KERTAS MODEL SPM

MATEMATIK

Dwibahasa

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 1

KERTAS 1

1 **C**

0.03074 , $4 < 5$ $(+0)$

$\therefore$ 0.0307

2 **A**

$1.28 \times 10^{-12} + (4.05 \times 10^{1}) \times 10^{-13}$

$= 1.28 \times 10^{-12} + 4.05 \times 10^{1-13}$

$= 1.28 \times 10^{-12} + 4.05 \times 10^{-12}$

$= 5.33 \times 10^{-12}$

3 **C**

$101111_2 - 22_5$

$= 47_{10} - 12_{10}$

$= 35$

4 **C**

$$\frac{p^2 - 1}{2p^2} \times \frac{4p^2 + 8p}{p^2 + p - 2}$$

$$= \frac{(p+1)\cancel{(p-1)}}{\cancel{2p}(p)} \times \frac{\cancel{2p}(2)\cancel{(p+2)}}{\cancel{(p-1)}\cancel{(p+2)}}$$

$$= \frac{2(p+1)}{p}$$

5 **B**

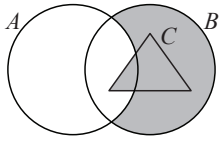
$$\frac{(x^6y^4)^{\frac{1}{2}}}{x^2y^{-2}} = x^3y^2 \div x^2y^{-2}$$

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

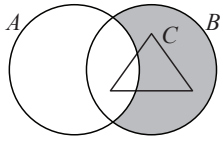
$$= xy^4$$

6 **D**

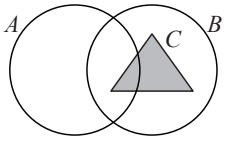
A:



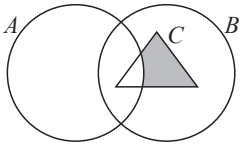
B:



C:



D:



7 **B**

Kontrapositif: Jika $\sim q$, maka $\sim p$. *Contrapositive*: *If* $\sim q$, *then* $\sim p$.	Songsangan: Jika $\sim p$, maka $\sim q$. *Inverse*: *If* $\sim p$, *then* $\sim q$.
$\therefore$ Jika $p \geqslant 0$, maka $p - 1 \geqslant 0$. *If* $p \geqslant 0$, *then* $p - 1 \geqslant 0$.	$\therefore$ Jika $p - 1 \geqslant 0$, maka $p \geqslant 0$. *If* $p - 1 \geqslant 0$, *then* $p \geqslant 0$.

8 **B**

$$\angle AFE = \frac{6 - 2 \times 180°}{2}$$
$$= 120°$$

$$\angle OFE = \frac{120°}{2}$$
$$= 60°$$

$$\angle EFG = \frac{5 - 2 \times 180°}{5}$$
$$= 108°$$

$$x = 60° + 108°$$
$$= 168°$$

9 A

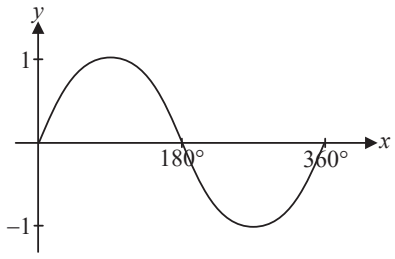
$$3rt - 4s^2 = 2rs$$
$$3rt - 2rs = 4s^2$$
$$r(3t - 2s) = 4s^2$$
$$r = \frac{4s^2}{(3t - 2s)}$$

10 C

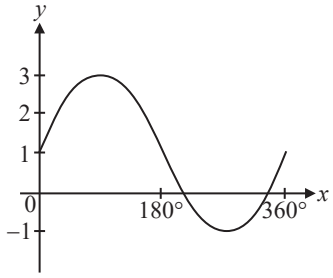
$$\frac{1 + 3m}{3} = \frac{2m + 2}{-2}$$
$$-2(1 + 3m) = 3(2m + 2)$$
$$-2 - 6m = 6m + 6$$
$$-6m - 6m = 6 + 2$$
$$-12m = 8$$
$$m = -\frac{2}{3}$$

11 A

$y = \sin x$



$y = 2 \sin x + 1$



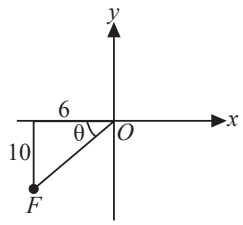
12 A

$$\left(\frac{x + 9}{2}, \frac{y + 10}{2}\right) = (4, 6)$$
$$\frac{x + 9}{2} = 4$$
$$x = (4 \times 2) - 9$$
$$x = -1$$
$$\frac{y + 10}{2} = 6$$
$$y = (6 \times 2) - 10$$
$$y = 2$$

13 B

$$\frac{\angle ABC}{\angle CBD} = \frac{2}{1}$$
$$\angle CBD = \frac{\angle ABC}{2}$$
$$\angle CBD = \frac{180° - 110°}{2}$$
$$\angle CBD = 35°$$

14 D



$\tan \theta = \dfrac{6}{10}$

$= 0.6$

15 B

$f(x) = ax^2 - 10x + c$

$a = 1$

$c =$ pintasan-y / *y-intercept*

$c = 12$

$y = 0; x^2 - 10x + 12 = 0$

$x = 5 + \sqrt{13}\ , 5 - \sqrt{13}$

Paksi simetri / *Axis of symmetry* $= \dfrac{(5 + \sqrt{13}) + (5 - \sqrt{13})}{2}$

$= 5$

$\therefore p = 5$

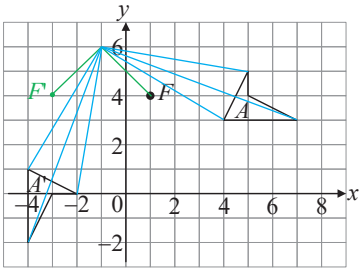
$y = x^2 - 10x + 12$

$= 5^2 - 10(5) + 12$

$= -13$

$\therefore q = -13$

16 B



$F'(-3, 4)$

17 B

Persamaan *MN* / *Equation of MN*:

$$\frac{x}{2} + \frac{y}{3} = 1$$

$$\frac{3x}{2} + y = 3$$

$$3x + 2y = 6$$

$$y = \frac{-3x + 6}{2}$$

Kecerunan *ST* / *Gradient of ST* = Kecerunan *MN* / *Gradient of MN* $= -\frac{3}{2}$

Persamaan *ST* / *Equation of ST*: $y = mx + c$

$$2 = -\frac{3}{2}(-4) + c$$

$$c = -4$$

$$y = -\frac{3}{2}x - 4$$

18 C

$$3y = x + 11$$

$$3(0) = x + 11$$

$$x = -11$$

19 B

P = RM25 000

$$r = \frac{3.2}{100}$$

$$= 0.032$$

$$n = \frac{12}{3}$$

$$= 4$$

$$t = 5$$

Jumlah simpanan / *Total savings*

$$= \text{RM}25\,000\left(1 + \frac{0.032}{4}\right)^{4(5)}$$

$$= \text{RM}29\,319.10$$

20 D

$$\text{Min / } \textit{Mean} = \frac{(24.5 \times 8) + (34.5 \times 6) + (44.5 \times 7) + (54.5 \times 4) + (64.5 \times 3) + (74.5 \times 2)}{8 + 6 + 7 + 4 + 3 + 2}$$

$$= \frac{1\,275}{30}$$

$$= 42.50$$

21 A

Q_1 Median Q_3

Data: 56, 57, 60, 63, 64, 66, 72, 74, 75, 75, 77, 78, 82, 83, 84, 87, 96

$Q_1 = \frac{63 + 64}{2}$

$= 63.5$

$Q_3 = \frac{82 + 83}{2}$

$= 82.5$

Julat antara kuartil / *Interquartile range* $= 82.5 - 63.5$

$= 19$

22 D

Kos perubatan setelah deduktibel ditolak / *Medical cost after deductible is deducted*

= RM2 500 – RM450

= RM2 050

Kos yang ditanggung oleh syarikat insurans / *Cost borne by the insurer*

$= \frac{80}{100} \times$ RM2 050

= RM1 640

23 D

Cukai pintu / *Property assessment tax*

= Nilai tahunan / *Annual value* × Kadar % / *Rate* %

= (RM1 200 × 6) × 0.05

= RM360

24 D

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

$= 8$

$MS = \sqrt{15^2 + 8^2}$

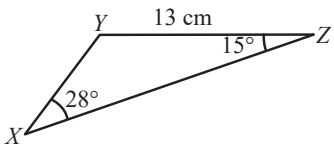
$= 17$

$\sin x = + \sin \angle MSP$

$= \frac{8}{17}$

25 B

$\angle XYZ = 180° - 15° - 28°$
$= 137°$



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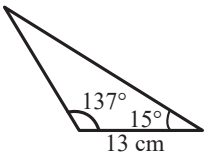


26 C

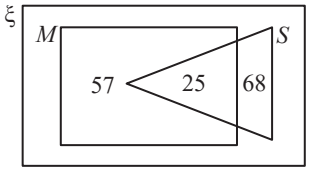
Kos pemasangan pagar / *Cost of installing a fence*:

$$\frac{5\ 000\ \text{m}^2}{\text{RM7 500}} = \frac{11\ 250\ \text{m}^2}{\text{Kos / } Cost}$$

$$\text{Kos / } Cost = \frac{11\ 250\ \text{m}^2}{5\ 000\ \text{m}^2} \times \text{RM7 500}$$

$$\text{Kos / } Cost = \text{RM16 875}$$

27 B



$n(M \text{ sahaja / } only) = 82$
$n(M \cap S) = 82 - 57$
$= 25$

$n(S \text{ sahaja / } only) = 93 - 25$
$= 68$

$n(M \cup S)' = 185 - 57 - 25 - 68$
$= 35$

28 B

$$m = \frac{kn^{\frac{1}{2}}}{p}$$

$$2 = \frac{k(\sqrt{16})}{4}$$

$$k = 2$$

$$m = \frac{2(\sqrt{81})}{6}$$

$$m = 3$$

29 B

$r + s = 42 - 8 - 12$
$= 22$

$r = 12 - 2$
$= 10$

$s = 22 - 10$
$= 12$

30 C

Aliran tunai Puan Zaleha / *Puan Zaleha cash flow*
= (RM3 400 + RM520) – RM2 700 – RM600
= RM620

∴ Aliran tunai Puan Zaleha adalah positif sebanyak RM620.
Puan Zaleha has a positive cash flow of RM620.

31 D

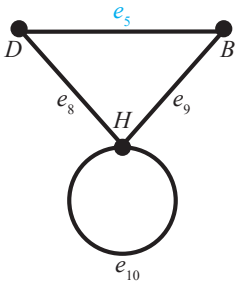
$A = P + Prt$
$= \text{RM12 500} + \text{RM12 500} \times \frac{3.2}{100} \times 9$
$= \text{RM16 100}$

Bayaran ansuran bulanan / *Monthly installment* $= \frac{\text{RM16 100}}{(9 \times 12)}$
$= \text{RM149.07}$

32 D

$x \leqslant 150 - 38$
$x \leqslant 112$

33 B



34 D

$3x - y \geq -4$

$-y \geq -4 - 3x$

$y \leq 4 + 3x$

A: (1, 5)

y	$4 + 3x$
5	$4 + 3(1) = 7$
$5 \leq 7$	
memuaskan / *satisfies*	

B: (2, 2)

y	$4 + 3x$
2	$4 + 3(2) = 10$
$2 \leq 10$	
memuaskan / *satisfies*	

C: (3, −1)

y	$4 + 3x$
−1	$4 + 3(3) = 13$
$-1 \leq 13$	
memuaskan / *satisfies*	

D: (−5, 4)

y	$4 + 3x$
4	$4 + 3(-5) = -11$
$4 \geq -11$	
tidak memuaskan / *not satisfies*	

35 D

0.1, 0.4, 0.7, 1, 1.2, 2.3, 2.3, 4.4, 4.5, 5.0, 5.1

Julat / *Range* = 5.1 − 0.1

= 5.0

36 A

Jarak yang dilalui / *Distance travelled* $= (7 \times 12)\text{ m} + \left(\frac{1}{2} \times 8 \times 12\right)\text{m}$

$= 84\text{ m} + 48\text{ m}$

$= 132\text{ m}$

37 D

Bentuk taburan plot kotak adalah pencong ke kiri.

The distribution shape of box plot is skewed to the left.

38 B

$$2X - \begin{bmatrix} 1 & -2 \\ 5 & 4 \end{bmatrix} = \begin{bmatrix} 11 & 6 \\ 9 & -8 \end{bmatrix}$$

$$2X = \begin{bmatrix} 11 & 6 \\ 9 & -8 \end{bmatrix} + \begin{bmatrix} 1 & -2 \\ 5 & 4 \end{bmatrix}$$

$$2X = \begin{bmatrix} 12 & 4 \\ 14 & -4 \end{bmatrix}$$

$$X = \begin{bmatrix} 6 & 2 \\ 7 & -2 \end{bmatrix}$$

39 C

$$[4 \quad u]\begin{bmatrix} 2u - 3 \\ -2 \end{bmatrix} = [-14 + 5u]$$

$$[4 \times (2u - 3) + (u \times -2)] = [-14 + 5u]$$

$$[8u - 12 - 2u] = [-14 + 5u]$$

$$[6u - 12] = [-14 + 5u]$$

$$6u - 5u = -14 + 12$$

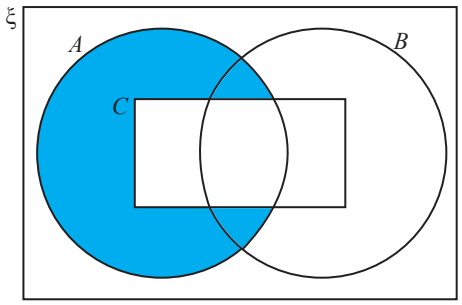
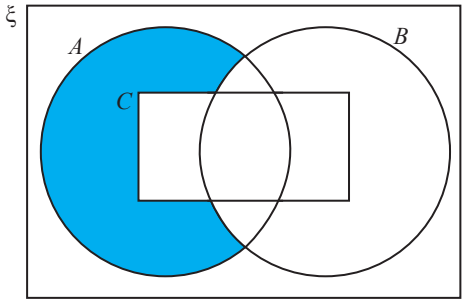
$$u = -2$$

40 D

$$\frac{1}{5} \times \frac{3}{7} = \frac{3}{35}$$

KERTAS 2

Bahagian A

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
1	(*a*) 	1	3
	(*b*) 	2	
2	$(x-3)(x-3)=2x-3$ $x^2-8x+12=0$ $(x-6)(x-2)=0$ $x=6\,,\,x=2$	1 1 1 1	4
3	(*a*) Persamaan garis lurus *RS*: $y=-\frac{1}{2}x+4$ *Equation of straight line RS* Persamaan garis lurus *TU*: $y=4$ *Equation of straight line TU*	1	3
	(*b*) $m_{MN}=m_{RS}=-\frac{1}{2}$ $y=-\frac{1}{2}x+c\ (0,\ 8)$ $8=-\frac{1}{2}(0)+c$ $c=8$ $\therefore y=-\frac{1}{2}x+8$	1 1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
4	$t = 3s - 9$ ... ① $\frac{1}{2}s + 8(3s - 9) = -23$ $s = 2$ Gantikan $s = 2$ ke dalam ① *Substitute* $s = 2$ *into* ① $t = 3(2) - 9$ $= -3$	 1 1 1 1	**4**
5 (*a*)	$\frac{1}{2}(t)(10) + \frac{1}{2}(18 + 10)(50 - t) = 430$ $-9t = -270$ $t = 30$	1 1	
(*b*)	$\frac{10 - 0}{30 - 0}$ $= 0.33 \text{ m s}^{-2}$	1 1	
(*c*)	Purata laju / *Average speed* $= \frac{430}{50}$ $= 8.6 \text{ m s}^{-1}$	1 1	**6**
6 (*a*)	$V = \{M, K, N, O, P, L\}$ $n(V) = 6$	1 1	
(*b*)	$E = \{(M, K), (K, N), (N, O), (K, O), (O, P), (K, P), (K, L), (L, O)\}$ $n(E) = 8$	1 1	
(*c*)	$d = 2E$ $= 2(8)$ $= 16$	 1	**5**
7 (*a*)	Aliran tunai / *Cash flow* $= (1\,500 + 600) - (1\,250 + 420)$ $= 430$ (Aliran tunai positif / *Positive cash flow*)	 1 1	
(*b*)	Aliran tunai / *Cash flow* $= (1\,500 + 600) - (1\,250 + 530 + 420)$ $= -100$ (Aliran tunai negatif / *Negative cash flow*)	 1 1	**4**
8 (*a*)	Palsu / *False*	1	
(*b*)	$n < m$	1	
(*c*)	Implikasi 1: Jika $\sqrt{x}$ adalah nombor integer, maka x ialah kuasa dua sempurna. *Implication* 1: *If* $\sqrt{x}$ *is an integer, then* x *is a perfect square.* Implikasi 2: Jika x ialah kuasa dua sempurna, maka $\sqrt{x}$ adalah nombor integer. *Implication* 2: *If* x *is a perfect square, then* $\sqrt{x}$ *is an integer.*	1 1	**4**

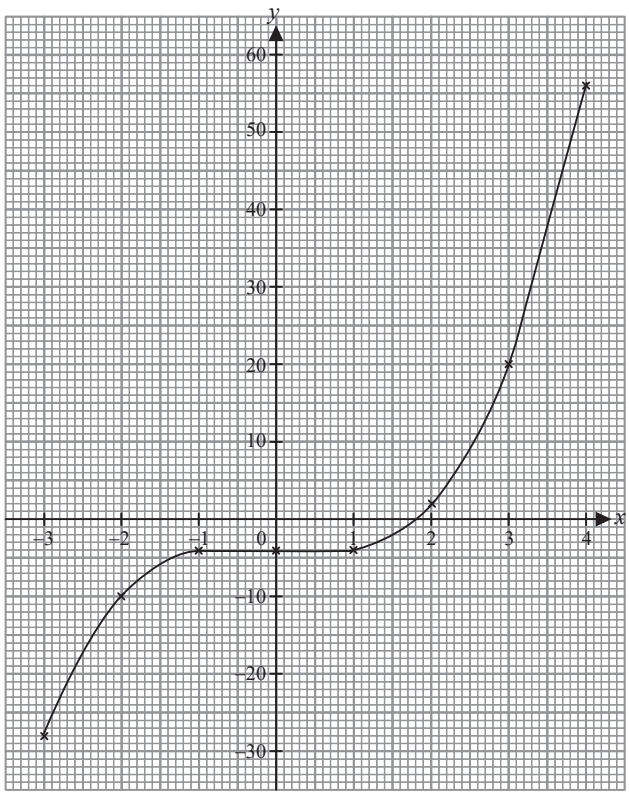
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
9	(*a*) $\frac{15}{38} \times \frac{14}{37}$ $= 0.1494$	1 1	
	(*b*) $\frac{10}{33} \times \frac{23}{32}$ $= 0.2178$	1 1	4
10	Katakan $ED = x$ *Let ED* $\left(\frac{52°}{360°}\right)\left(\frac{22}{7}\right)(x)^2 = 18.02$ $x = 6.3$ $EB = \frac{6.3}{3} \times 2$ $= 4.2$ Panjang lengkuk *AB* *Length of arc AB* $= \left(\frac{30°}{360°}\right)(2)\left(\frac{22}{7}\right)(4.2)$ $= 2.2$ m	 1 1 1	3

Bahagian B

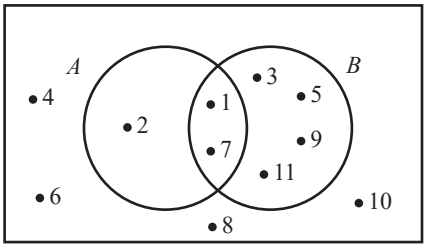
No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
11	(*a*)		

x	y
−3	
−2	−10
−1	
0	−4
1	
2	2
3	
4	

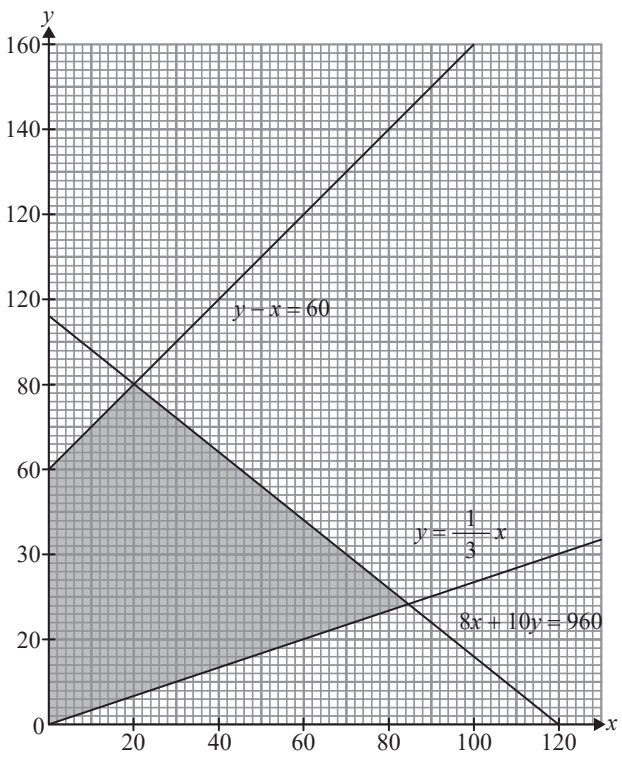
1	
1	
1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(*b*) 	4	
	(*c*) $y = 9$ $x = 3.5$	1 1	**9**
12	(*a*) (i) $(-3, 5) \rightarrow (5, 5)$	1	
	(ii) $(-3, 5) \rightarrow (-4, 0) \rightarrow (6, 0)$	2	
	(*b*) (i) **S**: Putaran 90° mengikut arah jam pada pusat (0, 2). *A rotation of* 90° *clockwise at centre* (0, 2).	3	
	(ii) **T**: Pembesaran dengan faktor skala −2 pada pusat (3, −3). *Enlargement with a scale factor of* −2 *at centre* (3, −3).	3	**9**
13	(*a*) Premium asas polisi komprehensif *Basic premium for comprehensive policy*		
	$= \text{RM}243.90 + \left(\frac{80\,000 - 1\,000}{1\,000}\right) \times \text{RM}20.30$	1	
	$= \text{RM}1\,847.60$	1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	Premium asas polisi pihak ketiga, kebakaran dan kecurian *Basic premium for third party, fire and theft* $= \frac{70}{100} \times \text{RM1 847.60}$ $= \text{RM1 293.32}$ $\text{NCD} = \frac{30}{100} \times \text{RM1 293.32}$ $= \text{RM388}$ Premium kasar = RM1 293.32 – RM388 *Gross premium* $= \text{RM905.32}$	1 1 1 1	
(*b*)	$H \propto \frac{E}{T^2}$ $H = \frac{kE}{T^2}$ $2\,500 = \frac{100k}{(3)^2}$ $k = 225$ $H = \frac{225E}{T^2}$ $H = \frac{(225)(400)}{5^2}$ $H = 3\,600$ ∴ Harga belian motosikal tersebut ialah RM3 600. *The purchase price of the motorcycle is* RM3 600.	1 1 1 1	**9**
14 (*a*)	$m = (-2)(5) - (-4)(2)$ $= -2$	1	
(*b*)	(i) $x - y = 12$ $x + y = 88$ (ii) $\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 12 \\ 88 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{1(1) - (-1)(1)} \begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} 12 \\ 88 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 1(12) + 1(88) \\ -1(12) + 1(88) \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 100 \\ 76 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 50 \\ 38 \end{pmatrix}$ ∴ Skor kumpulan *A* ialah 50 markah manakala skor kumpulan *B* ialah 38 markah. *The score of group A is* 50 *marks while the score of group B is* 38 *marks*.	1 1 1 1 1 1 1 2	**9**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
15	(*a*) $2342_8 = 2(8^3) + 3(8^2) + 4(8^1) + 2(8^0)$ $= 1\ 250$ murid / *students*	1	
	$\frac{36}{100} \times 1\ 250 = 450$	1	
	$\frac{6 \text{ bahagian / } parts}{450 \text{ murid / } parts} = \frac{1 \text{ bahagian / } parts}{x}$ $x = 75$ murid / *students*	1	
	Bilangan pengawas *Number of prefects* $= 3 \times 75$ $= 225$	1	
	Bilangan pustakawan *Number of librarians* $= 2 \times 75$ $= 150$	1	
	Bilangan pembimbing rakan sebaya *Number of peer mentor* $= 1 \times 75$ $= 75$	1	
	(*b*) 	3	**9**

Bahagian C

<table>
<tr><th>No.</th><th colspan="2">Skema Pemarkahan
Marking Scheme</th><th>Markah
Marks</th><th>Jumlah Markah
Total Marks</th></tr>
<tr><td rowspan="5">16</td><td>(a)</td><td>$y - x \leq 60$
$x \leq 3y$
$8x + 10y \leq 960$</td><td>1
1
1</td><td rowspan="5">15</td></tr>
<tr><td>(b)</td><td> 
</td><td>5</td></tr>
<tr><td>(c)</td><td>Nilai minimum / Minimum value: 15

Nilai maksimum / Maximum value: 61</td><td>1

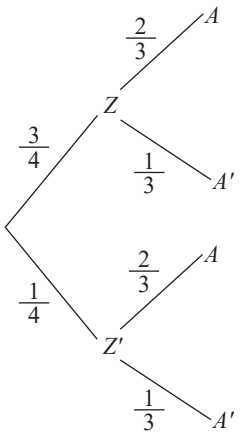
1</td></tr>
<tr><td>(d)</td><td>(i)
<table>
<tr><td>Bilangan kek cawan
Number of cupcakes</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Bilangan cip coklat
Number of chocolate chips</td><td></td><td></td><td></td><td></td><td>15</td><td>18</td></tr>
</table>
(ii) Menggunakan ungkapan algebra,
By using algebraic expressions,
$3 + 3(n - 1)$, $n = 1, 2, 3, \ldots$

$T_{15} = 3 + 3(15 - 1)$
$= 45$</td><td>2

1

1
1</td></tr>
</table>

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
17	(*a*) $\frac{90}{2} = \frac{x}{3}$ $x = \frac{90(3)}{2}$ $x = 135$ markah / *marks*	1 1	
	(*b*) (i) $\bar{x} = \frac{7.1 + 8.1 + 7.2 + 7.7 + 7.8 + 7.0}{6}$ $= 7.48$ atau / *or* $\frac{449}{60}$ $\sigma = \sqrt{\frac{7.1^2 + 8.1^2 + 7.2^2 + 7.7^2 + 7.8^2 + 7.0^2}{6} - \left(\frac{449}{60}\right)^2}$ $= 0.4059$ (ii) Cikgu Maniam perlu memilih Lim untuk mewakili sekolah dalam acara lontar peluru peringkat daerah kerana min Lim yang lebih tinggi berbanding Zamani menunjukkan prestasi yang lebih baik dan sisihan piawai yang lebih kecil berbanding Zamani menunjukkan jarak balingan Lim lebih konsisten. *Cikgu Maniam should choose Lim to represent the school in the district level shot-put because Lim's mean which is higher than Zamani's showing better performance and the standard deviation which is smaller than Zamani's showing Lim's throwing distance is more consistence.*	1 1 3	
	(*c*) (i) $x = -\frac{b}{2a}$ $= -\frac{14}{2(-1)}$ $= 7$ Gantikan $x = 7$ ke dalam fungsi $y = -x^2 + 14x + 32$. *Substitute* $x = 7$ *into function* $y = -x^2 + 14x + 32$. $y = -7^2 + 14(7) + 32$ $= 81$ Koordinat / *Coordinates* (7, 81) (ii) $-x^2 + 14x + 32 = 0$ $(x + 2)(x - 16) = 0$ $x = -2$(abaikan / *ignone*) , $x = 16$ Jarak peluru jatuh ke tanah dari pelontar ialah 16 m. *The distance the shot falls to the ground from the thrower is* 16 m.	1 1 1 1 1 1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(*d*)  $= P$(hanya seorang sahaja yang dipilih) P(*only one person is selected*) $= \left(\frac{3}{4} \times \frac{1}{3}\right) + \left(\frac{1}{4} \times \frac{2}{3}\right)$ $= \frac{5}{12}$	1 1	**15**

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 2

KERTAS 1

1 **B**

$55\,720 \div 35 = 1\,592$

2 **A**

$$\frac{100 - 62}{100} \times 8\,450\,000 = \frac{38}{100} \times 8\,450\,000$$
$$= 3\,211\,000$$
$$= 3.211 \times 10^6$$

3 **B**

$2511_7 + 423_7 = (1 + 7 + 245 + 686)_{10} + (3 + 14 + 196)_{10}$

$= 939_{10} + 213_{10}$

$= 1152_{10}$

7	1152	
7	164	− 4
7	23	− 3
7	3	− 2
	0	− 3

$\therefore 3234_7$

4 **C**

1110111_2

$= (1 + 2 + 4 + 0 + 16 + 32 + 64)_{10}$

$= 119_{10}$

8	119	
8	14	− 7
8	1	− 6
	0	− 1

$\therefore 167_8$

5 **D**

$(8 \times 32)\ \text{cm}^2 + [(\sqrt{6^2 + 8^2}) \times 32]\ \text{cm}^2 + (6 \times 32)\ \text{cm}^2 + 2\left(\frac{1}{2} \times 6 \times 8\right)\text{cm}^2$

$= 256\ \text{cm}^2 + 320\ \text{cm}^2 + 192\ \text{cm}^2 + 48\ \text{cm}^2$

$= 816\ \text{cm}^2$

6 **D**

Ciri-ciri persamaan kuadratik:
Characteristics of a quadratic equation:

1. Terdapat hanya satu pemboleh ubah.
   There is only one variable.
2. Kuasa tertinggi bagi pemboleh ubah ialah 2.
   There highest power of the variable is 2.

$\therefore 3y^2 + 2y + 3$ adalah persamaan kuadratik.
$3y^2 + 2y + 3$ *is a quadratic equation.*

7 **B**

$x^2 - 5x + 4 = 0$

$(x - 4)(x - 1) = 0$

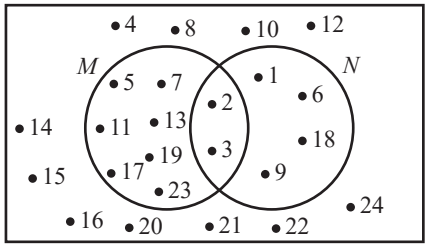
$x = 4, x = 1$

8 **A**

Set semesta, $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16\ 17, 18, 19, 20, 21, 22, 23, 24\}$
Universal set

Set $M = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$

Set $N = \{1, 2, 3, 6, 9, 18\}$



$(M \cap N') = \{5, 7, 11, 13, 17, 19, 23\}$

$n(M \cap N') = 7$

9 B

2, 3, 4, 3, 2, 1, 1, 5, 7, 3, 1, 2, 7, 3

Mod ialah 3.
Mode is 3.

10 C

Implikasi ***Implication***	Jika p, maka q *If* p, *then* q	Jika x ialah nombor ganjil, maka $x - 1$ boleh dibahagi tepat dengan 2. *If* x *is an odd number*, *then* $x - 1$ *is exactly divisible by* 2.
Kontrapositif ***Contrapositive***	Jika $\sim q$, maka $\sim p$ *If* $\sim q$, *then* $\sim p$	Jika $x - 1$ tidak boleh dibahagi tepat dengan 2, maka x bukan nombor ganjil. *If* $x - 1$ *is not divisible by* 2, *then* x *is not an odd number*.
Songsangan ***Inverse***	Jika $\sim p$, maka $\sim q$ *If* $\sim p$, *then* $\sim q$	Jika x bukan nombor ganjil, maka $x - 1$ tidak boleh dibahagi tepat dengan 2. *If* x *is not an odd number*, *then* $x - 1$ *is not divisible by* 2.

11 B

$$4 - 2m = \frac{4(m+1)}{3}$$
$$3(4 - 2m) = 4(m + 1)$$
$$12 - 6m = 4m + 4$$
$$-6m - 4m = 4 - 12$$
$$-10m = -8$$
$$m = \frac{4}{5}$$

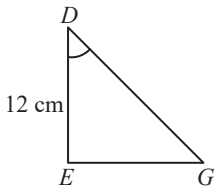
12 A

Insurans perjalanan, bagi menanggung pelbagai risiko semasa bercuti.
Travel insurance, *to cover various risks while on vacation*.

13 A

$$\text{Luas / } Area = \frac{1}{2} \times (2x) \times (2x + 3)$$
$$14 = \frac{1}{2} \times (2x) \times (2x + 3)$$
$$14 = \frac{4x^2 + 6x}{2}$$
$$28 = 4x^2 + 6x$$
$$4x^2 + 6x - 28 = 0$$
$$x = 2, x = -\frac{7}{2} \text{ (abaikan / } ignore\text{)}$$

14 C



$\tan \angle EDG = \frac{EG}{DE} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$

$EG = 9$ cm

$EF = EG + GF$

$= 9 \text{ cm} + 7 \text{ cm}$

$= 16$ cm

$\text{kos / cos } \angle EGD = -\frac{EG}{DG}$

$= -\frac{9}{\sqrt{9^2 + 12^2}}$

$= -\frac{9}{15}$

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

$\text{kos / cos } x = -\frac{3}{5}$

15 D

$\frac{x}{y} = \frac{1}{3}$

$3x = y$

$x + y = 20$

$x + 3x = 20$

$4x = 20$

$x = 5$

$y = 3(5)$

$y = 15$

$2y = 2 \times 15$

$2y = 30$

16 C

$$\frac{\sqrt{x}y \times (x^3y^2)^{\frac{1}{3}}}{x^2y^{-\frac{1}{3}}} = \frac{x^{\frac{1}{2}}y \times (x^3y^2)^{\frac{1}{3}}}{x^2y^{-\frac{1}{3}}}$$

$$= \frac{x^{\left(\frac{1}{2}+1\right)}y^{\left(1+\frac{2}{3}\right)}}{x^2y^{-\frac{1}{3}}}$$

$$= x^{\left(\frac{3}{2}-2\right)}y^{\left[\frac{5}{3}-\left(-\frac{1}{3}\right)\right]}$$

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

$$= \frac{y^2}{\sqrt{x}}$$

17 A

$$\frac{2}{m-n} + \frac{3n}{m^2-n^2} = \frac{2}{m-n} + \frac{3n}{(m-n)(m+n)}$$

$$= \frac{2(m+n)}{(m-n)(m+n)} + \frac{3n}{(m-n)(m+n)}$$

$$= \frac{2m+2n+3n}{m^2-n^2}$$

$$= \frac{2m+5n}{m^2-n^2}$$

18 C

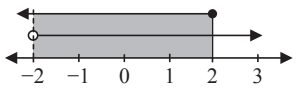
$$\frac{5}{2}x = \frac{1}{2}\sqrt{\frac{n-1}{m}}$$

$$\frac{5}{2}x \times 2 = \sqrt{\frac{n-1}{m}}$$

$$(5x)^2 = \frac{n-1}{m}$$

$$m = \frac{n-1}{25x^2}$$

19 A



$-2 < x \leqslant 2$

20 C

$$9^{t-1} = \frac{81^t}{27^{t+2}}$$

$$(3^2)^{t-1} = \frac{(3^4)^t}{(3^3)^{t+2}}$$

$$3^{2t-2} = \frac{3^{4t}}{3^{3t+6}}$$

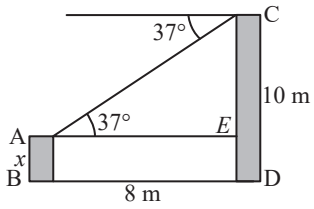
$$2t - 2 = 4t - (3t + 6)$$

$$2t - 2 = 4t - 3t - 6$$

$$2t - 4t + 3t = 2 - 6$$

$$t = -4$$

21 C



$$\tan 37° = \frac{CE}{8}$$

$$CE = 6.03 \text{ m}$$

$$x = 10 \text{ m} - 6.03 \text{ m}$$

$$= 3.97 \text{ m}$$

$$\approx 4 \text{ m}$$

22 A

Luas tapak / *Area of circle* $= \pi r^2$

$$= 154 \text{ cm}^2$$

Isi padu silinder / *Volume of cylinder*

$= \pi r^2 h$

$= 154 \text{ cm}^2 \times 12 \text{ cm}$

$= 1\,848 \text{ cm}^3$

23 D

Paksi simetri, $x = \frac{-3 + 5}{2}$

Axis of symmetry

$$= 1$$

$y = x^2 - 2x - 15$

$= 1^2 - 2(1) - 15$

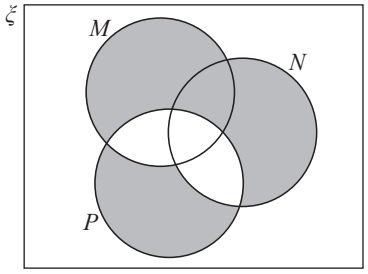
$= -16$

Titik minimum $= (1, -16)$

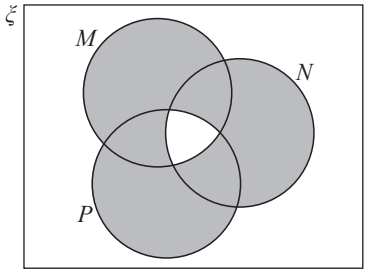
Minimum point

24 A

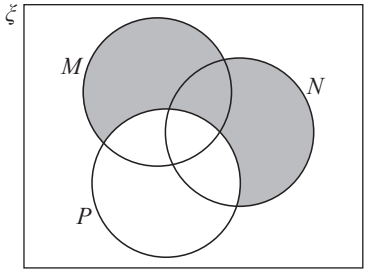
A: $(M \cup N)' \cup P'$



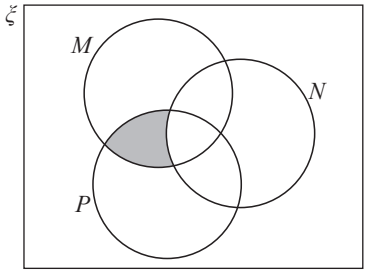
B: $(M \cap N \cap P)'$



C: $(M \cup N') \cup P'$



D: $(M \cap N') \cap P$



25 D

Darjah bucu / *Degree of vertex* $K = 3$
Darjah bucu / *Degree of vertex* $M = 6$
Darjah bucu / *Degree of vertex* $N = 4$
Darjah bucu / *Degree of vertex* $L = 5$

26 C

$$k = \frac{N'P'}{PN}$$
$$= -\frac{2}{4}$$
$$= -\frac{1}{2}$$

27 A

$P(M, H) + P(H, M)$
$$= \left(\frac{5}{9} \times \frac{4}{8}\right) + \left(\frac{4}{9} \times \frac{5}{8}\right)$$
$$= \frac{5}{9}$$

28 C

Varians baharu / *New variance* $= 39.06 \times 5^2$
$= 976.5$

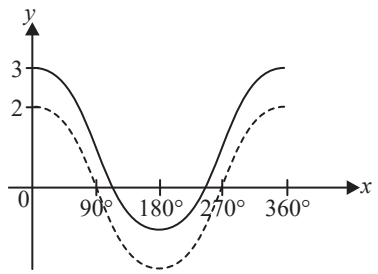
29 A

S – Spesifik / *Specific*

30 B

$$2y = 3x + 6$$
$$2(0) = 3x + 6$$
$$x = \frac{-6}{3}$$
$$x = -2$$

31 C



$\therefore y = 2 \text{ kos / cos } x + 1$

32 A

$$\begin{bmatrix} 4 & y \\ 2y & 1 \end{bmatrix}\begin{bmatrix} 3 \\ 5 \end{bmatrix}=\begin{bmatrix} -13 \\ -25 \end{bmatrix}$$

$$\begin{bmatrix} (4\times 3)+(y\times 5) \\ (2y\times 3)+(1\times 5) \end{bmatrix}=\begin{bmatrix} -13 \\ -25 \end{bmatrix}$$

$$\begin{bmatrix} 12+5y \\ 6y+5 \end{bmatrix}=\begin{bmatrix} -13 \\ -25 \end{bmatrix}$$

$$12+5y=-13$$
$$5y=-13-12$$
$$y=-5$$

33 C

$$\begin{bmatrix} 4 & -1 \\ 7 & -1 \end{bmatrix}-2\begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}+\frac{1}{5}\begin{bmatrix} 5 & -5 \\ 10 & -15 \end{bmatrix}$$

$$=\begin{bmatrix} 4 & -1 \\ 7 & -1 \end{bmatrix}-\begin{bmatrix} 8 & 6 \\ 14 & 10 \end{bmatrix}+\begin{bmatrix} 1 & -1 \\ 2 & -3 \end{bmatrix}$$

$$=\begin{bmatrix} 4-8+1 & -1-6-1 \\ 7-14+2 & -1-10-3 \end{bmatrix}$$

$$=\begin{bmatrix} -3 & -8 \\ -5 & -14 \end{bmatrix}$$

34 D

Q_1 $\qquad$ Q_3

11, 11, 11, 12, 13, 14, 16, 18, 19, 20, 22

Median = 14

$Q_3 - Q_1 = 19 - 11$

$= 8$

35 A

Pendapatan bercukai / *Chargeable income*

= RM48 000 – RM200 – RM9 000 – RM3 000 – RM5 000

= RM30 800 < RM35 000

∴ Puan Zaheerah layak menerima rebat sebanyak RM400.
Puan Zaheerah entitled to receive a rebate of RM400.

36 D

Jumlah jarak / *Total distance* $= (8\times 10)\text{ m}+\left[\frac{1}{2}\times(t-10)\times(8+12)\right]\text{m}+\left[\frac{1}{2}\times 12\times(40-t)\right]\text{m}$

$$320\text{ m}=80\text{ m}+10(t-10)\text{ m}+6(40-t)\text{ m}$$
$$320=80+10t-100+240-6t$$
$$4t=100$$
$$t=25\text{ s}$$

37 A

$y \leqslant 4 - 2x$ tidak termasuk garis lurus $y = 4 - 2x$.
$y \leqslant 4 - 2x$ *does not include the straight line* $= 4 - 2x$.

38 B

Premium tahunan bagi Encik Muhaidin / *Annual premium for Encik Muhaidin*

$$= \frac{\text{RM}185\,000}{\text{RM}1\,000} \times \text{RM}1.85$$

$$= \text{RM}342.25$$

Premium bulanan bagi Encik Muhaidin / *Monthly premium for Encik Muhaidin*

$$= \frac{\text{RM}342.25}{12}$$

$$= \text{RM}28.52$$

39 D

$$M \propto \frac{k\sqrt{N}}{P^3}$$

$$M = \frac{sN^{\frac{1}{2}}}{P^3}$$

40 A

$$m \propto \frac{1}{np^2}$$

$$m = \frac{k}{np^2}$$

$$3 = \frac{k}{3 \times 2^2}$$

$$k = 36$$

$$m = \frac{36}{np^2}$$

$$144 = \frac{36}{4 \times x^2}$$

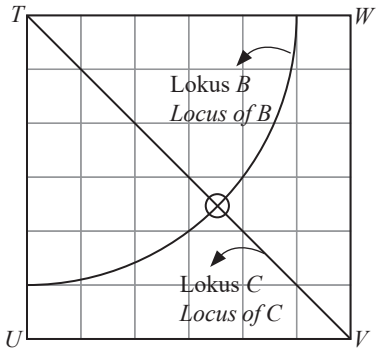
$$4x^2 = \frac{36}{144}$$

$$x = \sqrt{\frac{1}{16}}$$

$$x = \frac{1}{4}$$

KERTAS 2

Bahagian A

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
1	$x + y \leqslant 7$ $y < x$ $y \geqslant 1$	1 1 1	**3**
2	-576 , M , -144 , 72 , N , P $\div -2$ $\div -2$ $\div -2$ $\div -2$ $\div -2$ $= -576, 288, -144, 72, -36, 18$ $M - 2P$ $= 288 - 2(18)$ $= 252$	 1 1 1 1	**4**
3	(*a*) UV	1	
	(*b*) (*c*)  	3	**4**
4	(*a*) $\tan \angle NMP = 2.5$ $\frac{3.5}{MP} = 2.5$ $MP = 1.4$ m $US = 4$ m $- 0.2$ m $- 1.4$ m $= 2.4$ m	 1 1	
	(*b*) $\tan \angle RST = -\frac{3.5}{2.4}$ Sudut rujukan sepadan / *Corresponding reference angle* $\angle RST = \tan^{-1}\left(\frac{3.5}{2.4}\right)$ $= 55°34'$ $= 180° - 55°34'$ $= 124°26'$	 1 1	**4**
5	Isi padu / *Volume* $= \left(\frac{1}{2} \times (7 + 4) \times 4 \times 4\right) + \left(\frac{1}{3} \times 4 \times 4 \times t\right)$ $128 = 88 + \frac{16t}{3}$ $16t = 120$ $t = 7.5$ $\therefore$ Tinggi piramid / *Height of pyramid* $= 7.5$ cm	2 1 1	**4**

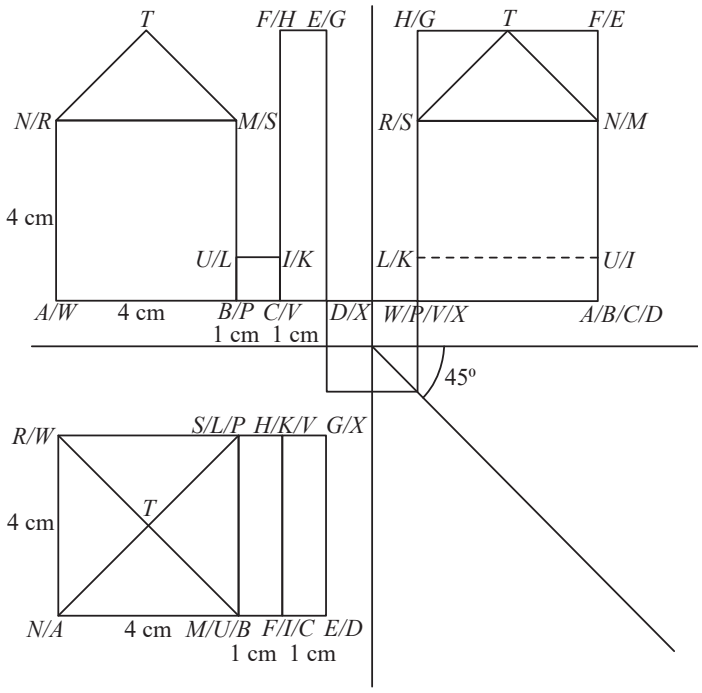
No.		Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
6	(*a*)	$\frac{1}{2}(3x)(5x+5) - x(3x+8) = 110$ $15x^2 + 15x - 6x^2 - 16x = 220$ $9x^2 - x - 220 = 0$ $x = 5, x = \frac{-44}{9}$ $\therefore x = 5$	1 1	
	(*b*)	Perimeter bingkai $A = 3(5) + 3(5) + 5(5+1)$ *Perimeter of frame A* $= 60$ cm	1 1	**4**
7	(*a*)	Luas sektor *TSR* / *Area of sector TSR* $= \frac{110°}{360°} \times \frac{22}{7} \times j^2$ $47.06 = \frac{121j^2}{126}$ $j^2 = 49$ $j = 7$	1 1	
	(*b*)	Perimeter seluruh kawasan / *Perimeter of the whole region* $= \left(\frac{110°}{360°} \times 2 \times \frac{22}{7} \times 7\right) + \left(\frac{180°}{360°} \times 2 \times \frac{22}{7} \times 3.5\right)$ $= \frac{121}{9} + 11 + 7$ $= 31.44$ cm	1 1 1	**5**
8	(*a*)	Kadar perubahan laju / *Rate of change of speed* $= \frac{16 - 0}{12 - 0}$ $= 1.33$ m s^{-2}	 1 1	
	(*b*)	Purata laju / *Average speed* $= \frac{\left[\frac{1}{2} \times (20+8) \times 16)\right] + \left[\frac{1}{2} \times (16+35) \times 2)\right] + \left[\frac{1}{2} \times 35 \times 20\right]}{42}$ $= \frac{625 \text{ m}}{42 \text{ s}}$ $= 14.88$ m s^{-1}	1 1	**4**
9	(*a*)	Cukai jualan dan perkhidmatan. *Sales and service tax.*	1	
	(*b*)	Harga makanan dan minuman / *Food and drink prices* $= 12(5) + 7(8) + 2(6) + 3(6)$ $=$ RM146 Cukai / *Tax* $= 6\% \times 146$ $=$ RM8.76 Harga yang Puan Malini perlu bayar *Price that Puan Malini must pay* $=$ RM146.00 + RM8.76 $=$ RM154.76	 1 1 1 1	**5**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
10	(*a*) $S = \{(A, 1), (A, 4), (A, 7), (A, 8), (G, 1), (G, 4), (G, 7), (G, 8), (E, 1), (E, 4), (E, 7), (E, 8)\}$	1	
	(*b*) $B = \{(A, 4), (A, 8), (E, 4), (E, 8)\}$ $P(B) = \frac{4}{12}$ $= \frac{1}{3}$	1 1	**3**

Bahagian B

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
11	(*a*) $m = 15(22) - 20(30)$ $= -270$ $n = 22$	1 1	
	(*b*) (i) $15x + 30y = 975$ $20x + 22y = 1\,030$ (ii) $\begin{pmatrix} 15 & 30 \\ 20 & 22 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 975 \\ 1\,030 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{(15)(22) - (20)(30)}\begin{pmatrix} 22 & -30 \\ -20 & 15 \end{pmatrix}\begin{pmatrix} 975 \\ 1\,030 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{-270}\begin{pmatrix} 22(975) + (-30)(1\,030) \\ -20(975) + (15)(1\,030) \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{-270}\begin{pmatrix} -9\,450 \\ -4\,050 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 35 \\ 15 \end{pmatrix}$ $\therefore$ Harga jambangan besar ialah RM35 manakala harga jambangan kecil ialah RM15. *The price of a large bouquet is* RM35 *while the price of a small bouquet is* RM15.	1 1 1 1 1 1 1 1	**9**
12	(*a*)	3	

f	fx	x^2	fx^2
5	5	1	5
3	6	4	12
8	24	9	72
7	28	16	112
8	40	25	200
10	60	36	360
6	42	49	294
2	16	64	128
1	9	81	81
$\sum f = 50$	$\sum fx = 230$		$\sum fx^2 = 1\,264$

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(*b*) (i) Min / *Mean*, $\bar{x} = \frac{\sum fx}{\sum f}$ $= \frac{230}{50}$ $= 4.6$	2 1	
	(ii) Sisihan piawai / *Standard deviation*, $\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$ $= \sqrt{\frac{1\,264}{50} - 4.6^2}$ $= 2.03$	2 1	**9**
13	(*a*) (*b*)  	9	**9**
14	(*a*) **U**: Pembesaran dengan faktor skala $-\frac{1}{2}$ pada pusat (6, 2). *An enlargement with a scale factor of* $-\frac{1}{2}$ *at centre* (6, 2). **T**: Putaran 90° lawan arah jam pada pusat (3, –1). *A rotation of* 90° *anticlockwise at centre* (3, –1).	3 3	

<table>
<tr><th>No.</th><th colspan="2">Skema Pemarkahan
Marking Scheme</th><th>Markah
Marks</th><th>Jumlah Markah
Total Marks</th></tr>
<tr><td></td><td>(b)</td><td>Luas imej = k^2 × luas objek
Area of image = k^2 × of object
Luas imej = $\left(\frac{1}{2}\right)^2$ × (luas imej + luas kawasan berlorek)
Area of image = $\left(\frac{1}{2}\right)^2$ × (area of image + area of shaded region)
Luas imej = $\frac{\text{luas imej} + 48}{4}$
Area of image = $\frac{\textit{area of image} + 48}{4}$

Biar luas imej / Let area of image = x

$x = \frac{x + 48}{4}$
$4x = x + 48$
$3x = 48$
$x = 16$

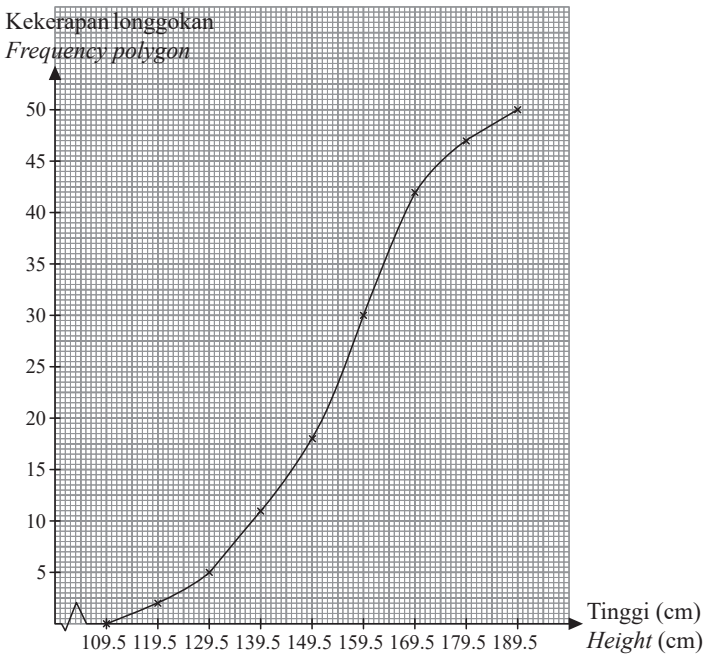
∴ Luas imej / Area of image = 16 m^2</td><td>1

1

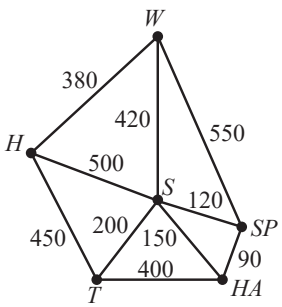
1</td><td>9</td></tr>
<tr><td>15</td><td>(a)</td><td>Kelas 4K1/ Class 4K1 = 83 – 40
= 43

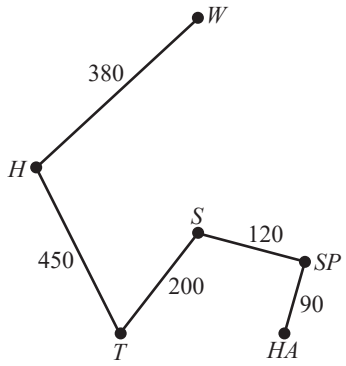
Kelas 4K2/ Class 4K2 = 75 – 42
= 33</td><td>1

1</td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)
<table>
<tr><th>Tinggi (cm)
Height (cm)</th><th>Kekerapan
Frequency</th><th>Kekerapan longgokan
Cumulative frequency</th><th>Sempadan atas
Upper boundary</th></tr>
<tr><td>110 – 119</td><td>2</td><td>2</td><td>119.5</td></tr>
<tr><td>120 – 129</td><td>3</td><td>5</td><td>129.5</td></tr>
<tr><td>130 – 139</td><td>6</td><td>11</td><td>139.5</td></tr>
<tr><td>140 – 149</td><td>7</td><td>18</td><td>149.5</td></tr>
<tr><td>150 – 159</td><td>12</td><td>30</td><td>159.5</td></tr>
<tr><td>160 – 169</td><td>12</td><td>42</td><td>169.5</td></tr>
<tr><td>170 – 179</td><td>5</td><td>47</td><td>179.5</td></tr>
<tr><td>180 – 189</td><td>3</td><td>50</td><td>189.5</td></tr>
</table></td><td>3</td><td></td></tr>
</table>

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(ii)  	4	9

Bahagian C

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
16	(*a*) (i) Jumlah jarak / *Total distance* $= \left(\frac{1}{2} \times 60 \times \frac{10}{60}\right) + \left(\frac{1}{2} \times 60 \times \frac{(35 + 20)}{60}\right) +$ $\left(\frac{1}{2} \times \frac{(75 + 60)}{60} \times 120\right) + \left(\frac{1}{2} \times \frac{80}{60} \times 120\right)$ $= 247.5$ km (ii) Laju / *Speed* $= \frac{247.5 \text{ km}}{2\frac{1}{4} \text{ jam / } hour}$ $= 110 \text{ km j}^{-1} / \text{km h}^{-1}$	1 1 1 1	
	(*b*) (i)  	3	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(ii)  Jumlah jarak minimum / *Minimum total distance* = 90 m + 120 m + 200 m + 450 m + 380 m = 1 240 m	2 1 1	
(*c*)	$5x + 3y = 216$ ... ① $x - y = 8$ $x = 8 + y$ ... ② Gantikan $x = 8 + y$ ke dalam ① *Substitute* $x = 8 + y$ *into* ① $5(8 + y) + 3y = 216$ $40 + 5y + 3y = 216$ $40 + 8y = 216$ $8y = 176$ $y = \frac{176}{8}$ $y = 22$ Gantikan $y = 22$ ke dalam ② *Substitute* $y = 22$ *into* ② $x = 8 + 22$ $= 30$ ∴ Harga tiket dewasa ialah RM30 dan harga tiket kanak-kanak ialah RM22. *The price of adult ticket is* RM30 *and the price of child ticket is* RM22.	 1 1 1 1	**15**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
17	(*a*) (i) Pendapatan bercukai / *Taxable income* = (4 480 × 12) – 9 000 – 1 200 – 2 500 – 6 000 – 200 = RM34 860	1	
	Encik Aslam layak mendapat rebat sebanyak RM550 kerana pendapatan bercukai beliau kurang daripada RM35 000 (Rebat RM400) dan melalui pembayaran zakat (RM150). *Encik Aslam is eligible for a rebate of* RM550 *because his taxable income is less than* RM35 000 (*Rebate* RM400) *and through payment of zakat* (RM150).	1	
	(ii) Pendapatan bercukai / *Chargeable income* = (4 480 × 12) – 9 000 – 1 200 – 2 500 – 6 000 – 200 = RM34 860	1	
	Cukai bagi 20 000 pertama / *Tax on the first* 20 000 = RM150	1	
	Cukai atas baki berikutnya / *Tax on the next balance* = RM34 860 – RM20 000 × 3% = RM445.80	1	
	Rebat yang layak / *Eligible rebate* = RM400 + RM150 = RM550		
	Cukai pendapatan / *Income tax* = RM150 + RM445.80 – RM550 = RM45.80	1	
	(*b*) (i) Jumlah insurans yang harus dibeli *The amount of insurance that should be purchased* $= \frac{80}{100} \times$ RM500 000 = RM400 000	1	
	Bayaran pampasan / *Compensation payment* $= \frac{320\,000}{400\,000} \times$ RM120 000 – RM3 000	1	
	= RM93 000	1	
	(ii) **Bank *X*** Jumlah bayaran balik / *Total repayment* $= 80\,000 + (80\,000)\left(\frac{2.99}{100}\right)(8)$		
	= RM99 136	1	
	Ansuran bulanan / *Monthly instalment* $= \frac{99\,136}{8 \times 12}$ = RM1 032.67	1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	Bank *Y*		
	Jumlah bayaran balik / *Total repayment* $= 80\,000 + (80\,000)\left(\frac{3.08}{100}\right)(10)$ $= \text{RM}104\,640$	1 1	
	Ansuran bulanan / *Monthly instalment* $= \frac{105\,680}{10 \times 12}$ $= \text{RM}872$	1	
	Encik Aslam harus memilih Bank *Y* kerana ansuran bulanan bagi Bank *Y* lebih rendah dan kurang membebankan Encik Aslam. *Encik Aslam should choose Bank Y because the monthly instalment for Bank Y is lower and less burdensome to Encik Aslam.*	1	**15**

KERTAS MODEL SIJIL PELAJARAN MALAYSIA SET 3

KERTAS 1

1 **C**

37 $\underline{8}$04 $(0 < 5)$, 8 tidak perlu ditambah 1. / 8 *does not need to be added to* 1.

$\therefore$ 37 800

2 **B**

$$\frac{42.315 \times 10^{-3}}{3.5 \times 10^{-5}} = 1.209 \times 10^{3}$$

3 **C**

$$\frac{2t-4}{3} = \frac{4(-t+2)}{5}$$
$$5(2t-4) = 3(4)(-t+2)$$
$$10t - 20 = -12t + 24$$
$$22t = 44$$
$$t = 2$$

4 **A**

$$-3y - 5x = 10$$
$$0 - 5x = 10$$
$$x = -2$$

5 **C**

$$\sqrt{\frac{p-q}{p}} = \frac{r}{3}$$

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

$$p - q = \frac{r^2}{9} \times p$$

$$9(p-q) = pr^2$$

$$9p - 9q = pr^2$$

$$9p - pr^2 = 9q$$

$$p(9 - r^2) = 9q$$

$$p = \frac{9q}{9 - r^2}$$

$$p = \frac{9q}{(3-r)(3+r)}$$

6 **D**

$3(x - 2) \leqslant -6y$, Guna / *Using* $(-1, -5)$

$3(-1 - 2) \leqslant -6(-5)$

$-9 \leqslant 30$

7 **B**

$$\frac{4p^2q^3 \times 5p^3q^5}{2r^3p^7} = \frac{20p^{2+3-7}\,q^{3+5}}{2r^3}$$

$$= \frac{10q^8}{p^2r^3}$$

8 **B**

Sudut pedalaman heksagon / *Interior angle of hexagon*

$$= \frac{(6-2) \times 180°}{6}$$

$= 120°$

Segi tiga sama kaki / *Isoceles triangle* $= 180°$

$$x = \frac{180° - 120°}{2}$$

$= 30°$

9 **C**

Titik tengah / *Midpoint*:

$$(2, -1) = \frac{6+p}{2}, \frac{2+(-4)}{2}$$

$$2 = \frac{6+p}{2}$$

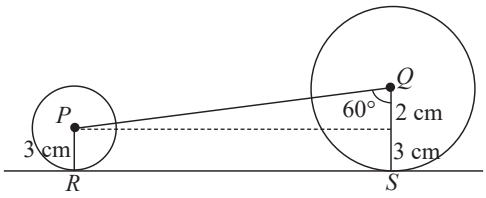
$4 = 6 + p$

$p = -2$

10 **A**

Bulatan / *Circle*

11 C



$$\tan\theta = \frac{RS}{2}$$
$$RS = \tan 60° \times 2$$
$$RS = 3.5 \text{ cm}$$

12 D

$$I = prt$$
$$999.60 = 10\,200 \times \frac{2.45}{100} \times y$$
$$y = 4$$

13 B

$$\tan x = -\frac{4}{3} = \frac{QR}{QS}$$
$$8^2 = 4^2 + PQ^2$$
$$PQ = \sqrt{8^2 - 4^2}$$
$$PQ = 6.9$$

$$PQS = 6.9 + 3$$
$$= 9.9 \text{ cm}$$

14 D

$$\frac{3x}{2y} - \frac{6-x}{8y}$$
$$= \frac{3x(4) - (6-x)}{8y}$$
$$= \frac{12x - 6 + x}{8y}$$
$$= \frac{13x - 6}{8y}$$

15 A

$$\frac{2m-5}{3} = 2(m-1)$$
$$2m - 5 = 6(m-1)$$
$$2m - 5 = 6m - 6$$
$$2m - 6m = -6 + 5$$
$$m = \frac{1}{4}$$

16 A

$48 = \frac{\theta}{360°} \times \frac{22}{7} \times 5^2$

$\theta = 220°$ (sudut major / *major angle*)

Sudut minor / *Minor angle* $= \theta = 140°$

Panjang lengkok / *Length of arc*

$= \frac{140°}{360°} \times 2 \times \frac{22}{7} \times 5$

$= 12.2$

17 B

Sudut di O / *Angle at O*

$= 180° - 55° - 55°$

$= 70°$

$x = 70° \div 2$

$= 35°$

18 C

Jumlah pinjaman / *Total loan* $= 745 \times 12 \times 4$

$=$ RM35 760

$35\ 760 = 30\ 000 + 30\ 000 \left(\frac{w}{100}\right)(4)$

$w = 4.8\%$

19 B

Akaun semasa / *Current account*

20 D

Sudut di garis lurus / *Angle at straight line* $= 180° - 88°$

$= 92°$

(sudut bertentangan sisi empat selari ialah sama / *opposite angle of a parallelogram is same*)

Sudut pedalaman pentagon / *Interior angle of pentagon*

$= \frac{(5 - 2) \times 180°}{5}$

$= 108°$

$a = 108° + 92°$

$= 200°$

21 C

$P(M) : \dfrac{1}{10} = \dfrac{x}{6 + 12 + x}$

$10x = 18 + x$

$9x = 18$

$x = 2$ (pen merah / *red pen*)

Jumlah / *Sum* $= 6 + 12 + 2$

$= 20$

22 B

$21302_4 = 626_{10} = 1162_8$

23 A

Jika ABC bukan segi tiga sama sisi, maka $\angle ABC \neq 180°$.

If ABC is not an equilateral triangle, then $\angle ABC \neq 180°$.

24 C

Punca / *Roots* $= -2, 3$

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

Paksi simetri / *Axis of symmetry* $= \dfrac{-b}{2a}$

$= \dfrac{-(-1)}{2(1)}$

$= \dfrac{1}{2}$ atau / *or* 0.5

$y = x^2 - x - 6$ (gantikan / *substitute* $x = 0.5$)

$y = (0.5)^2 - 0.5 - 6$

$y = -\dfrac{25}{4}$

Titik minimum / *Minimum point* $= \left(\dfrac{1}{2}, -\dfrac{25}{4}\right)$

25 B

Min / *Mean* $= 14.5$

$14.5 = \dfrac{\text{Jumlah / } Sum}{8}$

Jumlah 8 nombor / *Sum of* 8 *numbers* $= 116$

Jumlah baharu / *New sum* $= 116 + 13 + 18$

$= 147$

Min baharu / *New mean* $= \dfrac{147}{10}$

$= 14.7$

26 C

Susun tertib menaik / *Arrange in ascending order*:

56, 57, 66, 75, 76, 76, 84, 87, 92, 97

Q_1 Median Q_3

Julat antara kuartil / *Interquartile range* = 87 − 66
= 21

27 A

{(1, *I*), (1, *R*), (1, *O*), (1, *N*), (3, *I*), (3, *R*), (3, *O*), (3, *N*), (4, *I*), (4, *R*), (4, *O*), (4, *N*), (5, *I*), (5, *R*), (5, *O*), (5, *N*)}

Nombor perdana dan huruf vokal / *Prime number and vowel letter*
={(3, *I*),(3, *O*),(5, *O*),(5, *I*)}

$P = \frac{4}{16}$

$= \frac{1}{4}$

28 C

$y \geqslant x$ (lorekan di atas / *shaded upwards*)
$y \leqslant 5$ (lorekan di bawah / *shaded downwards*)

29 B

$$120 = \frac{p + p}{\frac{100}{60}}$$

$2p = 200$

$p = 100$ km

30 B

$45204_6 - 23315_6 = 21445_6$
$= 11456_7$

31 A

$R' = \{1, 11, 12, 15, 17\}$
$S = \{1, 3, 11\}$

$R' \cup S = \{1, 3, 11, 12, 15, 17\}$

32 C

$$p = k\left(\frac{\sqrt{q}}{3r}\right)$$

$$3 = k\left(\frac{\sqrt{9}}{3 \times 4}\right)$$

$$k = 12$$

$$p = 12\left(\frac{\sqrt{q}}{3r}\right)$$

$$2.5 = 12\left(\frac{\sqrt{q}}{3 \times 8}\right)$$

$$q = 25$$

33 D

$$\begin{bmatrix} -2 & 1 \\ 4 & -3 \end{bmatrix}\begin{bmatrix} r \\ 2 \end{bmatrix} = \begin{bmatrix} -14 \\ 26 \end{bmatrix}$$

$$\begin{bmatrix} (-2 \times r) + (1 \times 2) \\ (4 \times r) + (-3 \times 2) \end{bmatrix} = \begin{bmatrix} -14 \\ 26 \end{bmatrix}$$

$$(-2 \times r) + (1 \times 2) = -14$$

$$-2r = -16$$

$$r = 8$$

34 B

$$\begin{bmatrix} -2 & 1 & -1 \\ 4 & 5 & -3 \end{bmatrix} - \begin{bmatrix} 4 & 10 & -3 \\ 1 & -2 & -3 \end{bmatrix} = \begin{bmatrix} -6 & -9 & 2 \\ 3 & 7 & 0 \end{bmatrix}$$

35 B

$$211.75 \times 2 = \frac{350\,000}{1\,000} \times \text{Kadar premium / } \textit{Premium rate}$$

$$\text{Kadar premium / } \textit{Premium rate} = 211.75 \times 2 \times \frac{1\,000}{350\,000}$$

$$\text{Kadar premium / } \textit{Premium rate} = 1.21$$

36 B

Kenderaan / *Vehicle* 1 500 cc = RM90

Kenderaan / *Vehicle* 1 835 cc = RM280 + (1 835 – 1 800) × 0.50
= RM297.50

Jumlah cukai / *Total tax* = RM90 + RM297.50
= RM387.50

37 C

Pihak berkuasa tempatan
Local authority

38 C

kos / cos θ = –0.567

θ = kos^{-1} / cos^{-1} 0.567

θ = 55.5°

Kos negatif di sukuan II dan III. / *Cos is negative in quadrant* II *and* III.

II: θ = 180° – 55.5° = 124.5°

III: θ = 180° + 55.5° = 235.5°

39 B

$$k = \frac{\text{panjang imej / } \textit{length of image}}{\text{panjang objek / } \textit{length of object}}$$

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

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

$$= -0.5$$

Faktor skala negatif kerana pembesaran imej terbentuk arah bertentangan dari objek.
Scale factor is negative because the image formed is opposite of the object.

40 A

Julat antara kuartil / *Interquartile range*

= 76 – 50

= 26

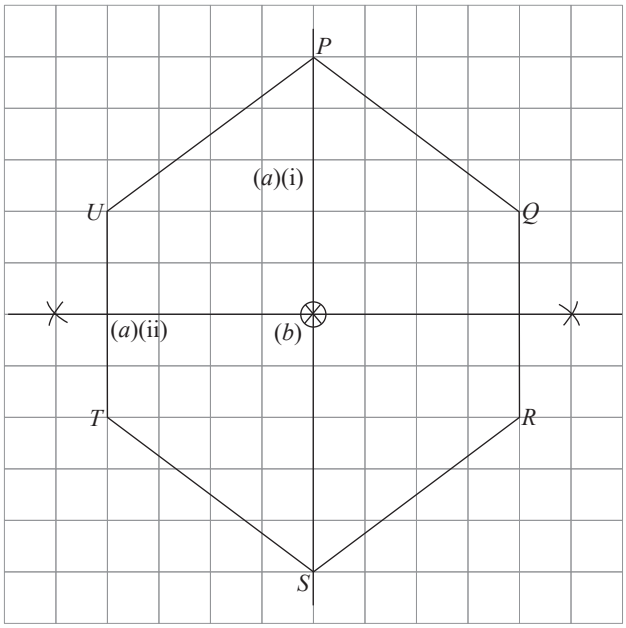
KERTAS 2

Bahagian A

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
1	Ketinggian / *Height* = y cm Tapak / *Base* = $(y - 2)$ cm Luas / *Area* $= \frac{1}{2} \times y \times (y - 2)$ $24 = \frac{1}{2} \times y \times (y - 2)$ $48 = y^2 - 2y$ $0 = y^2 - 2y - 48$ $0 = (y - 8)(y + 6)$	1	
	$(y - 8) = 0$, $(y + 6) = 0$ $y = 8$, $y = -6$ $y = 8$ kerana menghasilkan tapak dan tinggi segi tiga bernilai positif . $y = 8$ *because it produces base and length of triangle of positive value.*	1	
	Tapak / *Base* = 8 – 2 cm = 6 cm	1	**3**

No.	Skema Pemarkahan *Marking Scheme*		Markah *Marks*	Jumlah Markah *Total Marks*
2	(*a*)	Syarikat / *Company A* $= (1 \times 5^4) + (2 \times 5^3) + (2 \times 5^2) + (3 \times 5^1) + (4 \times 5^0)$ $= 944$ Syarikat / *Company B* $= (3 \times 4^4) + (2 \times 4^3) + (2 \times 4^2) + (3 \times 4^1) + (1 \times 4^0)$ $= 941$ Syarikat *A* telah menjual saham yang lebih banyak. *Company A sold more units of shares.*	1 1 1	
	(*b*)	$944 + 941$ $= 1885$ 8 | 1885 8 | 235 – 5 8 | 29 – 3 8 | 3 – 5 0 – 3 $\therefore 3535_8$	1 1	**5**
3	(*a*)	$M \propto Fd$ $M = kFd$ $20 = (k)(10)(0.5)$ $k = 4$ $\therefore M = 4Fd$	 1 1	
	(*b*)	$M = 4Fd$ $40 = 4(5)d$ $d = 2$ m	 1 1	**4**
4		Luas / *Area* $= \left(\frac{22}{7} \times 20^2\right) - 8\left[\frac{22}{7} \times \left(\frac{3}{2}\right)^2\right]$ $= \left(\frac{22}{7} \times 20^2\right) - 8\left(\frac{22}{7} \times 1.5^2\right)$ $= \left(\frac{8\,800}{7}\right) - 8\left(\frac{99}{14}\right)$ $= 1\,200.57$ m^2 atau / *or* $\frac{8\,404}{7}$ m^2	1 1 1 1	**4**
5	(*a*)	$m_{CD} = -\left(\frac{-6}{-3}\right)$ $= -2$	 1	
	(*b*)	$y = mx + c$ $4 = -2(-1) + c$ $c = 2$ $\therefore y = -2x + 2$	 1 1	

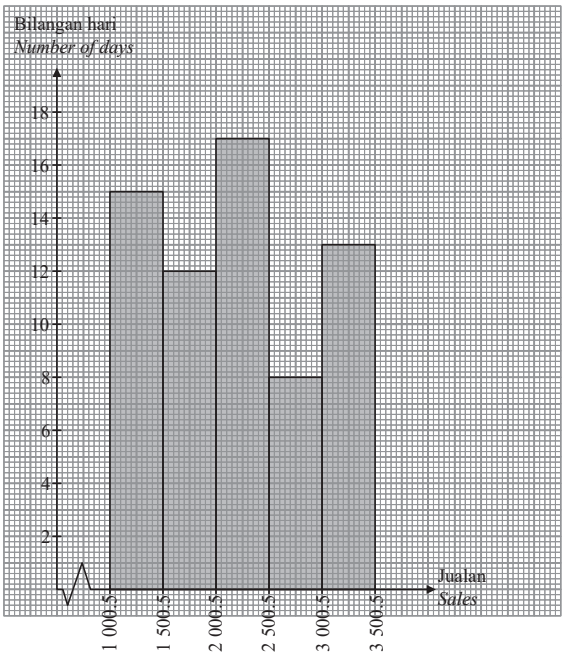
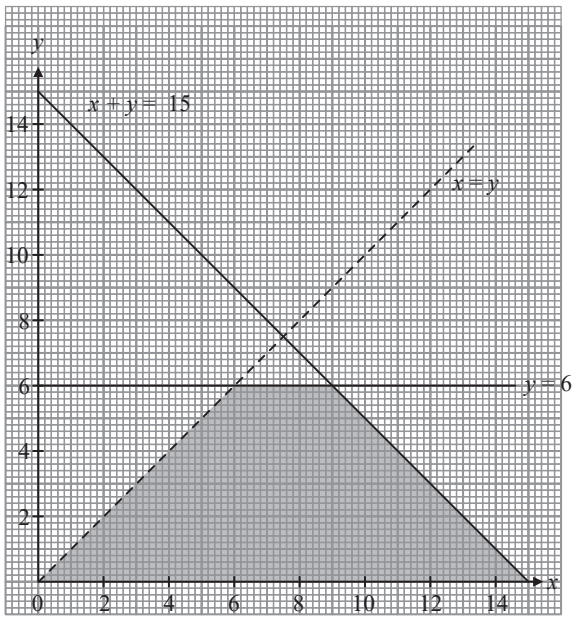
No.	Skema Pemarkahan *Marking Scheme*		Markah *Marks*	Jumlah Markah *Total Marks*
	(*c*)	$y = -2x + 2$ $0 = -2x + 2$ $-2 = -2x$ $x = 1$	1 1	**5**
6	(*a*)	Penyataan / *Statement* Palsu / *False*	1 1	
	(*b*)	– Jika $p = 4$, maka $2p^2 - 3 = 29$. *If* $p = 4$, *then* $2p^2 - 3 = 29$. – Jika $2p^2 - 3 = 29$, maka $p = 4$. *If* $2p^2 - 3 = 29$, *then* $p = 4$.	1 1	
	(*c*)	$2(n^2) - n$, di mana $n = 1, 2, 3, 4, \ldots$ $2(n^2) - n$, *where* $n = 1, 2, 3, 4, \ldots$	2	**6**
7		$4x + 4y = 10$ ... ① $2x + 5y = 11$……..② × 2 $4x + 10y = 22$…③ ① – ③: $4y - 10y = 10 - 22$ $-6y = -12$ $y = 2$ jam / *hours* $4x + 4(2) = 10$ $4x = 10 - 8$ $x = 0.5$ jam / *hour* Masa yang diperlukan untuk menghasilkan: *Time required to produce*: satu kerusi / *a chair* = 0.5 jam / *hours* atau / *or* 30 minit / *minutes* satu meja / *a table* = 2 jam / *hours*	 1 1 1 1	**4**
8		kos / cos $x = \frac{5}{13} = \frac{AD}{BD}$ $BD^2 = AD^2 + AB^2$ $13^2 = 5^2 + AB^2$ $BD = 12$ $\therefore \tan y = -\frac{5}{12}$	1 1 1	**3**

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
9	 	3	**3**
10	$x = 3x - 6 + 2x + 2$ $x - 3x - 2x = -6 + 2$ $-4x = -4$ $x = 1$	1 1 1	**3**

Bahagian B

No.		Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
11	(*a*)	Tidak layak mendapat rebat kerana pendapatan bercukai melebihi RM35 000. *Not eligible for rebate because chargeable income more than* RM35 000.	2	
	(*b*)	(i) Andaikan pendapatan tahunan = x *Let annual income* $65\,320 = x - \left(\frac{5}{100} \times x\right) - 20\,180$ $65\,320 + 20\,180 = x - 0.05x$ $85\,500 = x - 0.05x$ $x =$ RM90 000 $\therefore$ Pendapatan tahunan / *Annual income* = RM90 000	1 1	

No.		Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
		(ii) Cukai pendapatan / *Income tax* $= \text{RM1 500} + \left[(\text{RM65 320} - \text{RM50 000}) \times \frac{11}{100}\right]$ $= \text{RM185.20}$	1 1	
	(*c*)	PCB = 255 × 12 = RM3 060 RM185.20 – RM3 060 = RM125.20 Encik Tahir perlu membuat bayaran tambahan sebanyak RM125.20. *Encik Tahir need to do additional payment of* RM125.20.	1 1 1	**9**
12	(*a*)	$2M - [-6 \quad 15] = [8 \quad -7]$ $M = \frac{[8 \quad -7] + [-6 \quad 15]}{2}$ $M = [1 \quad 4]$	1 1	
	(*b*)	$-2(-1) - 8(a) = 0$ $2 - 8a = 0$ $a = \frac{-2}{-8}$ $a = \frac{1}{4}$	1 1	
	(*c*)	$x + y = 40\,000$ $(0.06x + 0.08y = 2\,760) \times 100$ $6x + 8y = 276\,000$ $\begin{bmatrix} 1 & 1 \\ 6 & 8 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 40\,000 \\ 276\,000 \end{bmatrix}$ $\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{8-6}\begin{bmatrix} 8 & -1 \\ -6 & 1 \end{bmatrix}\begin{bmatrix} 40\,000 \\ 276\,000 \end{bmatrix}$ $\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{2}\begin{bmatrix} 8 \times 40\,000 + (-1 \times 276\,000) \\ -6 \times 40\,000 + 1 \times 276\,000 \end{bmatrix}$ $\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{2}\begin{bmatrix} 44\,000 \\ 36\,000 \end{bmatrix}$ $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 22\,000 \\ 18\,000 \end{bmatrix}$ $x = \text{RM22 000} \quad , \quad y = \text{RM18 000}$	1 1 1 2	**9**
13	(*a*)	**Jualan (RM)** *Sales* **(RM)** / **Kekerapan** *Frequency* / **Sempadan atas** *Upper boundary* 1 001 – 1 500: 15: 1 500.5 1 501 – 2 000: 12: 2 000.5 2 001 – 2 500: 17: 2 500.5 2 501 – 3 000: 8: 3 000.5 3 001 – 3 500: 13: 3 500.5	4	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(*b*) 	5	**9**
14	(*a*) $x + y \leqslant 15$ $x > y$ $y \leqslant 6$	1 1 1	
	(*b*) 	5	
	(*c*) 9 jam / *hours*	1	**9**

No.	Skema Pemarkahan *Marking Scheme*		Markah *Marks*	Jumlah Markah *Total Marks*
15	(*a*)	(i) **Q** ialah putaran 90° lawan arah jam pada pusat (–5, 8). **Q** *is a rotation of* 90° *anticlockwise at centre* (–5, 8).	3	
		(ii) **P** ialah pembesaran dengan faktor skala –2 pada pusat (–4, 8). **P** *is an enlargement with a scale factor of* –2 *at centre* (–4, 8).	3	
	(*b*)	$160\ \text{cm}^2 = \text{Luas objek / } \textit{Area of object} \times (-2)^2$	1	
		$\text{Luas objek / } \textit{Area of object} = \frac{160}{(-2)^2}$	1	
		$\text{Luas objek / } \textit{Area of object} = 40\ \text{cm}^2$	1	**9**

Bahagian C

No.	Skema Pemarkahan *Marking Scheme*		Markah *Marks*	Jumlah Markah *Total Marks*
16	(*a*)	(i) $60\ \text{km j}^{-1}$ / km h^{-1}	1	
		(ii) $\frac{60}{\left(\frac{20}{60}\right)} = \frac{180-60}{\left(\frac{120-t}{60}\right)}$	1	
		$180 = \frac{120}{\left(\frac{120-t}{60}\right)}$		
		$120 - t = \frac{120}{180} \times 60$		
		$t = 80$	1	
		(iii) Jarak / *Distance* = Luas bawah graf / *Area below graph*		
		$= \left(\frac{1}{2} \times 60 \times \frac{20}{60}\right) + \left(60 \times \frac{60}{60}\right) + \left(\frac{1}{2} \times \frac{40}{60} \times 240\right)$		
		$= 150\ \text{km}$	1	
		$\text{Purata kelajuan / } \textit{Average speed} = \frac{150}{\left(\frac{120}{60}\right)}$	1	
		$= 75\ \text{km j}^{-1}$ / km h^{-1}	1	
	(*b*)	(i) $S = \{(J, 5), (J, 7), (J, 9), (M, 5), (M, 7), (M, 9), (O, 5), (O, 7), (O, 9), (T, 5), (T, 7), (T, 9)\}$	1	
		(ii) $S = \{(J, 5), (J, 7), (M, 5), (M, 7), (T, 5), (T, 7)\}$	1	
		$P = \frac{6}{12} = \frac{1}{2}$	1	
		(iii) $S = \{(O, 9)\}$	1	
		$P = \frac{1}{12}$	1	

No.	Skema Pemarkahan *Marking Scheme*	Markah *Marks*	Jumlah Markah *Total Marks*
	(*c*) (i) – bil utiliti / *utilities bill* – petrol (terima mana-mana jawapan yang sesuai) (*accept any suitable answer*)	1	
	(ii) Aliran tunai / *Cash flow* $= (4\ 700 + 650) - (2\ 800 + 1\ 200)$ $= 1\ 350$ Aliran tunai positif / *Cash flow positive*	1 1 1	**15**
17	(*a*) (i) Premium tahunan / *Annual premium* $= \left(\frac{200\ 000}{1\ 000} \times 2.91\right) + \left(\frac{200\ 000}{1\ 000} \times 1.78\right)$ $=$ RM582 + RM356 $=$ RM938	1 1 1	
	(ii) Premium tahunan + Polisi penyakit kritikal *Annual premium + Critical illness policy* $= \left(\frac{200\ 000}{1\ 000} \times 1.78\right) + \left(\frac{20}{100} \times \frac{200\ 000}{1\ 000} \times 1.80\right)$ $=$ RM356 + RM72 $=$ RM428	1 1 1	
	(*b*)		

RM1 000 pertama *On the first* RM1 000	RM220	1
Setiap RM1 000 baki *Each* RM1 000 *balance*	$\frac{68\ 000 - 1\ 000}{1\ 000} \times 20.30$ $=$ RM1 360.10	1 1
Premium asas *Basic premium*	RM220 + RM1 360.10 $=$ RM1 580.10	1
NCD	$\frac{40}{100} \times 1\ 580.10 = 632.04$	1
Premium kasar *Gross premium*	RM1 580.10 – RM632.04 $=$ RM948.06	1

	(*c*) (i) Tambah 4 pada nombor sebelumnya. *Add* 4 *to the previous number*.	1	
	(ii) 4 + 4 + 4 + 4 + 4 $= 20$	1 1	**15**