50

(ii) Pendapatan bercukai < RM35 000, Puan Rihai layak mendapat rebat cukai RM400.
Chargeable income < RM35 000, *Mrs. Rihai eligibles to receive tax rebate* RM400.

RM400 (rebat/*rebate*) + RM150 (zakat) = RM550

Jumlah rebat yang layak ialah RM550.
Tax rebate obtained is RM550.

(iii) Ya, lebihan cukai yang telah dibayar ialah (RM821 – RM50) = RM771.
Yes, an excess tax that has been paid is (RM821 – RM50) = RM771.

17 (*a*) **Bank *A***

$MV = 7\,000\left(1 + \frac{0.06}{2}\right)^{2(2)}$

$MV = 7\,878.56$

Bank *B*

$MV = 7\,000\left(1 + \frac{0.03}{4}\right)^{4(2)}$

$MV = 7\,431.19$

∴Bank *A* adalah lebih berbaloi dipilih kerana pakej yang ditawarkan membolehkan Encik Hamka memperoleh faedah yang lebih tinggi.
Bank A is more worth choosing because the package offered allows Mr. Hamka to earn higher interest.

(*b*) (i)

Bulan *Months*	**Jumlah pelaburan (RM)** *Total of investment* **(RM)**	**Harga seunit** *Price per unit*	**Bilangan unit** *Number of unit*
Januari/*January*	RM780	RM1.20	650
Februari/*February*	RM780	RM0.90	867
Mac/*March*	RM780	RM1.30	600
April	RM780	RM1.20	650
Mei/*May*	RM780	RM1.20	650
Jun/*June*	RM780	RM1.10	709
Julai/*July*	RM780	RM1.15	678
Ogos/*August*	RM780	RM0.95	821
September	RM780	RM1.30	600
Oktober/*October*	RM780	RM1.00	780
November	RM780	RM1.00	780
Disember/*December*	RM780	RM1.00	780

Jumlah unit/*Number of units*
= 650 + 867 + 600 + 650 + 650 + 709 + 678 + 821 + 600 + 780 + 780 + 780
= 8 565 unit/*units*

(ii) Pembelian sekali gus pada bulan Januari/*Lump sum purchased on January*:
Modal/*Capital* = RM780 × 12 = RM9 360

RM9 360 ÷ RM1.20 seunit/*per unit* = 7 800 unit/*units*

Strategi pemurataan yang dibuat oleh Encik Hamka adalah pilihan pelaburan yang bijak berbanding pembelian secara sekali gus pada bulan Januari kerana beliau akan memperoleh bilangan unit yang lebih banyak dengan modal yang sama.
The averaging strategy made by Mr. Hamka is a wise investment choice as opposed to a lump sum purchase in January as he will acquire a larger number of units with the same capital.

(*c*) (i) Dividen/*Dividend* = 6 200 × RM1.20 × 0.075
= RM558

(ii) $\frac{6\,200}{8}$ = 775 unit/*units*

(iii) 6 200 + 775 = 6 975 unit/*units*

KERTAS 1

1 **C**

$9(4) - 6(3) + 8 = 36 - 18 + 8$
$= 26$

2 **A**

Setiap objek dalam domain mempunyai satu imej sahaja.
Each object in the domain has only one image.

3 **A**

$\frac{36^x}{216} = \frac{1}{6^x}$
$\frac{6^{2x}}{6^3} = \frac{1}{6^x}$
$6^{2x-3} = 6^{-x}$
$2x - 3 = -x$
$3x = 3$
$x = 1$

4 **D**

$124_6 \longrightarrow 52_{10}$
$567_8 \longrightarrow 375_{10}$
$52 + 375 = 427$
$427_1 \longrightarrow 3202_5$

5 **B**

$P \propto \frac{Q}{R^2}$
$P = \frac{kQ}{R^2}$
$1 = \frac{k(12)}{4^2}$
$16 = 12k$
$k = \frac{4}{3}$

$P = \frac{\frac{4}{3}S}{2^2}$
$4(3) = \frac{4}{3}S$
$\frac{12(3)}{4} = S$
$S = 9$

6 **C**

Laju purata / *Average speed* = $\frac{\text{Jumlah jarak / } \textit{Total distance}}{\text{Jumlah masa / } \textit{Total time}}$

Laju purata / *Average speed* = $\frac{\left(\frac{1}{2} \times 6 \times 4\right) + \left[\frac{1}{2} \times (6 + 22) \times 4\right] + (22 \times 2)}{10}$

Laju purata / *Average speed* = $\frac{112}{10}$

Laju purata / *Average speed* = 11.2 m s^{-1}

7 **B**

Panjang LK / *Length of* $LK = \sqrt{13^2 - 12^2}$
$= 5$ cm

Luas / *Area* = $\left(\frac{1}{2} \times 12 \times 19\right) - \left(\frac{1}{2} \times 5 \times 12\right)$
$= 114 \text{ cm}^2 - 0 \text{ cm}^2$
$= 84 \text{ cm}^2$

8 **C**

$$\frac{(p-4)\times q}{2p\times q} - \frac{(p-2q)\times 2}{pq\times q}$$

$$= \frac{pq-4q-(2p-4q)}{2pq}$$

$$= \frac{pq-4q-2p+4q}{2pq}$$

$$= \frac{pq-2p}{2pq}$$

9 **D**

Jumlah sudut pedalaman / *Sum of interior angles*

$= (6-2)\times 180°$

$= 720°$

$x = 720° - 270° - 90° - 43° - 167° - 101°$

$= 49°$

10 **A**

$\angle EOF = 180° - 35° - 35°$

$= 101°$

$\angle EGF = 110° \div 2$

$= 55°$

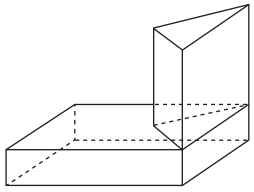
$\angle EFG = 180° - (30° + 35°) - 55°$

$= 60°$

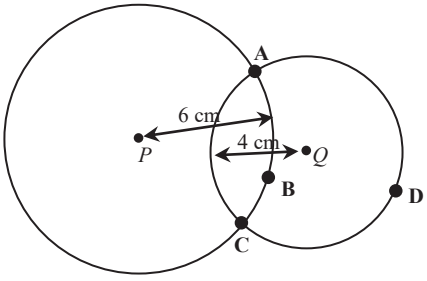
$x = 60° - 35°$

$= 25°$

11 **D**



12 **B**



13 **A**

$4x + (0) = 8$

$$x = \frac{8}{4}$$

$x = 2$

14 **B**

$3.4 \times 10^{-5} - 0.57 \times 10^{-5}$

$= 2.83 \times 10^{-5}$

15 C

Darjah bagi bucu / *Degree of vertex A* = 3
Darjah bagi bucu / *Degree of vertex B* = 3
Darjah bagi bucu / *Degree of vertex C* = 4
Darjah bagi bucu / *Degree of vertex D* = 4
Bilangan darjah / *Number of degrees* = 3 + 3 + 4 + 4
= 14

16 C

Kadar pengangguran
Unemployment rate

17 B

75% daripada premium asas polisi komprehensif adalah kadar premium polisi pihak ketiga, kebakaran dan kecurian.
75% of the basic premium of comprehensive policy is the premium rate of third party, fire and theft policy from the basic premium.

18 A

Komisen
Commissions

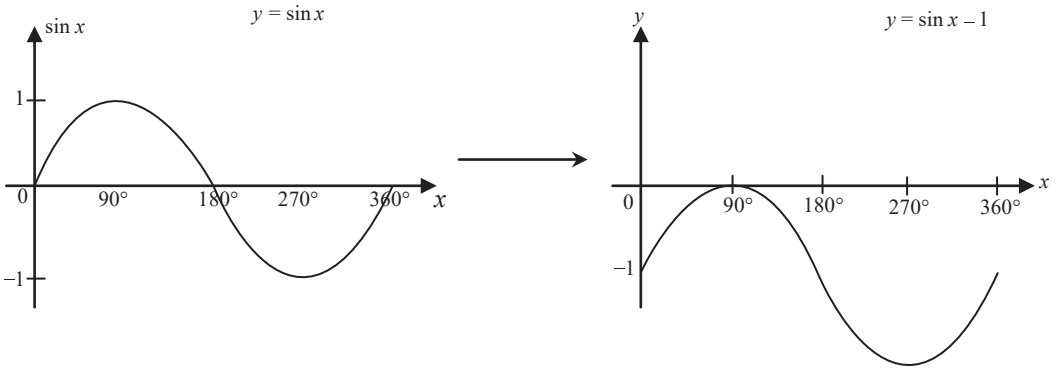
19 D

$$p\sqrt{q} - 4p = p - 3\sqrt{q}$$
$$p\sqrt{q} + 3\sqrt{q} = p + 4\text{p}$$
$$\sqrt{q}(p + 3) = 5p$$
$$\sqrt{q} = \frac{5p}{p + 3}$$
$$\sqrt{q} = \left(\frac{5p}{p + 3}\right)^2$$

20 A

$n(J \cup K \cap L)' = 5 + 6 + 11 + 9 + 7$
$= 38$

21 C



22 D

Jenis buah ***Type of fruit***	Oren *Orange*	Epal *Apple*
Nisbah ***Ratio***	9 : 7	
Bilangan buah ***Number of fruits***	9 × 3 = 27	7 × 3 = 21

Bilangan buah oren yang elok / *Number of good oranges*
$= 27 - 7$
$= 20$

23 B

$3x^2 - 3x - 18 = 0$
$(x - 3)(x + 2) = 0$
$x = 3, x = -2$

24 A

$$\frac{1}{60} = \frac{\text{Ukuran skala / } \textit{Scale measurement}}{\text{Ukuran sebenar / } \textit{Actual measurement}}$$
$$\frac{1}{60} = \frac{\text{Ukuran skala / } \textit{Scale measurement}}{22.2 \text{ m}}$$
$$\frac{1}{60} = \frac{\text{Ukuran skala / } \textit{Scale measurement}}{22.2 \times 100}$$

$$\text{Ukuran skala / } \textit{Scale measurement} = \frac{2\,200 \text{ cm}}{60}$$
Ukuran skala / *Scale measurement* = 37 cm

25 A

$$\text{Min / } \textit{Mean} = \frac{(23 \times 2) + (28 \times 8) + (33 \times 18) + (38 \times 26) + (43 \times 30) + (48 \times 10) + (53 \times 4)}{98}$$
$$= \frac{3\,834}{98}$$
$= 39.12$

26 D

Nombor perdana / *Prime number* = 2, 3, 5, 7
Nombor kuasa dua sempurna / *Perfect square number* = 9, 16, 25

$$\text{Kebarangkalian / } \textit{Probability} = \frac{4}{8} + \frac{3}{8}$$
$$= \frac{7}{8}$$

27 D

Rebat cukai / *Tax rebate* = RM400

28 C

$10 - 8x < x + 28$, $x + 28 \leqslant 40 - 5x$
$10 - 28 < x + 8x$ $x + 5x \leqslant 40 - 28$
$-18 < 9x$ $6x \leqslant 12$
$x < -2$ $x \leqslant 2$
$\therefore x = -1, 0, 1, 2$

29 B

Jika $x + 1 \neq 7$, maka $x \neq 6$
If $x + 1 \neq 7$, *then* $x \neq 6$

30 D

Julat / *Range* = 1.9 – 1.0
= 0.9

1.0, 1.1, 1.1, 1.2, 1.2, 1.3, 1.4, 1.5, 1.5, 1.6, 1.7, 1.9

$$Q_1 = \frac{1.1 + 1.2}{2} = 1.15$$

$Q_3 = \frac{1.5 + 1.6}{2} = 1.55$

Julat antara kuartil / *Interquartile range* = 1.55 – 1.15
= 0.4

Beza julat dengan julat antara kuartil / *Difference of range and interquartile range*
= 0.9 – 0.4
= 0.5

31 C

$\frac{60}{100} \times 20 = 12$

Bilangan rantai $\geqslant y$ cm ialah 12 utas.
The number of the necklaces $\geqslant y$ cm *is* 12.
$\therefore y = 39$ cm

32 B

Jumlah bilangan kek / *Total number of cakes* = x

$\frac{90°}{360°} \times x = 165$

$x = \frac{165 \times 360}{90}$

$x = 660$

Bilangan kek perisa kopi / *Number of coffee flavoured cakes*
= 660 – 165 – 385
= 110

33 A

$(2 \times -5) + (-2 \times 3x) + (3 \times 4x) = 8$

$-10 + (-6x) + 12x = 8$

$-10 + 6x = 8$

$6x = 18$

$x = 3$

34 D

Kadar perubahan laju / *Rate of change of speed*

$= \frac{3 - 15}{7 - 0}$

$= -\frac{12}{7}$

35 B

Titik tengah / *Midpoint*

$= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$= \left(\frac{4 + 2}{2}, \frac{6 + (-2)}{2}\right)$

$= (3, 2)$

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{7 - 2}{-5 - 3}$

$= -\frac{5}{8}$

36 C

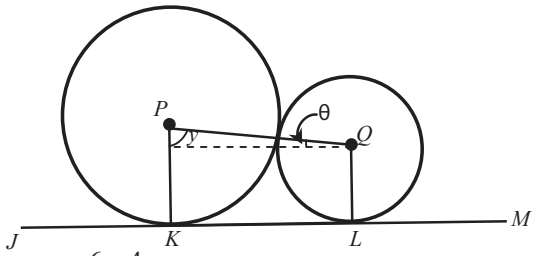
Jumlah wang simpanan / *Total savings*

$= \text{RM}9\,000 + \left(\frac{4}{100} \times 9\,000\right)$

$= \text{RM}9\,000 + 360$

$= \text{RM}9\,360$

37 D



$\sin \theta = \frac{6-4}{6+4}$

$\sin \theta = \frac{2}{10}$

$\theta = 11.54°$

$y = 180° - 90° - 11.54°$

$= 78.46°$

38 A

Isi padu hemisfera / *Volume of hemisphere*

$= \frac{1}{2} \times \frac{4}{3} \pi j^3$

$= \frac{2}{3} \pi j^3$

$= \frac{2}{3} \times \frac{22}{7} \times 3^3$

$= 56\frac{4}{7}\ \text{cm}^3$

Isi padu kon / *Volume of cone*

$= \frac{1}{3} \pi j^2 t$

$= \frac{1}{3} \times \frac{22}{7} \times 3^2 \times 4$

$= 37\frac{5}{7}\ \text{cm}^3$

Isi padu bekas / *Volume of the container*

$= 56\frac{4}{7}\ \text{cm}^3 + 37\frac{5}{7}\ \text{cm}^3$

$= 94\frac{2}{7}\ \text{cm}^3$

Jumlah isi padu 20 000 bekas / *Volume of* 20 000 *containers*

$= 20\,000 \times 94\frac{2}{7}\ \text{cm}^3$

$= 1\,885\,714.286\ \text{cm}^3$

$= \frac{1\,885\,714.286}{1\,000} \times 1\ l$

$= 1\,885.714286$

$= 1\,885\frac{5}{7}\ l$

39 B

$4x = 5y + 4$

$x = \frac{5y+4}{4}$

$x = \frac{5(-12)+4}{4}$

$x = -14$

,

$3y = 2\left(\frac{5y+4}{4}\right) - 8$

$3y + 8 = \frac{10y+9}{4}$

$12y + 32 = 10y + 8$

$2y = -24$

$y = -12$

40 C

Fungsi eksponen
Exponential functions

KERTAS 2

Bahagian A

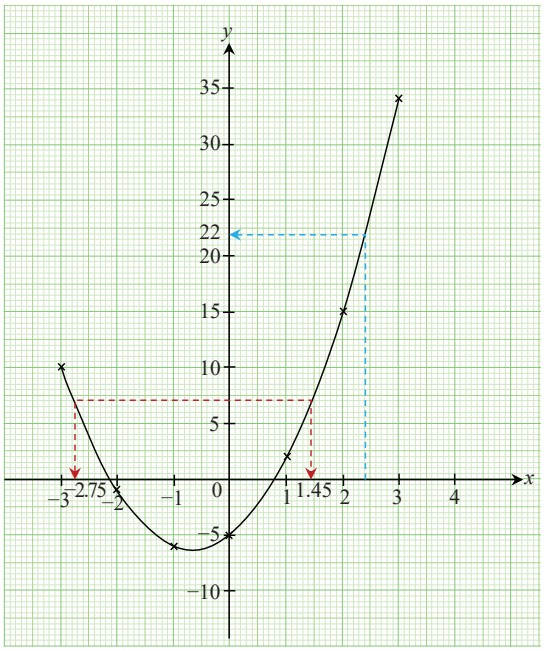
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
1	$\left(\frac{x+6}{2}, \frac{y+0}{2}\right) = (0, 4)$ atau *or* $\frac{x+6}{2} = 0$ $\frac{y+0}{2} = 4$ atau *or* setara *equivalent* $E(-6, 8)$	1 1	**2**
2	(*a*) Min / *Mean* $= \frac{30\ 720}{12}$ $= 2\ 560$	1	
	(*b*) Sisihan piawai / *Standard deviation* $= \sqrt{\frac{87\ 043\ 675}{12} - (2\ 560)^2}$ $= 836.68$	 1 1	**3**
3	(*a*) (i) Antejadian: *k* ialah faktor bagi 3 *Antecedent*: *k is a factor of* 3 (ii) Akibat: *k* ialah faktor bagi 6 *Consequence*: *k is a factor of* 6	1 1	
	(*b*) Kontrapositif: Jika kos $\theta \neq \frac{1}{2}$, maka $\theta \neq 60°$ *Contrapositive*: *If* $\cos\theta \neq \frac{1}{2}$, *then* $\theta \neq 60°$ Benar / *True*	1 1	**4**

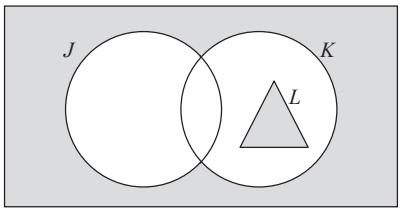
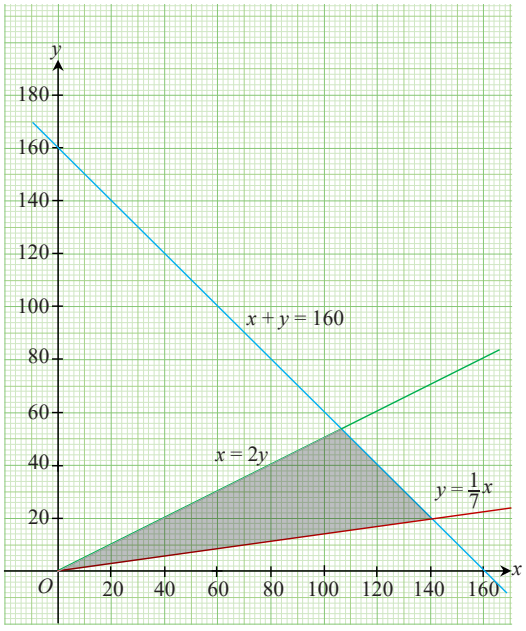
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
4	(*a*) Tempoh masa *Time-bound*	1	
	(*b*) RM3 300 – RM1 840 – RM360 = RM1 100 6 × RM1 100 – RM7 000 = –RM400 Dia tidak mencapai matlamat kewangannya. Dia mengalami kekurangan RM400. *He cannot achieve his financial goal. He has a shortage of* RM400.	1 1 1	**4**
5	Isi padu silinder + isi padu hemisfera $= \pi j^2 t + \frac{2}{3}\pi j^3$ *Volume of cylinder + volume of hemisphere* $= \left(\frac{22}{7} \times 14^2 \times 35\right) + \left(\frac{2}{3} \times \frac{22}{7} \times 14^3\right)$ $= 21\,560 + 5\,749\frac{1}{3}$ $= 27\,309\frac{1}{3}\text{ cm}^3$ Jumlah bilangan guli $= 27\,309\frac{1}{3}\text{ cm}^3 - 195\frac{1}{42}\text{ cm}^3$ *The total number of marbles* $= 14$	2 1 1	**4**
6	(*a*) Premium tahunan Encik Gan *Encik Gan's monthly premium* $= \frac{90\,000}{1\,000} \times \text{RM3.58} \div 12$ = RM26.85	1 1	
	(*b*) Premium tahunan Puan Shapu *Puan Shapu's annual premium* $= \frac{85\,000}{1\,000} \times \text{RM1.73}$ = RM147.05 Premium tahunan Puan Phuva *Puan Phuva's annual premium* $= \frac{95\,000}{1\,000} \times \text{RM2.24}$ = RM212.80 Beza premium tahunan = RM212.80 – RM147.05 *The difference of annual premium* = RM65.75	1 1 1	**5**
7	$10x(x-2) = 350$ $10x^2 - 2x - 350 = 0$ $x^2 - 2x - 35 = 0$ $(x-7)(x+5) = 0$ $x = 7$ atau / *or* $x = -5$ (Abaikan / *Ignored*) $AB : AC = 3 : 5$ $\frac{AB}{10(7)} = \frac{3}{5}$ $AB = 42$	1 1 1	

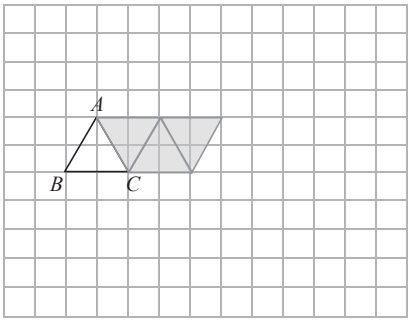
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	Luas segi tiga $= \frac{1}{2}(7-2)(42)$ *Area of the triangle* $= 105\ \text{cm}^2$	1 1	**5**
8	(*a*) $\theta = 37°58', (180° - 37°58')$ $= 37°58', 142°2'$	1 1	
	(*b*) $\theta = (180° - 50°35') - (360° - 50°35')$ $= 129°25', 309°25'$	1 1	**4**
9	$I = Prt$ $= 7\,000 \times \frac{5}{100} \times 4$ $= \text{RM}1\,400$	1	
	$MV = P\left(1 + \frac{r}{n}\right)^{nt}$ $= 7\,000\left(1 + \frac{0.05}{4}\right)^{4(4)}$ $= \text{RM}8\,539.23$	1	
	Faedah = RM8 539.23 – RM7 000 *Interest* = RM1 539.23	1 1	
	Beza faedah = RM1 539.23 – RM1 400 *Difference of interest* = RM139.23	1	**5**
10	(*a*) $\frac{24}{30} \times \frac{23}{29}$ $= \frac{92}{145}$	1 1	
	(*b*) $\left(\frac{6}{30} \times \frac{24}{29}\right) + \left(\frac{24}{30} \times \frac{6}{29}\right)$ $= \frac{48}{145}$	1 1	**4**

Bahagian B

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
11	(*a*) x | –2 y | –1 x | 2 y | 15	1 1	

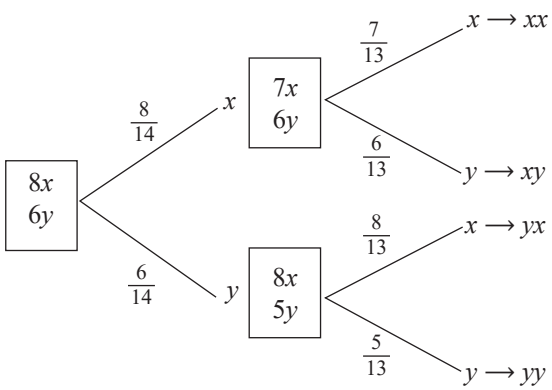
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	(*b*)  	4	
	(*c*) (i) 22 (ii) –2.75, 1.45	1 2	**9**
12	(*a*) Katakan kek vanila = x, kek coklat = y *Let vanilla cake = x, chocolate cake = y* $28x + 24y = 194$ $16x + 12y = 104$ $\begin{bmatrix}28 & 24\\16 & 12\end{bmatrix}\begin{bmatrix}x\\y\end{bmatrix} = \begin{bmatrix}194\\104\end{bmatrix}$ $\begin{bmatrix}x\\y\end{bmatrix} = \frac{1}{(28)(12)-(24)(16)}\begin{bmatrix}12 & -24\\-16 & 28\end{bmatrix}\begin{bmatrix}194\\104\end{bmatrix}$ x = RM3.50 y = RM4	 1 1 1 1 1 1	
	(*b*) $\begin{bmatrix}6 & 7\end{bmatrix}\begin{bmatrix}3.5\\4\end{bmatrix}$ = 49 Duit Amir cukup kerana RM50 melebihi RM49. *Amir's money is enough because* RM50 *exceeds* RM49.	1 1 1	**9**
13	(*a*) $x = 17 - 5$ $= 12$ $y = 21 - 12$ $= 9$ $z = 40 - 12 - 5 - 7 - 9$ $= 7$	 1 1 1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	(*b*) (i) 	3	
	(ii) $5 + 9$ $= 14$	1 1	**8**
14	(*a*) $x \geqslant 2y$	1	
	$x + y \leqslant 160$	1	
	$y \geqslant \frac{1}{7}x$	1	
	(*b*) Lukis paksi-*x* dan paksi-*y* dengan skala yang betul. *Draw x-axis and y-axis with the correct scale.*	1	
			
	Garis lurus $x + y = 160$ dilukis dengan betul. *The straight line $x + y = 160$ is drawn correctly.*	1	
	Garis lurus $x = 2y$ dilukis dengan betul. *The straight line $x = 2y$ is drawn correctly.*	1	
	Garis lurus $y = \frac{1}{7}x$ dilukis dengan betul. *The straight line $y = \frac{1}{7}x$ is drawn correctly.*	1	
	Rantau dilorek dengan betul. *The region is shaded correctly.*	1	
	(*c*) (i) 140 (ii) 20	1 1	**10**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
15	(*a*) (i) Putaran 90 lawan arah jam pada pusat (6, 9). *A 90° counter-clockwise rotation at the center* (6, 9). (ii) Pembesaran pada pusat (10, 9) dengan faktor skala 2. *Enlargement at the center* (10, 9) *with a scale factor of* 2.	3 3	
	(*b*) Tiga segi tiga sama sisi dilukis dengan saiz yang betul. *Three equilateral triangles are drawn with the correct size.* 	3	**9**

Bahagian C

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
16	(*a*) (i) Ahli Kelab STEM / *STEM Club members* = x Ahli Kelab Kewangan / *Finance Club members* = $\frac{1}{4}x$ Ahli Kelab Seni / *Art Club members* = 2 $x + \frac{1}{4}x + 2 = 32$ $\frac{5}{4}x = 30$ $x = 24$ Ahli Kelab Kewangan / *Finance Club members* = $\frac{1}{4}(24)$ $= 6$ ∴ Nisbah / *Ratio* = 24 : 6 : 2 (ii) Peratus ahli Kelab STEM / *STEM Club members* = $\frac{24}{32} \times 100$ $= 75\%$	 1 1 1 1	
	(*b*) Katakan bilangan murid lelaki / *Let the number of male students* = x Katakan bilangan murid perempuan / *Let the number of female students* = y $5x + 4y = 109$ ...① $x + y = 24$ ...② ② × 5 : $5x + 5y = 120$ ...③ ③ – ① : $y = 11$ $x = 24 - 11$ $= 13$ Bilangan murid lelaki Tingkatan 1 / *Number of Form* 1 *male students* $= 5 \times 13$ $= 65$ Bilangan murid perempuan Tingkatan 1 / *Number of Form* 1 *female students* $= 4 \times 11$ $= 44$	 1 1 1 1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	(*c*) (i) $t = 6 + 5$ $= 11$ s	1	
	(ii) Laju purata / *Average speed* $= \frac{30 - 0}{20 - 0}$ atau setara / *or equivalent* $= \frac{3}{2}$ atau setara / *or equivalent*	1 1	
	(*d*) Katakan duit syiling 20 sen / *Let* 20 *cent coins* = x Katakan duit syiling 50 sen / *Let* 50 *cent coins* = y  $P(xy$ atau / *or* $yx)$ $= P(xy) + P(yx)$ $= \left(\frac{8}{14} \times \frac{6}{13}\right) + \left(\frac{6}{14} \times \frac{8}{13}\right)$ $= \frac{48}{91}$	3 1	**15**
17	(*a*) Cukai jalan kereta 1 590 cc = RM90.00 *Road tax* 1 590 cc	1	
	Cukai jalan kereta 1 650 cc = RM200.00 + (1 650 – 1 600) × RM0.40 *Road tax* 1 650 cc = RM220.00	1	
	Cukai jalan kereta 1 950 cc = RM280.00 + (1 951 – 1 800) × RM0.50 *Road tax* 1 950 cc = RM355.50	1	
	Jumlah cukai jalan = RM90.00 + RM220.00 + RM355.50 *Total road tax* = RM665.50	1	
	(*b*) $D \longrightarrow A \longrightarrow C \longrightarrow B$ Laluan ini mengambil masa yang paling singkat, iaitu 30 minit. *This route takes the shortest time, which is* 30 *minutes.*	1 2	
	(*c*) (i) $N \propto \frac{Q}{R}$ $N = \frac{kQ}{R}$ $50 = \frac{k(25)}{10}$ $k = 20$	1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	$N = \frac{20Q}{R}$	1	
	(ii) $60 = \frac{20Q}{10}$	1	
	$Q = 30$	1	
	(*d*) $(1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) = 6$	1	
	$(2 \times 3^1) + (1 \times 3^0) = 7$	1	
	(6 × RM5) + (7 × RM8)	1	
	= RM86	1	**15**

KERTAS 1

1 **C**

$406\,000$

$= 4.06 \times 10^5$

2 **D**

$3221_4 = 3 \times 4^3 + 2 \times 4^2 + 2 \times 4^1 + 1 \times 4^0$

$= 233_{10}$

$310_5 = 3 \times 5^2 + 1 \times 5^1 + 0 \times 5^0$

$= 80_{10}$

$203_7 = 2 \times 7^2 + 0 \times 7^1 + 3 \times 7^0$

$= 101_{10}$

$21221_3 = 2 \times 3^4 + 1 \times 3^3 + 2 \times 3^2 + 2 \times 3^1 + 1 \times 3^0$

$= 214_{10}$

$\therefore 310_5, 203_7, 21221_3, 3221_4$

3 **B**

$\frac{y - 15}{30} = 3.5$

$y - 15 = 105$

$y = 120$ m

4 **C**

$348 \times 438 = 152\,424$ m^2

$152\,424 = 152\,000$ m^2 (tiga angka bererti / *three significant figures*)

5 **A**

$\frac{u}{3 + u + 7} \times 360° = 120°$

$\frac{u}{u + 10} = \frac{120°}{360°}$

$\frac{u}{u + 10} = \frac{1}{3}$

$3u = u + 10$

$3u - u = 10$

$2u = 10$

$u = 5$

6 **D**

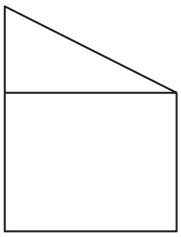
A: $\angle e + \angle p = 180°$ adalah benar.
$\angle e + \angle p = 180°$ *is true.*

B: $\angle p + \angle q + \angle r = 180°$ adalah benar.
$\angle p + \angle q + \angle r = 180°$ *is true.*

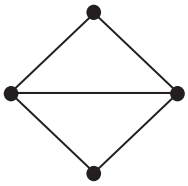
C: $\angle e + \angle f + \angle g = 360°$ adalah benar.
$\angle e + \angle f + \angle g = 360°$ *is true.*

D: $\angle f = \angle p + \angle q$ adalah tidak benar. $\angle f = \angle p + \angle r$ adalah benar.
$\angle f = \angle p + \angle q$ *is not true.* $\angle f = \angle p + \angle r$ *is true.*

7 **B**



8 **B**



bukan subgraf
not a subgraph.

9 **A**

$2 \times \frac{22}{7} \times 16 \times 4 = 402.29 \text{ cm}^2$

10 **D**

Bentuk *S* dan *T* tidak mempunyai ruang apabila berlaku teselasi.
S and T shapes do not have space when tessellation happens.

11 **A**

Faktor skala $= \frac{45}{9}$
Scale factor

$= 5$

12 **A**

FSTB / *HCF*

5	$25x^3, 5x^3$
x	$5x^3, x^2$
x	$5x^2, x$

$5x, 1$

$5 \times x \times x = 5x^2$

13 **D**

$$A = P + Prt$$
$$522.50 \times 8 \times 12 = 38\,000 + 38\,000(r)(8)$$
$$50\,160 = 38\,000 + 304\,000r$$
$$12\,160 = 304\,000r$$
$$r = \frac{12\,160}{304\,000}$$
$$r = 0.04$$
$$r = 4\%$$

14 C

Bentuk graf ialah ∪, $a > 0$.

The graph shape is ∪, $a > 0$.

$y = x^2 - 3, y = 0^2 - 3$

$y = -3$

$y = x^2 - 9, y = 0^2 - 9$

$y = -9$

$\therefore y = x^2 - 9$

15 B

$$\frac{24p - 12pq}{p^2 - 36} \div \frac{6p^2q}{p + 6}$$

$$= \frac{\cancel{12p}(2 - q)}{\cancel{(p + 6)}(p - 6)} \times \frac{\cancel{p + 6}}{\cancel{6p^2q}}$$

$$= \frac{2(2 - q)}{pq(p - 6)}$$

16 B

kos $x = -\frac{1}{\sqrt{2}}$, $180° \leqslant x \leqslant 360°$, kos x berada di sukuan III.

cos $x = -\frac{1}{\sqrt{2}}$, $180° \leqslant x \leqslant 360°$, cos x *is in quadrant* III.

sin $x = -\frac{1}{\sqrt{2}}$ jika berada di sukuan III.

sin $x = -\frac{1}{\sqrt{2}}$ *if it is in quadrant* III.

$6 \sin x = -\frac{6}{\sqrt{2}}$

17 A

$$\tan 40° = \frac{16}{FG}$$

$$FG = \frac{16}{\tan 40°}$$

$$FG = 19.07 \text{ m}$$

18 C

$$u = \frac{5}{6}\sqrt{\frac{v}{w}}$$

$$\frac{6u}{5} = \sqrt{\frac{v}{w}}$$

$$\left(\frac{6u}{5}\right)^2 = \left(\sqrt{\frac{v}{w}}\right)^2$$

$$\frac{36u^2}{25} = \frac{v}{w}$$

$$w = \frac{25v}{36u^2}$$

19 B

$\frac{5}{2}q \leqslant 20$

$q \leqslant \frac{40}{5}$

$q \leqslant 8$

$4q + 5 > 29$

$4q > 24$

$q > \frac{24}{4}$

$q > 6$

$q = 7, 8$

20 A

Domain = {3, 5, 7}

Julat = {9, 11, 12}

Range

21 D

Biarkan jumlah empat nombor = T

Let the total of four numbers = T

$\frac{T}{4} = 15$

$T = 15 \times 4$

$T = 60$

$\frac{T + x + x + 2}{4 + 2} = 25$

$T + 2x + 2 = 25 \times 6$

$60 + 2x + 2 = 150$

$2x = 150 - 62$

$2x = 88$

$x = 44$

22 C

Luas sukuan $= \frac{1}{4} \times \pi j^2$

Area of quadrant $= \frac{1}{4} \times \pi r^2$

$= \frac{1}{4} \times \frac{22}{7} \times 7^2$

$= \frac{77}{2}$ cm^2

Luas segi tiga $= \frac{1}{2} \times (10 + 7) \times (7 + 4)$

Area of triangle

$= \frac{187}{2}$ cm^2

Luas kawasan berlorek $= \frac{187}{2} - \frac{77}{2}$

Area of shaded region

$= 55$ cm^2

23 A

Andaikan / *Let,*
Farhan = f
Wahid = w
Zurina = z

$f = 6w$

Andaikan / *Let*, $w = m$

$f = 6w$
$f = 6m$

$f + w = 6m + m$
$= 7m$

$z = f + 17$
$= 6m + 17$

24 C

A:	Segi empat selari *Parallelogram*	0
B:	Rombus *Rhombus*	2
C:	Trapezium	0
D:	Layang-layang *Kite*	1

25 B

$\left(\frac{-9+5}{2}, \frac{8+14}{2}\right)$
$= \left(\frac{-4}{2}, \frac{22}{2}\right)$
$= (-2, 11)$

26 B

Pilihan jenama adalah bukan kuantiti.
Choices of brands are not quantities.

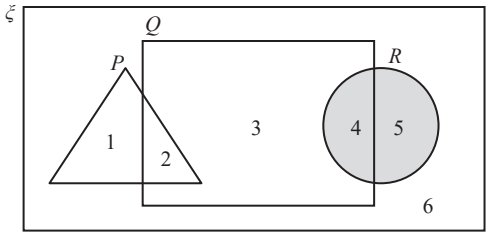
27 C

$\angle EGO = \frac{180° - 140°}{2}$
$= 20°$
$\angle KGE = 90° - 20°$
$= 70°$
$\angle KGE = \angle GEF$
$\angle GEF = 70°$
$y = 70°$

28 B

$G = \{48, 54, 60, 66, 72, 78\}$
$n(G) = 6$

29 D



$P = 1, 2$
$P' = 3, 4, 5, 6$
$Q = 2, 3, 4$
$R = 4, 5$

$P' \cup Q = 3, 4, 5, 6 \cup 2, 3, 4$
$= 2, 3, 4, 5, 6$
$P' \cup Q \cap R = 2, 3, 4, 5, 6 \cup 4, 5$
$= 4, 5$

{29, 30, 31, 32, 33}

30 A

Bilangan darjah $= 6 \times 2$
Number of degrees
$= 12$

31 D

2, 2, 3, 4, 5, 6, 7, 7, 8, 9, 10, 10, 11, 12
$10 - 4 = 6$

32 C

RM1 800 − RM1 300 = RM500

33 B

$$\tan \theta = \frac{0.75}{(-0.62)}$$
$$= -1.21$$

34 B

$$y = mx + c$$
$$0 = \frac{3}{4}x + 6$$
$$-6 = \frac{3}{4}x$$
$$x = \frac{-6 \times 4}{3}$$
$$x = -8$$

35 A

$$\frac{55}{250} = \frac{11}{50}$$

36 D

$$\text{RM11 000} \times \frac{7}{100} \times \frac{1}{2} = \text{RM385}$$

37 A

$e \propto f^3$

$e = kf^3$

$-25.6 = k(4)^3$

$k = -0.4$

$-86.4 = (-0.4)f^3$

$f^3 = 216$

$f = \sqrt[3]{216}$

$f = 6$

38 D

$$\begin{pmatrix} -2 \\ 4 \end{pmatrix}(6 \quad 3) = \begin{pmatrix} -2 \times 6 & -2 \times 3 \\ 4 \times 6 & 4 \times 3 \end{pmatrix}$$

$$= \begin{pmatrix} -12 & -6 \\ 24 & 12 \end{pmatrix}$$

39 D

$p - 3(7) = 8$

$p - 21 = 8$

$p = 8 + 21$

$p = 29$

$7 - 3q = 4$

$-3q = 4 - 7$

$-3q = -3$

$q = \frac{-3}{-3}$

$q = 1$

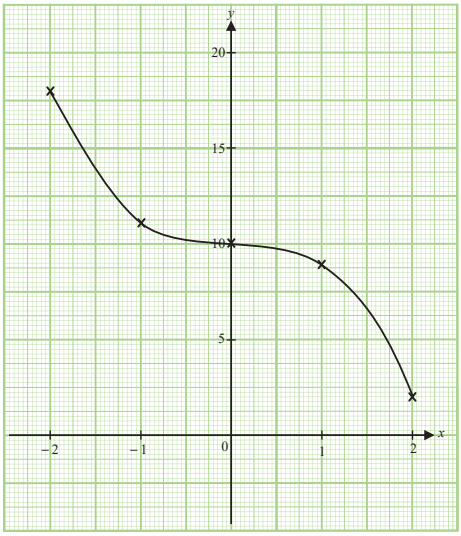
40 C

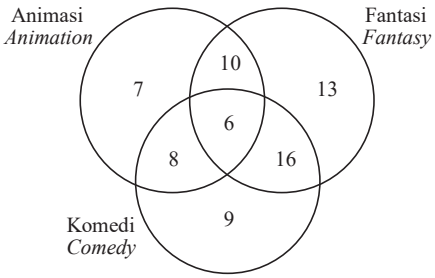
$$\frac{(42 \times 2) + (47 \times 7) + (52 \times 16) + (57 \times 19) + (62 \times 9) + (67 \times 4) + (72 \times 3)}{60}$$

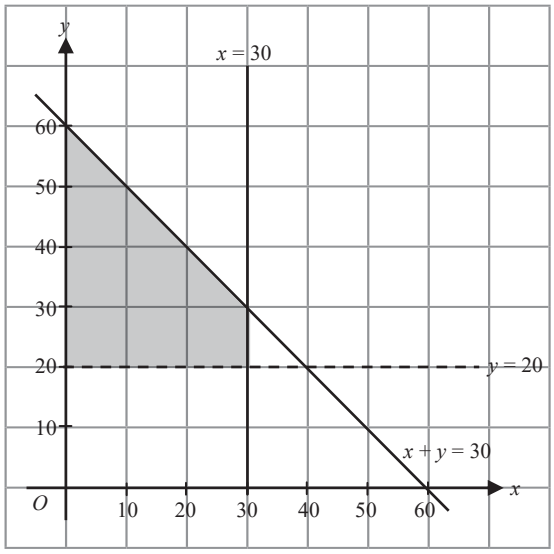
$$= \frac{3\,370}{60}$$

$= 56.17$

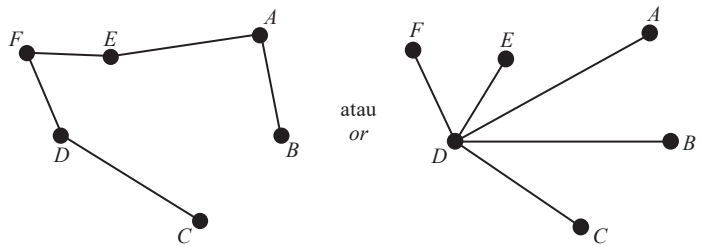
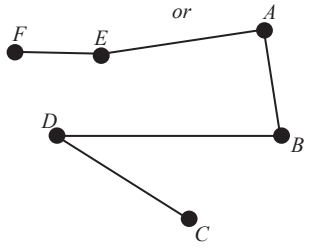
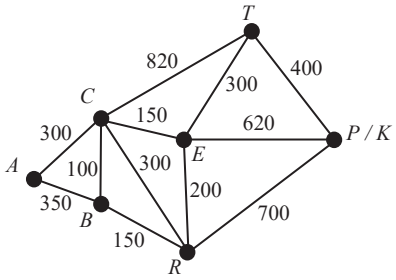
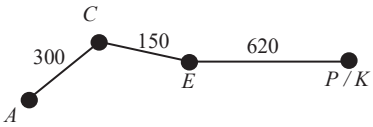
Bahagian A

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
1	(*a*) $\begin{array}{\|c\|c\|c\|c\|c\|c\|}\hline x & -2 & -1 & 0 & 1 & 2 \\ \hline y & 18 & 11 & 10 & 9 & 2 \\ \hline \end{array}$	1	**3**
	(*b*)  	2	
2	$m = \dfrac{3-0}{0-6}$ $= -\dfrac{1}{2}$	1	**3**
	$0 = -\dfrac{1}{2}(0) + c$ $c = 0$	1	
	$y = -\dfrac{1}{2}x$	1	

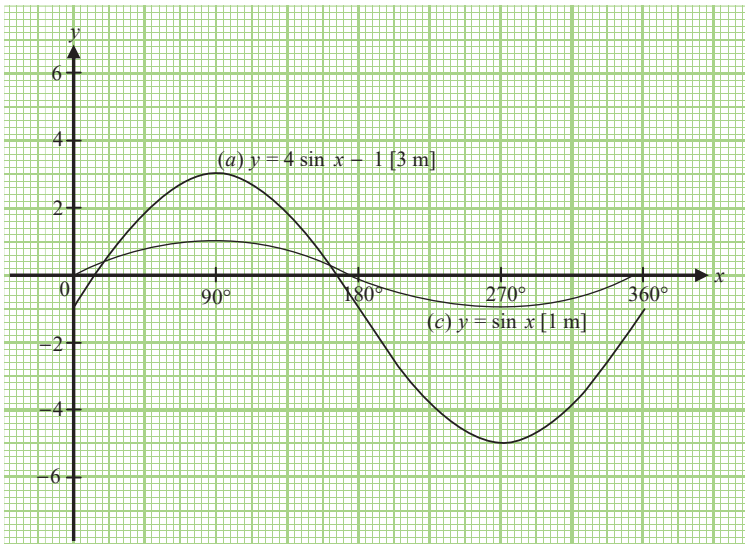
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
3	(*a*) Min / *Mean* $= \dfrac{34 + 37 + 41 + 44 + 46 + 48 + 50 + 63 + 64 + 67 + 67 + 69 + 71}{13}$ $= 53.92$	1 1	
	(*b*) $\dfrac{11}{13} \times 100\% = 84.62\%$ Murid kelas tersebut mencapai peratusan lulus sebanyak 84.62%. *Pupils in the class achieved a passing percentage of* 84.62%.	1	**3**
4	(*a*) 	2	
	(*b*) (i) $7 + 13 + 9 = 29$ (ii) $7 + 8 + 13 + 16 + 9$ $= 53$	1 1 1	**5**
5	(*a*) *EFGH* mempunyai 4 paksi simetri. *EFGH has* 4 *axes of symmetry.*	1	
	(*b*) (i) $y = 230x + 10$ (ii) $2\,080 = 230x + 10$ $2\,070 = 230x$ $x = 9$ bulan / *months*	2 1 1	**5**
6	(*a*) Tidak, kos rawatan adalah sama dengan deduktibel. *No, the cost of treatment is equal to the deductible.*	1	
	(*b*) Kos perubatan selepas deduktibel *Medical cost after deductible* = RM40 000 − RM3 000 = RM37 000 Kos yang ditanggung oleh Becky *The cost borne by Becky* $= \dfrac{30}{100} \times$ RM37 000 + RM3 000 = RM14 100	1 1 1	**4**
7	(*a*) Laju seragam *Uniform speed*	1	
	(*b*) Jumlah jarak *Total distance* $= \dfrac{1}{2} \times 15 \times 30 + \dfrac{1}{2} \times (45 - 25) \times 30$ $= 525$ m	2 1	**4**
8	(*a*) Tidak. Satu daripada panjang sisi sepadan bentuk tersebut adalah tidak sama. *No. One of the corresponding side lengths of the shape is not similar.* atau / *or* Tidak. Satu daripada sudut sepadan bentuk tersebut adalah tidak sama. *No. One of the corresponding angles of the shape is not similar.*	1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	(*b*) Pembesaran pada pusat (7, 4) dengan faktor skala $\frac{-2}{3}$. *Enlargement at centre* (7, 4) *with a scale factor of* $\frac{-2}{3}$.	3	**4**
9	(*a*) (i) Pendapatan bercukai *Chargeable income* = RM46 990 – RM400 – RM9 000 – RM3 800 – RM3 000 = RM30 790 (ii) Layak. Rebat cukai sebanyak RM400 akan diberikan kepada pembayar cukai sekiranya pendapatan bercukainya tidak melebihi RM35 000. *Eligible. Tax rebate of* RM400 *will be given to the taxpayers if their taxable income is not exceeding* RM35 000.	1 1 1	
	(*b*) Cukai pendapatan *Income tax* = RM150 + (RM30 790 − RM20 000) × 3% − RM400 = RM73.70	1 1	**5**
10	(*a*) $x + y \leqslant 60$	1	
	(*b*) 	3	**4**

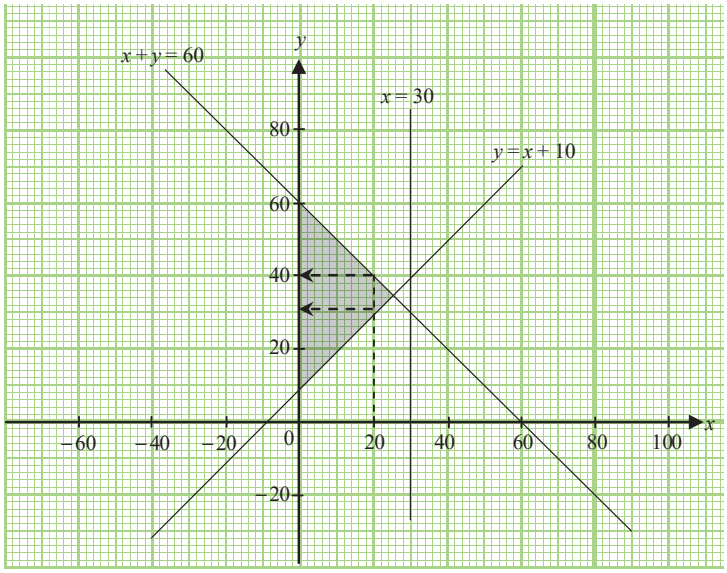
Bahagian B

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
11	(*a*) (i) $n(E) = 11$ $d = 2 \times 11 = 22$	1 1	
	(ii)  atau *or* atau *or*  	1	
	(*b*) (i)  (ii)  Jarak terdekat / *Shortest distance* $= A \rightarrow C \rightarrow E \rightarrow K$ $= 300 + 150 + 620$ $= 1\,070$ m	3 1 1	
	(*c*) Tempoh masa diambil / *Time taken* $= \frac{20}{100} \times 1\,070$ $= 214$ minit / *minutes* $= 3$ jam 34 minit / 3 *hours* 34 *minutes* Waktu sampai ke puncak / *Time arrive at peak* = 5:00 a.m. + 3:34 = 8:34 a.m.	 1 1	**10**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
12	(*a*) Pendapatan tahunan / *Annual income* = RM5 200 × 12 = RM62 400	1	
	Pendapatan bercukai / *Chargeable income* = 62 400 − 9 000 − 4 000 − 1 800 − 3 800 − 6 000 − 400	1	
	= RM37 400	1	
	(*b*) 35 000 pertama / *On the first* 35 000 = RM600		
	Baki berikutnya / *Next balance* = RM192	1	
	Rebat / *Rebate* = RM600 Cukai pendapatan / *Income tax*		
	= 600 + 192 − 600	1	
	= RM192	1	
	(*c*) 20 × 12 = 240	1	
	RM240 − RM192 = RM48	1	
	PCB > Cukai pendapatan / *Tax income* Baki RM48 akan dipulangkan ke akaun Puan Samsiah oleh LHDN. *Balance of* RM48 *will be refunded to Puan Samsiah's account by IRB.*	1	**9**
13	(*a*) (i) **T**: Pembesaran pada pusat (−7, 13) dengan faktor skala $-\frac{1}{2}$. *Enlargement at centre* (−7, 13) *with scale factor* $-\frac{1}{2}$.	3	
	(ii) **S**: Translasi / *Translation* $\begin{pmatrix}10\\-3\end{pmatrix}$.	2	
	(*b*) Anggap luas imej / *Let the area of an image* = x		
	Luas imej / *Area of an image* = $\left(-\frac{1}{2}\right)^2$ × Luas objek / *Area of an object*	1	
	$x = \frac{1}{4} \times (18 + x)$		
	$4x = 18 + x$		
	$3x = 18$		
	$x = 6\ \text{m}^2$	1	
	∴ Luas trapezium *IJKL* / *Area of trapezium IJKL* = 6 m^2	1	**8**
14	(*a*) (i) Koordinat sekolah / *School coordinates*		
	$= \left(\frac{-2+6}{2}, \frac{10+(-6)}{2}\right)$	1	
	= (2, 2)	1	
	(ii) $\sqrt{(-2-3)^2 + (10-(-4))^2}$	1	
	= 14.87	1	
	(*b*) (i) $m = \frac{10-(-6)}{-2-6}$	1	
	$m = -2$		
	$-2 = \frac{6-(-4)}{p-3}$		
	$p = -2$	1	
	(ii) $y = -2x + c$, (3, −4)		
	$-4 = -2(3) + c$	1	
	$c = 2$	1	
	∴ $y = -2x + 2$	1	**9**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
15	(*a*), (*c*) x | 0° | 90° | 180° | 270° | 360° y | −1 | 3 | −1 | −5 | −1  	2 4	
	(*b*) (i) 360° (ii) 4 (iii) 3	1 1 1	**9**

Bahagian C

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
16	(*a*) $x + y \leqslant 60$ $x \leqslant 30$ $y \geqslant x + 10$	1 1 1	
	(*b*) (i)  	5	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	(ii) Nilai maksimum / *Maximum value* = 40 Nilai minimum / *Minimum value* = 30	1 1	
	(*c*) $5x + 3y = 19$ $-2x + 3y = 13$ $x = 2$ $5(2) + 3y = 19$ $y = 3$ ∴ Harga ABC jagung ialah RM2 dan harga ABC coklat ialah RM3. *The price of corn shave ice is* RM2 *and the price of chocolate shave ice is* RM3.	1 1 1 1 1	**15**
17	(*a*) (i)	4	

Titik tengah, *Midpoint*, *x*	x^2	Van *A*			Van *B*		
		f	*fx*	fx^2	*f*	*fx*	fx^2
52	2 704	3	156	8 112	2	104	5 408
57	3 249	2	114	6 498	3	171	9 747
62	3 844	2	124	7 688	1	62	3 844
67	4 489	1	67	4 489	1	67	4 489
72	5 184	0	0	0	1	72	5 184
Jumlah / *Total*		8	461	26 787	8	476	28 672

(ii)

Jenis van *Type of van*	Min *Mean*	Sisihan piawai *Standard deviation*
Van *A*	57.625	5.27
Van B	59.5	6.61

	1
	1
Min menunjukkan kos penggunaan minyak van *A* lebih rendah berbanding van *B*. Kos penggunaan minyak bagi van *A* juga lebih konsisten kerana sisihan piawainya lebih kecil berbanding van *B*. *The mean shows that the cost of the usage of fuel for van A is lower compared to van B. The the cost of the usage of fuel for van A is also more consistent because the standard deviation is smaller compared to van B.*	1
Oleh itu, Encik Hamdan perlu membeli van A kerana ianya lebih menjimatkan. *Therefore, Encik Hamdan should buy van A because it is more economical.*	1

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Markah Total *Total Marks*
	(*b*) Ansurans bulanan / *Monthly payment* $= \dfrac{(84\,000) + (84\,000)\left(\frac{4}{100}\right)(5)}{5 \times 12}$	1	
	$= \text{RM}1\,680$	1	
	(*c*) Kadar asas / *Base rate* = RM200		
	Kadar progresif / *Progressive rate* = (1 750 − 1 600) × 0.40 = RM60	1	
	Cukai jalan / *Road tax* = RM200 + RM60 = RM260	1	
	(*d*) Premium asas / *Premium rate* = RM151.20		
	NCD $= \dfrac{15}{100} \times$ RM151.20 = RM22.68	1	
	Premium kasar / *Gross premium* = RM151.20 − RM22.68	1	
	= RM128.52	1	**15**