

KERTAS SOALAN PEPERIKSAAN SEBENAR SPM 2021-2023



MATEMATIK Dwibahasa

SIJIL PELAJARAN MALAYSIA 2021

KERTAS 1

1 D

A: 1 050 kilometer / kilometre = 1.05×10^3 kilometer / kilometre → Salah / Incorrect

B: 0.75 teraliter / teralitre = 7.5×10^{-1} teraliter / teralitre → Salah / Incorrect

C: 0.089 fentometer / fentometre = 8.9×10^{-2} fentometer / fentometre → Salah / Incorrect

D: 2 160 gigabait / gigabyte = 2.16×10^3 gigabait / gigabyte → Betul / Correct

2 C

A, B dan D menerangkan kelebihan kad kredit.

A, B and D explains the advantages of credit card.

3 D

$P = \text{RM}3\ 000$

$R = 5\%$ atau 0.05 setahun

5% or 0.05 per year

$n = 2$

$t = 5$

$$\begin{aligned} MV &= P \left(1 + \frac{r}{n} \right)^{nt} \\ &= 3000 \left(1 + \frac{0.05}{2} \right)^{2(5)} \\ &= \text{RM}3\ 840.25 \end{aligned}$$

4 D

Aset → Menjana pendapatan

Asset → Generate income

Liabiliti → Tidak menjana pendapatan

Liability → Does not generate income

5 D

A: Cukai jalan → Dikenakan cukai kepada pengguna jalan raya yang memiliki kenderaan termasuk motosikal dan kereta.

Road tax → Taxed to road users who own vehicles including motorcycles and cars.

B: Cukai pintu → Dikenakan cukai kepada semua pegangan atau harta tanah.

Property assessment tax → Taxed to all holdings or real estate.

C: Cukai pendapatan → Dikenakan cukai atas pendapatan.

Income tax → Taxed on income.

D: Cukai jualan dan perkhidmatan → Dikenakan cukai terhadap pengguna yang menggunakan perkhidmatan bercukai tertentu seperti perkhidmatan hotel, insurans dan takaful, penyedia makanan dan minuman, telekomunikasi, kad kredit dan sebagainya.

Sale and service tax → Taxed on consumers who use certain taxable services such as hotel services, insurance and takaful, food and beverage providers, telecommunications, credit cards and etc.

6 B

A: Graf berakhir bukan pada jarak 0 km seperti yang ditunjukkan dalam Jadual 1.

The graph ends not at a distance of 0 km as shown in Table 1.

B: Menepati data yang ditunjukkan dalam Jadual 1.

Adhere to the data shown in Table 1.

C: Jarak semakin jauh (meningkat), yang mana tidak sama dengan data dalam Jadual 1 yang menunjukkan jarak semakin dekat (menurun).

The distance is getting further (increasing), which is not the same as the data in Table 1 that shows the distance is getting closer (decreasing).

D: Graf bermula pada jarak 0 km, yang mana tidak sama dengan data dalam Jadual 1 yang bermula pada jarak 3.2 km.

The graph starts at a distance of 0 km, which is not the same as the data in Table 1 that starts at a distance of 3.2 km.

7 C

Graf laju-masa / *Speed-time graph:*

Jarak = Luas bawah graf

Distance = Area under the graph

$$(8 - 2) \times u + \frac{1}{2} \times (10 + u) \times 2 = 220$$

$$6u + 10 + u = 220$$

$$7u = 220 - 10$$

$$u = 30$$

8 B

$R(R, 0)$

$S(S, 0)$

$$f(x) = x^2 - 7x - 8$$

$$0 = x^2 - 7x - 8$$

$$0 = (x + 1)(x - 8)$$

$$x + 1 = 0$$

$$x = -1$$

$$x - 8 = 0$$

$$x = 8$$

Titik R berada pada bahagian negatif pada paksi-x, maka:

Point R is on the negative side of the x-axis, then:

$R(-1, 0)$

Titik S berada pada bahagian positif pada paksi-x, maka:

Point S is on the positive side of the x-axis, then:

$S(8, 0)$

9 B

$$p \propto \frac{1}{\sqrt{q}}$$

$$p = \frac{k}{\sqrt{q}}$$

$$4 = \frac{k}{\sqrt{25}}$$

$$k = 4 \times 5$$

$$= 20$$

$$p = \frac{20}{\sqrt{q}}$$

10 B

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

$$m = \frac{3 - 0}{0 - (-6)}$$

$$= \frac{3}{6}$$

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

11 D

Faktor skala / Scale factor

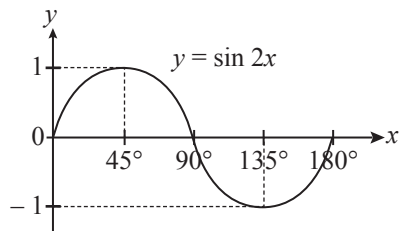
$$= \frac{\text{Imej / Image}}{\text{Objek / Object}}$$

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

$$= 3$$

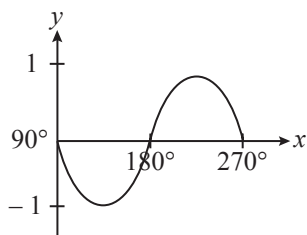
12 C

Graf / Graph $\sin 2x$:



Maka, graf $y = \sin 2x$ bagi $90^\circ \leq x \leq 270^\circ$ adalah

Hence, the graph represents $y = \sin 2x$ for $90^\circ \leq x \leq 270^\circ$ is



13 B

Lokus x bergerak 6 cm dari titik $R =$ titik **A** dan **B**

*Locus x moves 6 cm from point $R =$ point **A** and **B***

Lokus y bergerak jarak sama dari garis PQ dan $SR =$ titik **B** dan **D**

*Locus y moves such that it is equidistance from line PQ and $SR =$ point **B** and **D***

Titik yang memenuhi kedua-dua syarat ialah titik **B**.

*The point that meets both conditions is point **B**.*

14 C

$$VPQ = VQR = VUR = 18$$

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

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

$$k^2 = \frac{\text{luas imej / area of image}}{\text{luas objek / area of object}}$$

$$\left(\frac{1}{2}\right)^2 = \frac{UST}{18}$$

$$UST = 4.5$$

$$\begin{aligned} \text{Jumlah luas / Total area} &= 3(18) + 4.5 \\ &= 58.5 \text{ cm}^2 \end{aligned}$$

15 B

$$\begin{aligned} PS + RQ &= 100 + 150 \\ &= 250 \end{aligned}$$

16 B

$$\xi = \{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$$

$$P \cup Q = \{12, 14, 15, 16, 17, 18\}$$

$$(P \cup Q)' = \{10, 11, 13, 19, 20\}$$

17 B

Hujah deduktif:

Deductive argument:

Premis 1: Jika P , maka Q .

Premise 1: If P , then Q .

Premis 2: Bukan Q adalah benar.

Premise 2: Not Q is true.

Kesimpulan: Bukan P adalah benar.

Conclusion: Not P is true.

Premis1: Jika $m \div 8 = -2$, maka $m = -6$.

Premise 1: If $m \div 8 = -2$, then $m = -6$.

Premis 2 : $m = 16$

Premise 2

Kesimpulan: $m \div 8 \neq -2$

Conclusion: $m \div 8 \neq -2$

18 C

A: Julat / Range 23 hingga / to 27 = 5 kali / times

B: Julat / Range 38 hingga / to 38 = 6 kali / times

C: Julat / Range 41 hingga / to 49 = 8 kali / times

D: Julat / Range 50 hingga / to 55 = 5 kali / times

19 B

$$\begin{aligned}\text{Min / Mean} &= \frac{\sum fx}{\sum f} \\ &= \frac{(10.5 \times 2) + (30.5 \times 7) + (50.5 \times 5) + (70.5 \times 11) + (90.5 \times 5)}{2 + 7 + 5 + 11 + 5} \\ &= 57.17\end{aligned}$$

20 B

Kimia / Chemistry:

Lulus / Pass = 0.4

Gagal / Fail = 0.6

Matematik / Mathematics:

Lulus / Pass = 0.7

Gagal / Fail = 0.3

$$0.7 \times 0.4 = 0.28$$

21 A

$$\begin{aligned}\frac{\sqrt{p^{-4} \times q^4}}{p \times p \times q \times q} &= \frac{(p^{-4} \times q^4)^{\frac{1}{2}}}{p^2 \times q^2} \\ &= \frac{p^{-2} \times q^2}{p^2 \times q^2} \\ &= p^{-2-2} q^{2-2} \\ &= p^{-4} q^0 \\ &= p^{-4}\end{aligned}$$

22 A

$$\sqrt{(3.36 \times 10^3)^2 - (3.24 \times 10^3)^2} = 889.9 \text{ cm}$$

$$\begin{aligned}\text{Luas / Area} &= \frac{1}{2} \times (3.24 \times 10^3) \text{ cm} \times 889.9 \text{ cm} \\ &= 1.44 \times 10^6 \text{ cm}^2\end{aligned}$$

23 D

$$m = \frac{\text{mencancang / vertical}}{\text{mengufuk / horizontal}}$$

$$\frac{4}{3} = \frac{2.1}{x}$$

$$x = 1.6$$

$$\begin{aligned}\text{Jarak PR / Distance of PR} &= 4.8 - 1.6 \\ &= 3.2 \text{ cm}\end{aligned}$$

24 C

$$x^2 - 4x = \frac{4}{3} \left(2 - \frac{x}{2} \right)$$

$$3x^2 - 12x = 8 - 2x$$

$$3x^2 - 12x + 2x - 8 = 0$$

$$3x^2 - 10x - 8 = 0$$

$$(3x + 2)(x - 4) = 0$$

$$x = -\frac{2}{3}x \quad , \quad x = 4$$

25 B

Graf menunjukkan hubungan \geq . Maka, **B** dan **D** diambil kira.

*The graph shows the relationship of \geq . Then, **B** and **D** are taken into account.*

$$P(-3, -1)$$

$$Q(3, 8)$$

$$\mathbf{B}: 2y \geq 3x + 7$$

Gantikan koordinat titik *P* / *Substitute the coordinates of P*:

$$2(-1) \geq 3(-3) + 7$$

$$-2 \geq -2(\text{Benar / True})$$

Gantikan koordinat titik *Q* / *Substitute the coordinates of Q*:

$$2(8) \geq 3(3) + 7$$

$$16 \geq 16(\text{Benar / True})$$

26 C

$$pq + 1 = q^2 + p$$

$$pq - p = q^2 - 1$$

$$p(q - 1) = q^2 - 1$$

$$p = \frac{q^2 - 1}{q - 1}$$

$$p = \frac{(q - 1)(q + 1)}{q - 1}$$

$$= q + 1$$

27 B

$$h \propto \frac{1}{t}$$

$$t = 40$$

$$h = 1\,250$$

$$h = \frac{k}{t}$$

$$1\,250 = \frac{k}{40}$$

$$k = 50\,000$$

$$h = \frac{50\,000}{t}$$

$$h = \frac{50\,000}{100}$$

$$= 500 \text{ cm}$$

28 D

$$\begin{pmatrix} 3 & 2 \\ -5 & 4 \end{pmatrix} \begin{pmatrix} 1 \\ -x \end{pmatrix} = \begin{pmatrix} -x \\ -17 \end{pmatrix}$$

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

$$\begin{aligned} (-5)(1) + (4)(-x) &= -17 \\ -5 - 4x &= -17 \\ x &= \frac{-17 + 5}{-4} \\ x &= 3 \end{aligned}$$

29 D

$$\begin{aligned} x &= \frac{180^\circ - 70^\circ}{2} \\ &= 55^\circ \\ y &= 180^\circ - 65^\circ - 55^\circ \\ &= 60^\circ \end{aligned}$$

30 C

$$\begin{aligned} 1 : m \\ P &= 1\ 386 \\ Q &= 154 \end{aligned}$$

$$\begin{aligned} P: \frac{22}{7} \times r^2 &= 1\ 386 \\ r &= 21 \end{aligned}$$

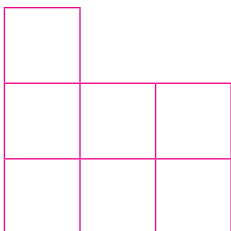
$$\begin{aligned} Q: \frac{22}{7} \times r^2 &= 154 \\ r &= 7 \end{aligned}$$

$$\begin{aligned} \text{Imej / Image : Objek / Object} \\ &= 7 : 21 \\ &= \frac{7}{7} : \frac{21}{7} \\ &= 1 : 3 \end{aligned}$$

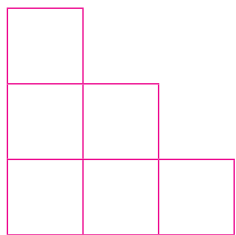
$$\therefore m = 3$$

31 D

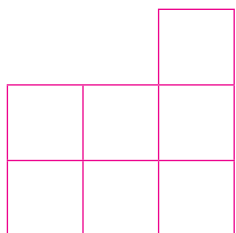
A:



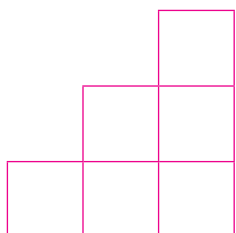
B:



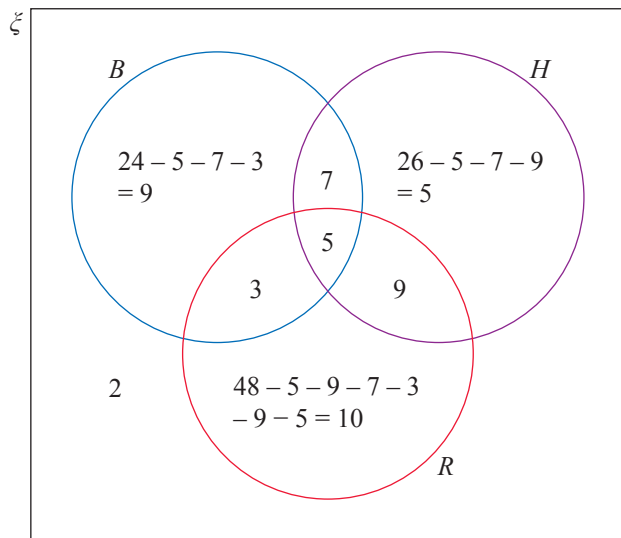
C:



D:



32 D



33 A

$$MM : MT = 2 : 1$$

$$60 - 8 - 11 - 10 - 10 = 21$$

$$3 \text{ bahagian / parts} = 21$$

$$1 \text{ bahagian / part} = \frac{21}{3}$$
$$= 7$$

$$MM = 2 \times 7 = 14 \text{ orang murid / students}$$

$$MT = 1 \times 7 = 7 \text{ orang murid / students}$$

Jumlah kutipan yuran / Total fee collection

$$= (8 \times 3) + (11 \times 5) + (10 \times 5) + (10 \times 5) + (14 \times 4) + (7 \times 6)$$
$$= 277$$

34 C

$$\{GE, GT, EG, ET, TE, TG\}$$

35 A

$$\text{Harga jualan / Selling price} = \text{RM}550\,000$$

$$t = 5$$

$$\text{Wang pendahuluan / Deposit} = \frac{10}{100} \times 550\,000$$
$$= 55\,000$$

$$\text{Jumlah pendapatan / Total income} = \text{RM}7\,200$$

$$\text{Perbelanjaan / Expenses} = \text{RM}4\,000$$

$$7\,200 - 4\,000 - \frac{55\,000}{5 \times 12} = \text{RM}2\,283.33$$

36 (Tidak ada dalam pilihan jawapan / None in the answer choices)

$$(17 \times 100) \times (4 \times 100) = 680\,000$$

$$680\,000 - 2(200 \times 200) - (100 \times 300) = 570\,000$$

$$\frac{570\,000}{28\,000} = 20.36$$

\therefore 21 tin cat / can of paint

37 B

$$\begin{pmatrix} 5 & -2 \\ -7 & 3 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \frac{1}{2x} \begin{pmatrix} 16 \\ -20 \end{pmatrix}$$

$$5(2) + (-2)(3) = \frac{16}{2x}$$

$$10 - 6 = \frac{16}{2x}$$

$$2x = 4$$

$$x = 2$$

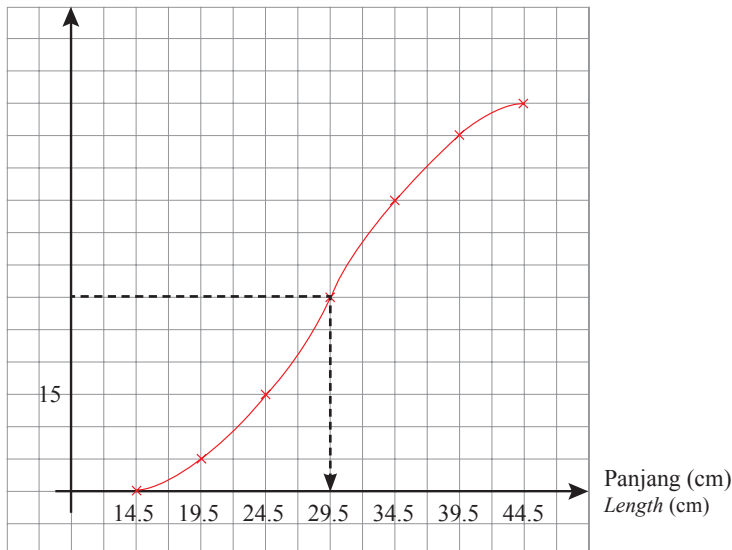
38 C

$$\frac{25}{100} \times x = 15$$

$$x = 60$$

$$\frac{1}{2} \times 60 = 30$$

Kekerapan longgokan
Cumulative frequency



Median panjang / *Median of length* = 29.5

39 D

$$\begin{aligned} \text{Isnin / Monday} &: 100110_2 \\ &= (1 \times 2^5) + (1 \times 2^2) + (1 \times 2) \\ &= 38 \text{ pengunjung / visitors} \end{aligned}$$

Selasa / *Tuesday*: 55 pengunjung / visitors

$$\begin{aligned} \text{Rabu / Wednesday} &: 2201_3 \\ &= (2 \times 3^3) + (2 \times 3^2) + (1 \times 3^0) \\ &= 73 \text{ pengunjung / visitors} \end{aligned}$$

$$\begin{aligned} \text{Khamis / Thursday} &: 124_8 \\ &= (1 \times 8^2) + (2 \times 8^1) + (4 \times 8^0) \\ &= 84 \text{ pengunjung / visitors} \end{aligned}$$

$$\begin{aligned} \text{Purata / Mean} &= \frac{38 + 55 + 73 + 84}{4} \\ &= 62.5 \text{ pengunjung / visitors} \end{aligned}$$

40 B

- I: Kelebihan menggunakan kad kredit
The advantages of using credit card
 II: Kelemahan menggunakan kad kredit
The disadvantages of using credit card
 III: Kelemahan menggunakan kad kredit
The disadvantages of using credit card
 IV: Kelebihan menggunakan kad kredit
The advantages of using credit card

∴ I dan / and IV

KERTAS 2

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
1	4 sisi / sides = $4x + 4$ 1 sisi / side = $\frac{4x + 4}{4} = x + 1$ Luas / Area = $(x + 1)(x + 1)$	1 1	2
2	(a) Beza di antara jujukan / <i>Difference between a sequence</i> $= \left(\frac{5}{3} - \frac{1}{3} \right) \div 2$ $= \frac{2}{3}$ $J = \frac{1}{3} + \frac{2}{3}$ $= \frac{3}{3}$ $= 1$ $K = \frac{5}{3} + \frac{2}{3}$ $= \frac{7}{3}$	1	3
	(b) Tambah $\frac{2}{3}$ kepada nombor yang sebelumnya. <i>Add $\frac{2}{3}$ to the previous number.</i>	1	
3	$m = 0.25$ (a) Kecerunan / <i>Gradient</i> = $\frac{\text{Mengufuk / Horizontal}}{\text{Mencancang / Vertical}}$ $0.25 = \frac{1.25}{x}$ $x = 6$ $\tan \theta = \frac{1.5}{6}$ $\theta = 14.04^\circ$	1 1	4
	(b) $\sqrt{1.5^2 + 6^2} = 6.185$	2	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
4	Sofa $M = (5 \times 9^2) + (4 \times 9^1) + (7 \times 9^0) = 448$ Sofa $N = (2 \times 6^3) + (4 \times 6^2) + (4 \times 6^1) + (1 \times 6^0) = 601$ \therefore Sofa M lebih murah. / <i>Sofa M is cheaper.</i>	2 1	3
5	(a) $N \propto \frac{D}{P}$ $N = \frac{kD}{P}$ $480 = \frac{k(5\,000)}{80}$ $k = 7.68$ $N = \frac{7.68D}{P}$	1 1	4
	(b) $D = 75\,000, P = 80$ $N = \frac{(7.68)(75\,000)}{80} = 7\,200$	2	
6	(a) Gaji / <i>Salary</i> = RM56 000 Derma / <i>Donation</i> = RM200 Pendapatan bercukai / <i>Chargeable income</i> $= 56\,000 - 200 - 9\,000 - 1\,800 - 3\,000$ $= \text{RM}42\,000$	1 1	5
	(b) Kos perubatan selepas deduktibel / <i>Medical cost after deductible</i> $= 27\,000 - 2\,000$ $= \text{RM}25\,000$ Kos yang ditanggung oleh Athar / <i>Cost borne by Athar</i> $= \left(\frac{10}{100} \times 25\,000\right) + 2\,000$ $= \text{RM}4\,500$	2 1	
7	(a) $y = 3$	1	5
	(b) (i) $13 = \sqrt{(8-3)^2 + (2-h)^2}$ $169 = 25 + 4 - 4h + h^2$ $0 = h^2 - 4h - 140$ $0 = (h-14)(h+10)$ $h-14=0 \quad h+10=0$ $h=14 \quad h=-10$ \therefore Koordinat rumah Liza ialah $(-10, 30)$. Maka, h adalah -10 . <i>The coordinate of Liza's house is $(-10, 30)$. Then, h is -10.</i>	1 1	
	(ii) $y = mx + c$ $m = \frac{8-3}{2-(-10)}$ $= \frac{5}{12}$ $3 = \frac{5}{12}(2) + c$ $c = \frac{13}{6}$ $y = \frac{5}{12}x + \frac{13}{6}$	1 1	

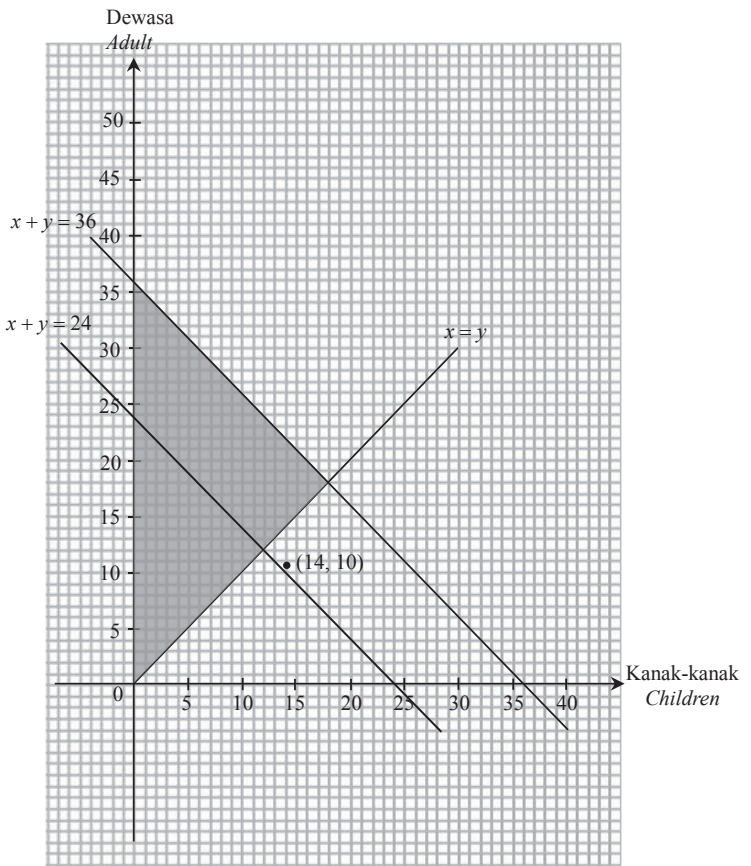
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
8	$\frac{7+5}{x} = \frac{1}{3}$ $\frac{12}{x} = \frac{1}{3}$ <p>Jumlah murid / <i>Number of students</i> = 3×12 = 36</p> <p>Bilangan murid yang lulus / <i>Number of students who passed</i> = $36 - 12$ = 24</p> <p>Lelaki / <i>Boys</i> = $\frac{24}{3} \times 1$ = 8</p> <p>Perempuan / <i>Girls</i> = $\frac{24}{3} \times 2$ = 16</p> <p>$\therefore x = 8, y = 16$</p>	1 1 1 1	4
9	<p>(a) Pendapatan / <i>Income</i> = 3 200 Perbelanjaan / <i>Expenses</i> = 1 950</p> <p>Baki / <i>Balance</i> = $3\,200 - 1\,950$ = RM1 250</p> <p>$14\,400 \div 12$ bulan / <i>months</i> = RM1 200</p> <p>Muaz dapat mencapai matlamat kewangannya kerana baki gajinya melebihi simpanan yang diperlukan untuk beliau membeli motosikal tersebut. <i>Muaz was able to achieve his financial goals because his remaining salary exceeded the savings required for him to buy the motorcycle.</i></p>	1 1	4
	<p>(b) Pendapatan / <i>Income</i> = 4 000 Perbelanjaan / <i>Expenses</i> = 3 200</p> <p>Aliran tunai positif / <i>Positive cash flow</i> = 1 850 Baki pendapatan / <i>Balance income</i> = $4\,000 - 3\,200$ = 800</p> <p>Pendapatan yang diperoleh daripada kerja sambilan = $1\,850 - 800$ <i>Income earned from the part time job</i> = RM1 050</p>	1 1	
10	<p>(a) $\frac{(42 \times 3) + (47 \times 6) + (52 \times m) + (57 \times 16) + (62 \times 10) + (67 \times 4)}{3 + 6 + m + 16 + 10 + 4} = 55.6$</p> $\frac{2\,208 + 52m}{39 + m} = 55.6$ $2\,208 + 52m = 2\,168.4 + 55.6m$ $2\,208 - 2\,168.4 = 55.6m - 52m$ $39.6 = 3.6m$ $m = 11$	2 1	6
	<p>(b) $\sigma^2 =$</p> $\frac{(3 \times 42^2) + (6 \times 47^2) + (11 \times 52^2) + (16 \times 57^2) + (10 \times 62^2) + (4 \times 67^2)}{3 + 6 + 11 + 16 + 10 + 4} - 55.6^2$ $= \frac{156\,670}{50} - 55.6^2$ $= 42.04$	2 1	

Bahagian B

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
11	<p>(a) DEF dan DGF, DAB dan DCB, EFJ dan GFJ. DEF and DGF, DAB and DCB, EFJ and GFJ. (Terima mana-mana jawapan yang munasabah) (Accept any reasonable answer)</p>	2	
	<p>(b)</p>	2	
	<p>(c) (i) Q: Pantulan pada garis $x = 3$. Reflection on line $x = 3$.</p> <p>(ii) $k = \frac{6}{3}$ $= 2$</p> <p>P: Pembesaran pada titik J dengan faktor skala, $k = 2$. Enlargement at point J with the scale factor, $k = 2$.</p>	2	9

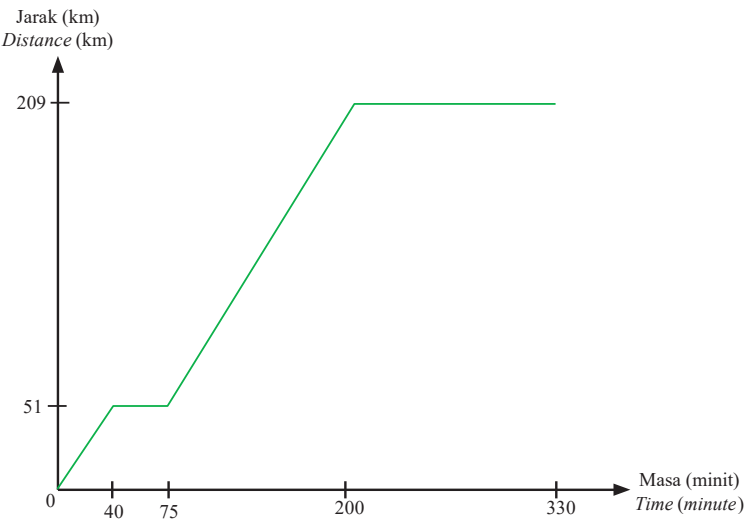
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
12	<p>(a), (b)</p>	<p>4</p> <p>5</p>	<p>9</p>
13	<p>(a) Joe = {2, 3, 5, 7}</p> <p>Karl = {2, 4, 6, 8}</p> <p>Liam = {1, 3, 5, 15}</p>	<p>1</p> <p>1</p> <p>1</p>	
	<p>(b) (i)</p> <p>(ii) $(K \cup L)' \rightarrow (K \cup L)' \cup J'$</p>	<p>3</p> <p>2</p>	<p>8</p>

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
14	<p>(a) $p = \text{piza} / \text{pizza}, c = \text{kek cawan} / \text{cup cake}$</p> $3p + 6c = 45 \dots\dots\dots ①$ $7p = 45 + c$ $7p - c = 45 \dots\dots\dots ②$ $\begin{pmatrix} 3 & 6 \\ 7 & -1 \end{pmatrix} \begin{pmatrix} p \\ c \end{pmatrix} = \begin{pmatrix} 45 \\ 45 \end{pmatrix}$ $\begin{pmatrix} p \\ c \end{pmatrix} = \frac{1}{3(-1) - 6(7)} \begin{pmatrix} -1 & -6 \\ -7 & 3 \end{pmatrix} \begin{pmatrix} 45 \\ 45 \end{pmatrix}$ $= \frac{1}{-45} \begin{pmatrix} -1(45) + (-6)(45) \\ -7(45) + 3(45) \end{pmatrix}$ $= \frac{1}{-45} \begin{pmatrix} -315 \\ -180 \end{pmatrix}$ $= \begin{pmatrix} 7 \\ 4 \end{pmatrix}$ <p>$p = 7, c = 4$</p>	<p>1</p> <p>1</p> <p>2</p> <p>2</p>	
	<p>(b) Baucar ketiga / <i>Third voucher</i> = $125 - 45 - 45$ = 35</p> $4p + 2c$ $= (4 \quad 2) \begin{pmatrix} p \\ c \end{pmatrix}$ $= (4 \quad 2) \begin{pmatrix} 7 \\ 4 \end{pmatrix}$ $= 4(7) + 2(4)$ $= 36$ <p>Nilai belian ialah RM36 manakala nilai baucar ialah RM35. <i>The purchase value is RM36 while the voucher value is RM35.</i> ∴ Nilai baucar tidak mencukupi. / <i>Voucher value is insufficient.</i></p>	<p>1</p> <p>1</p> <p>1</p>	<p>9</p>

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
15	(a) $x + y \leq 36$ $x \leq y$	1	
	(b), (d)(ii) 	1	
	(c) Tidak kerana titik (14, 10) terletak di luar kawasan rantau berlorek. <i>No because point (14, 10) lies outside the shaded region.</i>	4	
	(d) (i) $x + y \leq 24$	2	
	(ii) Rujuk graf di atas. / <i>Refer the above graph.</i>	1	

10

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	<p>(d) $\bar{x}_S = \frac{254 + 251 + 256 + 260 + 253}{5}$ $= 254.8$</p> <p>$\sigma_S = \sqrt{\frac{254^2 + 251^2 + 256^2 + 260^2 + 253^2}{5} - (254.8)^2}$ $= 3.059$</p> <p>$\bar{x}_T = \frac{252 + 255 + 258 + 254 + 255}{5}$ $= 254.8$</p> <p>$\sigma_T = \sqrt{\frac{252^2 + 255^2 + 258^2 + 254^2 + 255^2}{5} - (254.8)^2}$ $= 1.939$</p> <p>Raket T. Nilai sisihan piawai yang lebih kecil menunjukkan laju bola tangkis lebih konsisten apabila menggunakan raket T. <i>Racquet T. A smaller standard deviation value indicates that the shuttlecock speed is more consistent when using racquet T.</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>15</p>
17	<p>(a) (i) $5 : 35$ $= \frac{5}{5} : \frac{35}{5}$ $= 1 : 7$</p> <p>(ii) $\frac{7}{35} = \frac{1}{5}$</p> <p>(b) $g = \text{guru} / \text{teacher}, m = \text{murid} / \text{student}$</p> <p>$g = m + 40$ ① $5g + 35m = 3\,000$ ②</p> <p>$5(m + 40) + 35m = 3\,000$ $5m + 200 + 35m = 3\,000$ $40m = 3\,000 - 200$ $m = 70$</p> <p>$g = 70 + 40$ $g = 110$</p> <p>Yuran yang perlu dibayar oleh seorang murid ialah RM70, manakala seorang guru ialah RM110. <i>The fee that has to be paid by a student is RM70, while a teacher is RM110.</i></p> <p>(c) (i) Graf laju-masa : jarak = luas bawah graf <i>Graph speed-time : distance = area under a graph</i></p> <p>Luas bawah graf / <i>Area under a graph</i> $= \left(\frac{1}{2} \times 90 \times \frac{[(36-8)+40]}{60}\right) + \left(\frac{1}{2} \times 80 \times \frac{[(200-75)+(191-79)]}{60}\right)$ $= 51 + 158$ $= 209 \text{ km}$</p>	<p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks	
	<p>(ii)</p> 	3	15	
	<p>(d) Cikgu Linda: $P \rightarrow T \rightarrow S \rightarrow U \rightarrow R \rightarrow Q$ $= 15 + 21 + 20 + 11 + 9$ $= 76$</p> <p>Cikgu Kumar: $P \rightarrow Q \rightarrow R \rightarrow U \rightarrow S \rightarrow T$ $= 13 + 9 + 11 + 20 + 21$ $= 74$</p> <p>Pendapat Cikgu Kumar lebih baik kerana tempoh masa untuk sampai lebih pendek iaitu 74 minit. Ini sesuai dengan matlamat mereka yang mahu menjimatkan masa perjalanan. <i>Cikgu Kumar's opinion is better because the arrival time is shorter which is 74 minutes. This suits the purpose of those who want to save travel time.</i></p>	1		
		1		
		1		

KERTAS 1

1 B

$$\begin{aligned} 16 \left(\sqrt[3]{\frac{1}{64}} \right)^{-1} &= 16 \left(\frac{1}{4} \right)^{-1} \\ &= 16(4) \\ &= 64 \end{aligned}$$

2 C

$$\begin{aligned} 5.4 \times 10^3 + 4.7 \times 10^2 &= 5.4 \times 10^3 + 0.47 \times 10^3 \\ &= (5.4 + 0.47) \times 10^3 \\ &= 5.87 \times 10^3 \end{aligned}$$

3 D

$$\begin{aligned} \text{A: } 615_{10} - 46_{10} &= 569_{10} \\ \text{B: } 615_9 - 46_9 &= 558_9 \\ \text{C: } 615_8 - 46_8 &= 547_8 \\ \text{D: } 615_7 - 46_7 &= 536_7 \end{aligned}$$

4 C

$$\begin{aligned} \text{RM}156.25 \times 2.5\% &= \text{RM}3.90625 \\ &= \text{RM}3.91 \text{ (tiga angka bererti / three significant figures)} \end{aligned}$$

5 D

$$\begin{aligned} \text{A: } 5.49 \times 10^{-4} &= 0.000549 \\ \text{B: } 5.48 \times 10^{-3} &= 0.00548 \\ \text{C: } 5.48 \times 10^3 &= 5\,480 \\ \text{D: } 5.49 \times 10^4 &= 54\,900 \\ 53\,770, 54\,320, 54\,900, 55\,420 \end{aligned}$$

6 A

$$\begin{aligned} \text{Modal Azhar / Azhar's capital} &= \text{RM}(5.3 \times 10^4) \\ \text{Modal Baba / Baba's capital} &= \text{RM}(5.3 \times 10^4) - \text{RM}5\,000 \\ \text{Modal Chew / Chew's capital} &= \text{RM}(5.3 \times 10^4) - \text{RM}5\,000 \\ \text{Jumlah modal / Total amount of capital} &= \text{RM}(1.7 \times 10^5) \\ \text{Modal Dolly / Dolly's capital} &= \text{RM}(1.7 \times 10^5) - \text{RM}(5.3 \times 10^4) - [\text{RM}(5.3 \times 10^4) - \text{RM}5\,000] - [\text{RM}(5.3 \times 10^4) - \text{RM}5\,000] \\ &= \text{RM}(17 \times 10^4) - \text{RM}(5.3 \times 10^4) - [\text{RM}(5.3 \times 10^4) - \text{RM}(0.5 \times 10^4)] - [\text{RM}(5.3 \times 10^4) - \text{RM}(0.5 \times 10^4)] \\ &= \text{RM}(17 \times 10^4) - \text{RM}(5.3 \times 10^4) - \text{RM}(4.8 \times 10^4) - \text{RM}(4.8 \times 10^4) \\ &= \text{RM}[(17 - 5.3 - 4.8 - 4.8) \times 10^4] \\ &= \text{RM}(2.1 \times 10^4) \end{aligned}$$

7 D

$$\begin{aligned} m &= \frac{1+n}{3-2n} \\ m(3-2n) &= 1+n \\ 3m-2mn &= 1+n \\ -n-2mn &= 1-3m \\ n+2mn &= 3m-1 \\ n(1+2m) &= 3m-1 \\ n &= \frac{3m-1}{1+2m} \end{aligned}$$

8 C

$$\begin{aligned}2m + 5 &= 7(1 - m) \\2m + 5 &= 7 - 7m \\2m + 7m &= 7 - 5 \\9m &= 2 \\m &= \frac{2}{9}\end{aligned}$$

9 D

$$\begin{aligned}y - 6 &< 2(2y + 3) \\y - 6 &< 4y + 6 \\y - 4y &< 6 + 6 \\-3y &< 12 \\y &> \frac{12}{-3} \\y &> -4\end{aligned}$$

10 A

$$\begin{aligned}-3x + 5 &\leq 6 + x \\-3x - x &\leq 6 - 5 \\-4x &\leq 1 \\x &\geq \frac{1}{-4} \\x &\geq -\frac{1}{4}\end{aligned}$$

11 C

$$\begin{aligned}j &\propto \frac{1}{p} \\j &= \frac{k}{p} \\120 &= \frac{k}{6.5} \\k &= 780 \\j &= \frac{780}{p}\end{aligned}$$

12 B

$$\begin{aligned}p &\propto \sqrt{w} \\p &= k\sqrt{w} \\k &= \frac{p}{\sqrt{w}}\end{aligned}$$

A:

$$k = \frac{4}{\sqrt{9}} = \frac{4}{3}$$

$$k = \frac{3}{\sqrt{16}} = \frac{3}{4}$$

Nilai-nilai k adalah berbeza.

The values of k are different.

B:

$$k = \frac{3}{\sqrt{9}} = \frac{3}{3} = 1$$

$$k = \frac{4}{\sqrt{16}} = \frac{4}{4} = 1$$

Nilai-nilai k adalah sama.

The values of k are same.

C:

$$k = \frac{3}{\sqrt{9}} = \frac{3}{3} = 1$$

$$k = \frac{5}{\sqrt{16}} = \frac{5}{4}$$

Nilai-nilai k adalah berbeza.

The values of k are different.

D:

$$k = \frac{4}{\sqrt{9}} = \frac{4}{3}$$

$$k = \frac{6}{\sqrt{16}} = \frac{3}{2}$$

Nilai-nilai k adalah berbeza.

The values of k are different.

13 C

$$\begin{aligned} \begin{bmatrix} -7 & 4 \\ 0 & 8 \end{bmatrix} + 3 \begin{bmatrix} 2 & 6 \\ 1 & -1 \end{bmatrix} &= \begin{bmatrix} -7 & 4 \\ 0 & 8 \end{bmatrix} + \begin{bmatrix} 6 & 18 \\ 3 & -3 \end{bmatrix} \\ &= \begin{bmatrix} -7 + 6 & 4 + 18 \\ 0 + 3 & 8 + (-3) \end{bmatrix} \\ &= \begin{bmatrix} -1 & 22 \\ 3 & 5 \end{bmatrix} \end{aligned}$$

14 B

$$\sphericalangle VST = 25^\circ$$

$$\sphericalangle PTS = 25^\circ + 30^\circ = 55^\circ$$

$$\sphericalangle TPQ = 180^\circ - 30^\circ = 150^\circ$$

$$\begin{aligned} x + y &= [(5 - 2) - 180^\circ] - 55^\circ - 150^\circ - 100^\circ \\ &= 235^\circ \end{aligned}$$

15 B

$$NR = 10 \text{ cm} - 4 \text{ cm} = 6 \text{ cm}$$

$$MR = \frac{4}{5} \times 10 \text{ cm} = 8 \text{ cm}$$

$$\begin{aligned} \tan x^\circ &= -\frac{NR}{MR} \\ &= -\frac{6}{8} \\ &= -\frac{3}{4} \end{aligned}$$

16 B

$$\sphericalangle POM = 2 \times 34^\circ = 68^\circ$$

$$\begin{aligned} x &= 180^\circ - 68^\circ - 90^\circ \\ &= 22^\circ \end{aligned}$$

17 D

A: Bukan teselasi kerana terdapat bintang yang tidak berulang.

Not a tessellation because there are non-repeating spots.

B: Bukan teselasi kerana terdapat bintang yang tidak berulang.

Not a tessellation because there are non-repeating spots.

C: Bukan teselasi kerana terdapat bintang yang tidak berulang.

Not a tessellation because there are non-repeating spots.

D: Merupakan teselasi yang terdiri daripada bintang yang berulang.

It is a tessellation consisting of repeating spots.

18 C

$$P = \{A, B\}$$

$$P' = \{C, D\}$$

$$Q = \{D\}$$

$$Q' = \{A, B, C\}$$

$$R = \{B, C, D\}$$

$$\begin{aligned} P' \cap Q' \cap R &= \textcircled{C} \text{ D} \cap \text{A B} \cap \textcircled{C} \cap \text{B C D} \\ &= \textcircled{C} \cap \text{B} \textcircled{C} \text{ D} \\ &= \text{C} \end{aligned}$$

19 A

$$\begin{aligned} \text{Min} / \text{Mean} &= \frac{2.3 + 4.5 + 5.7 + 5.7 + 3.8}{5} \\ &= 4.4 \end{aligned}$$

20 B

Bilangan bungkusan cendol yang dijual

The number of packet of cendol sold

$$= 60 + 65 + 50 + 55 + 80$$

$$= 310$$

Bilangan bungkusan susu soya yang dijual

The number of packet of soy milk sold

$$= 40 + 50 + 40 + 40 + 60$$

$$= 230$$

Katakan harga sebungkus cendol / *Let the price of a packet of cendol = x*

$$310x + 230(\text{RM}1.20) = \text{RM}834$$

$$310x + \text{RM}276 = \text{RM}834$$

$$310x = \text{RM}558$$

$$x = \frac{\text{RM}558}{310}$$

$$x = \text{RM}1.80$$

21 A

$$\begin{aligned} m^3 \times n \times p^7 \times m^3 \times n^{-2} \times p^3 &= m^{3+3} \times n^{1+(-2)} \times p^{7+3} \\ &= m^6 \times n^{-1} \times p^{10} \\ &= \frac{m^6 p^{10}}{n} \end{aligned}$$

22 B

$$y = ax^n - x + c$$

$$y = (0)x^n - x + 3$$

$$y = -x + 3$$

$$\text{Kecerunan} / \text{Gradient} = -1$$

$$\text{Pintasan-y} / \text{y-intercept} = 3$$

23 B

Dari graf, laju seragam ialah 60 km j⁻¹.

From the graph, the uniform speed is 60 km h⁻¹.

24 C

$$\text{A: } y > 2x + 4$$

$$\text{B: } y < 2x + 4$$

$$\text{C: } y \geq 2x + 4$$

$$\text{D: } y \leq 2x + 4$$

25 A

$$A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$M^{-1} = \frac{1}{(10)(1) - q(-3)} \begin{pmatrix} p & 3 \\ 2 & 10 \end{pmatrix}$$

$$-bc = -q(-3)$$

$$-6 = 3q$$

$$q = -2$$

$$p = d$$

$$p = 1$$

26 C

$$T \propto \sqrt{L}$$

$$T = k\sqrt{L}$$

$$3 = k\sqrt{36}$$

$$k = \frac{3}{6}$$

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

$$T = \frac{\sqrt{L}}{2}$$

27 D

$$\tan \theta = \frac{5}{12}$$

$$\frac{XY}{YZ} = \frac{5}{12}$$

$$XZ^2 = XY^2 + YZ^2$$

$$= 5^2 + 12^2$$

$$= 169$$

$$XZ = 13$$

Diberi $XZ = 26$. Oleh itu, $13 \times 2 = 26$.

Given $XZ = 26$. Thus, $13 \times 2 = 26$.

$$YZ = 12 \times 2$$

$$= 24 \text{ cm}$$

28 A

$$\sphericalangle SOQ = 2 \times 52^\circ = 104^\circ$$

$$\sphericalangle PSO = 180^\circ - 60^\circ = 120^\circ$$

$$x = 360^\circ - 90^\circ - 104^\circ - 120^\circ$$

$$= 46^\circ$$

29 B

$$\text{Skala} = \frac{\text{Ukuran lukisan berskala}}{\text{Ukuran objek}}$$

$$\text{Scale} = \frac{\text{Measurement of scale drawing}}{\text{Measurement of object}}$$

$$\frac{1}{8} = \frac{10}{SR}$$

$$SR = 80 \text{ cm}$$

$$PS / QR = \frac{4\,000}{80}$$

$$= 50 \text{ cm}$$

$$\text{Perimeter} = 50 + 50 + 80 + 80$$

$$= 260 \text{ cm}$$

30 C

A mempunyai jarak lebih daripada 4 cm dari titik L dan titik M

A has distance more than 4 cm from point L and M

B mempunyai jarak lebih daripada 4 cm dari titik M

B has distance more than 4 cm from point M

C mempunyai jarak kurang daripada 4 cm dari setiap titik J , titik M dan titik L

C has distance less than 4 cm from each of the points J , M and L

D mempunyai jarak lebih daripada 4 cm dari titik J

D has distance more than 4 cm from point J

31 C

– Terdapat rantau persilangan antara set P dan set Q .

There is a region of intersection between set P and set Q .

– Terdapat rantau kesatuan antara persilangan set P dan set Q , dengan set R .

There is a region of union between the intersection of set P and set Q , with set R .

$(P \cap Q) \cup R$

32 D

Mod / Mode = 170

$x = 171$

33 A

$P = 10\,000$, $r = 0.05$, $n = 4$, $t = 2$

$$\begin{aligned}MV &= P \left(1 + \frac{r}{n}\right)^{nt} \\ &= 10\,000 \left(1 + \frac{0.05}{4}\right)^{(4)(2)} \\ &= 10\,000(1.104486101) \\ &= 11\,044.86\end{aligned}$$

$$\begin{aligned}\text{Faedah / Interest} &= \text{RM}11\,044.86 - \text{RM}10\,000 \\ &= \text{RM}1\,044.86\end{aligned}$$

34 D

Skim pinjaman emas / Gold loan scheme

$$\begin{aligned}\text{Faedah untuk 7 tahun / Interest for 7 years} &= \text{RM}10\,000 \times \frac{6}{100} \times 7 \\ &= \text{RM}4\,200\end{aligned}$$

$$\begin{aligned}\text{Jumlah bayaran balik / Total repayment} &= \text{RM}10\,000 + \text{RM}4\,200 \\ &= \text{RM}14\,200\end{aligned}$$

$$\begin{aligned}\text{Ansuran bulanan / Monthly installment} &= \frac{\text{RM}14\,200}{84} \\ &= \text{RM}169.05\end{aligned}$$

Skim pinjaman premium mempunyai ansuran bulanan yang lebih rendah.

Premium loan scheme has lower monthly installment.

$$\begin{aligned}\text{Beza ansuran bulanan / Difference of monthly installment} &= \text{RM}169.05 - \text{RM}150 \\ &= \text{RM}19.05\end{aligned}$$

$$\begin{aligned}\text{Penjimatan / Savings} &= \text{RM}19.05 \times 84 \\ &= \text{RM}1\,600.20 \approx \text{RM}1\,600\end{aligned}$$

35 B

Katakan kos hamper pertama / Let the cost of the first hamper = x

x , $2x$, $4x$, $8x$, $16x$, $32x$

$$x + 2x + 4x + 8x + 16x + 32x = 63x$$

$$63(\text{RM}30) = \text{RM}1\,890$$

36 A

$$\sin 212^\circ = -0.5299192642$$

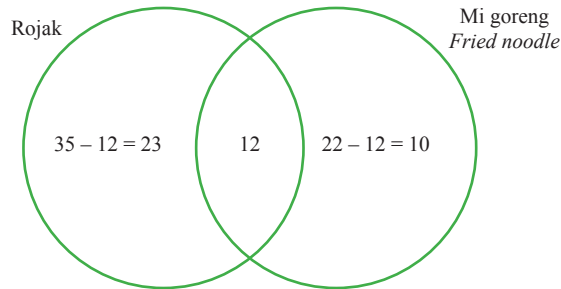
A: $\sin 328^\circ = -0.5299192642$

B: $\sin 302^\circ = -0.8480480962$

C: $\sin 244^\circ = -0.8987940463$

D: $\sin 238^\circ = -0.8480480962$

37 B



Bilangan pelanggan yang suka satu jenis makanan sahaja

The number of customers who like one type of food only

$$= 23 + 10$$

$$= 33$$

38 D

$$P' = (7, 5)$$

$$P = (7 - 5, 5 + 2)$$

$$= (2, 7)$$

$$P = \mathbf{D}$$

39 D

A: Peristiwa ini tidak dipengaruhi oleh kesudahan yang telah berlaku sebelum ini.

The event is not affected by the outcome that had already occurred previously.

B: Peristiwa ini tidak dipengaruhi oleh kesudahan yang telah berlaku sebelum ini.

The event is not affected by the outcome that had already occurred previously.

C: Peristiwa ini tidak dipengaruhi oleh kesudahan yang telah berlaku sebelum ini.

The event is not affected by the outcome that had already occurred previously.

D: Peristiwa ini dipengaruhi oleh kesudahan yang telah berlaku sebelum ini.

The event is affected by the outcome that had already occurred previously.

40 B

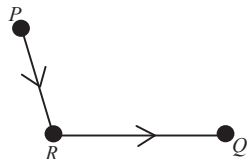
Pelepasan cukai meliputi caruman Kumpulan Wang Simpanan Pekerja (KWSP), rawatan perubatan dan yuran pengajian.

The individual tax rebate consists of contributions to the Employees Provident Fund (EPF), medical treatment and education fees.

Bahagian A

No.	Skema Pemarkahan <i>Marking Scheme</i>	Markah <i>Marks</i>	Markah Total <i>Total Marks</i>
1	<p>Katakan bilangan jualan majalah pada Januari = j <i>Let the number of magazine sales in January = j</i></p> <p>Katakan bilangan jualan majalah pada Februari = f <i>Let the number of magazine sales in February = f</i></p> <p>Katakan bilangan jualan majalah pada Mac = m <i>Let the number of magazine sales in March = m</i></p> <p>$m = 4f$① $f + m = 2j$②</p> <p>Gantikan $m = 4f$ dan $j = 400$ ke dalam persamaan ②. <i>Substitute $m = 4f$ and $j = 400$ into equation ②.</i></p> <p>$f + 4f = 2(400)$ $5f = 800$ $f = 160$</p> <p>$m = 4(160)$ $= 640$</p> <p>$j + f + m = 400 + 160 + 640$ $= 1\ 200$</p> <p style="text-align: center;">atau / or</p> <p>$m = 4f$① $f + m = 2j$② $m - 4f = 0$③ ③ - ②</p> <p>$-5f = 2j$ $5f = 2(400)$ $f = 160$</p> <p>$m = 4(160)$ $= 640$</p> <p>$j + f + m = 400 + 160 + 640$ $= 1\ 200$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p style="text-align: center;">5</p>
2	<p>(a) $x = 10$</p> <p>(b) $J = (0, 8)$ $K = (10, 13)$ $M = (10, 0)$</p> <p>$m_{JK} = \frac{13 - 8}{10 - 0}$ $= \frac{1}{2}$</p> <p>$m_{JK} = m_{MN}$ $y = mx + c$</p> <p>$0 = \frac{1}{2}(10) + c$ $c = -5$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	

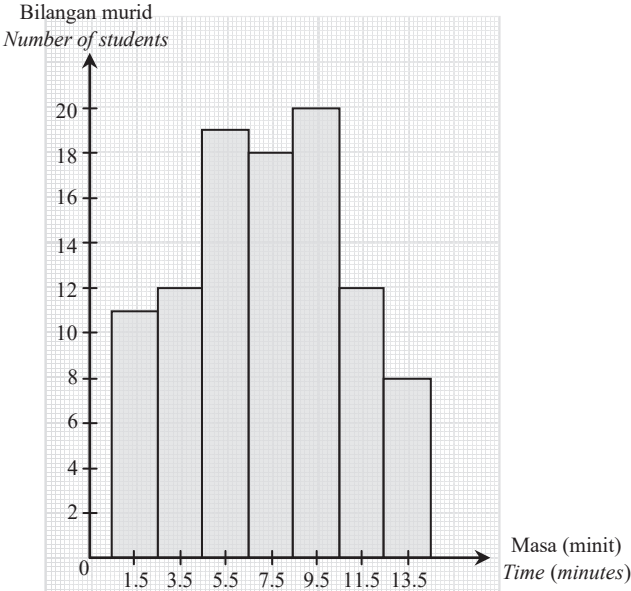
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	$y = \frac{1}{2}x + (-5)$ $y = \frac{x}{2} - 5$	1	4
3	<p>(a) $\frac{\text{Luas sektor} / \text{Area of sector}}{\pi j^2} = \frac{\theta}{360^\circ}$</p> $\frac{115.5}{\left(\frac{22}{7}\right)^2} = \frac{360^\circ - 240^\circ}{360^\circ}$ $j^2 = 110.25$ $j = 10.5$	1 1	4
	<p>(b) $\frac{\text{Panjang lengkok} / \text{Arc length}}{2\pi j} = \frac{\theta}{360^\circ}$</p> $\frac{\text{Panjang lengkok} / \text{Arc length}}{2\left(\frac{22}{7}\right)(10.5)} = \frac{120^\circ}{360^\circ}$ <p>Panjang lengkok minor $LM = 22$ cm The minor arc length of LM</p>	1 1	
4	$MV = P\left(1 + \frac{r}{n}\right)^{nt}$ $= 10\,000 \left(1 + \frac{0.03}{4}\right)^{(4)(2)}$ $= 10\,615.99$ <p>Jumlah faedah yang diperoleh / The total interest received = RM10 615.99 – RM10 000 = RM615.99</p>	1 1 1	3
5	$\frac{1}{2} \times \text{tapak} \times \text{tinggi} = \text{luas segi tiga}$ $\frac{1}{2} \times \text{base} \times \text{height} = \text{area of triangle}$ $\frac{1}{2}(x)(2+x) = 7.5$ $x^2 + 2x - 15 = 0$ $(x-3)(x+5) = 0$ <p>$x = 3, x = -5$ $x > 0, x = 3$</p> $y = 2(2+x)$ $= 2(2+3)$ $= 10 \text{ cm}$	1 1 1 1 1	5
6	<p>(a) Antejadian / Antecedent: $a^2 - b^2 = (a - b)^2$ Akibat / Consequence: $a^2 - b^2 = (a - b)(a + b)$</p>	1 1	4
	<p>(b) Akas / Converse: Jika / If $a^2 - b^2 = (a - b)(a + b)$, maka / then $a^2 - b^2 = (a - b)^2$</p> <p>Songsangan / Inverse: Jika / If $a^2 - b^2 \neq (a - b)^2$, maka / then $a^2 - b^2 \neq (a - b)(a + b)$</p>	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
7	 <p>Jarak terdekat / <i>Shortest distance</i> = 6 km + 5.3 km = 11.3 km</p>	2 1	3
8	(a) Petrol (terima jawapan lain yang munasabah) (<i>accept other reasonable answers</i>)	1	4
	(b) Jumlah pendapatan – Jumlah perbelanjaan <i>Total income – Total expenses</i> = RM1 700 + RM987.60 – (RM2 350 + RM860.90) = –RM523.30 (Aliran tunai negatif / <i>Negative cash flow</i>)	2 1	
9	P(Sekurang-kurangnya seorang ahli perempuan dipilih) <i>P(At least one girl member is chosen)</i> $= \left(\frac{2}{6} \times \frac{1}{5}\right) + \left(\frac{2}{6} \times \frac{4}{5}\right) + \left(\frac{4}{6} \times \frac{2}{5}\right)$ $= \frac{3}{5}$	2 1	3
10	(a) Ubahan langsung <i>Direct variation</i>	1	5
	(b) (i) $y \propto x$ $y = kx$ $15 = k(6)$ $k = \frac{5}{2}$ $y = \frac{5}{2}x$	1 1	
	(ii) $40 = \frac{5}{2}x$	1	
	$x = 16$	1	

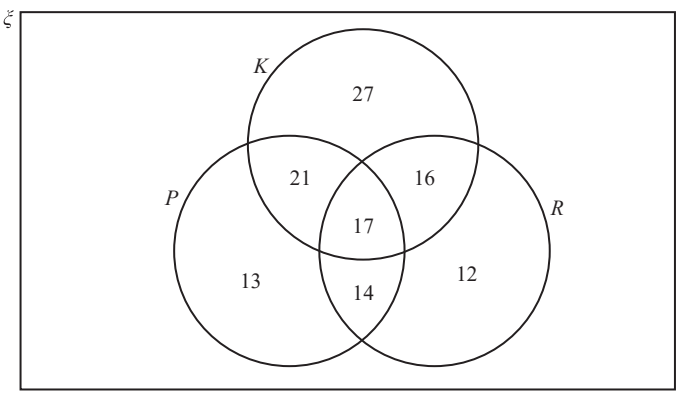
Bahagian B

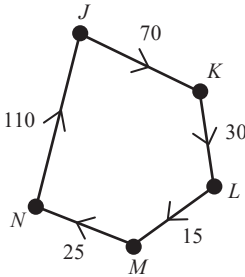
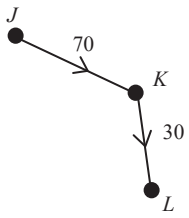
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
11	(a) Premium asas / <i>Basic premium</i> = RM339.10 + RM26 × $\frac{90\,000 - 1\,000}{1\,000}$ = RM2 653.10 NCD = RM2 653.10 × 55% = RM1 459.21 Premium kasar / <i>The gross premium</i> = RM2 653.10 – RM1 459.21 = RM1 193.89	2 1 1 1 1	

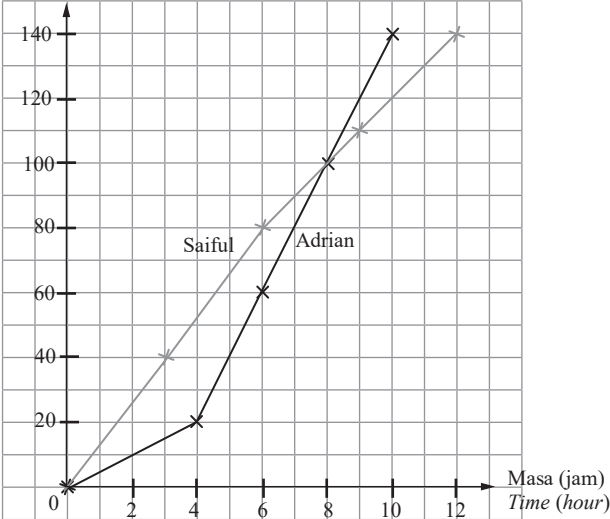
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks							
	<p>(b) (i) Katakan umur Rokiah / <i>Let the age of Rokiah = R</i> Katakan umur Nuha / <i>Let the age of Nuha = N</i></p> $R = 3N$ $R - 3N = 0 \dots\dots\dots \textcircled{1}$ $\frac{R + N}{2} = 36$ $R + N - 72 = 0 \dots\dots\dots \textcircled{2}$ <p>(ii) $R - 3N = 0$ $R + N = 72$</p> $\begin{pmatrix} 1 & -3 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} R \\ N \end{pmatrix} = \begin{pmatrix} 0 \\ 72 \end{pmatrix}$ $\begin{pmatrix} R \\ N \end{pmatrix} = \frac{1}{(1)(1) - (-3)(1)} \begin{pmatrix} 1 & 3 \\ -1 & 1 \end{pmatrix} \begin{pmatrix} 0 \\ 72 \end{pmatrix}$ $= \frac{1}{4} \begin{pmatrix} 216 \\ 72 \end{pmatrix}$ $= \begin{pmatrix} 54 \\ 18 \end{pmatrix}$ <p>$R = 54$ $N = 18$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>8</p>							
14	<p>(a) (i) Pembesaran pada pusat $(2, -4)$ dengan faktor skala $-\frac{1}{2}$. <i>Enlargement at the centre of $(2, -4)$ with the scale factor of $-\frac{1}{2}$.</i></p> <p>(ii) Putaran 180° pada asalan. <i>Rotation of 180° at the origin.</i></p> <p>(b) Luas imej = $k^2 \times$ Luas objek <i>Area of image = $k^2 \times$ Area of object</i></p> $MNQSTU = \left(-\frac{1}{2}\right)^2 \times 125 \text{ cm}^2$ $= 31.25 \text{ cm}^2$	<p>3</p> <p>3</p> <p>2</p> <p>1</p>	<p>9</p>							
15	<p>(a)</p> <table border="1" data-bbox="232 1281 482 1726"> <thead> <tr> <th data-bbox="232 1281 482 1370">Titik tengah Midpoint</th> </tr> </thead> <tbody> <tr> <td data-bbox="232 1370 482 1428">3.5</td> </tr> <tr> <td data-bbox="232 1428 482 1487">5.5</td> </tr> <tr> <td data-bbox="232 1487 482 1546">7.5</td> </tr> <tr> <td data-bbox="232 1546 482 1605">9.5</td> </tr> <tr> <td data-bbox="232 1605 482 1664">11.5</td> </tr> <tr> <td data-bbox="232 1664 482 1726">13.5</td> </tr> </tbody> </table>	Titik tengah Midpoint	3.5	5.5	7.5	9.5	11.5	13.5	<p>1</p>	
Titik tengah Midpoint										
3.5										
5.5										
7.5										
9.5										
11.5										
13.5										

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	<p>(b) (i) Min / Mean</p> $\frac{(11 \times 1.5) + (12 \times 3.5) + (19 \times 5.5) + (18 \times 7.5) + (20 \times 9.5) + (12 \times 11.5) + (8 \times 13.5)}{100} = 7.34$ <p>(ii) $\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$</p> $= \sqrt{\frac{(11 \times 1.5^2) + (12 \times 3.5^2) + (19 \times 5.5^2) + (18 \times 7.5^2) + (20 \times 9.5^2) + (12 \times 11.5^2) + (8 \times 13.5^2)}{100} - 7.34^2} = 3.49$	<p>1</p> <p>1</p> <p>2</p> <p>1</p>	
	<p>(c)</p> 	<p>4</p>	<p>10</p>

Bahagian C

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
16	<p>(a)</p> 	<p>3</p>	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks								
	<p>(b) (i) $Q = RM655 \times \frac{100}{10}$ $= RM6\ 550$ Jumlah pendapatan / Total income $= RM6\ 550 + RM350$ $= RM6\ 900$</p> <p>(ii) Aliran tunai / Cash flow $= RM6\ 550 + RM350 - RM655 - RM300 - RM900 - RM1\ 050 -$ $RM600 - RM600 - RM500 - RM1\ 000 - RM500$ $= RM795$</p> <p>Aliran tunai Hayati adalah positif, iaitu lebih RM795. <i>Hayati's cash flow is positive, having surplus RM795.</i></p> <p>(c)</p> <table border="1" data-bbox="235 617 978 917"> <tr> <td data-bbox="235 617 299 689">M</td> <td data-bbox="299 617 978 689">Membayar RM2 800 <i>Pay RM2 800</i></td> </tr> <tr> <td data-bbox="235 689 299 766">A</td> <td data-bbox="299 689 978 766">RM2 800 boleh dibayar dalam 5 bulan <i>RM2 800 can be paid within 5 months</i></td> </tr> <tr> <td data-bbox="235 766 299 842">R</td> <td data-bbox="299 766 978 842">Simpanan 5 bulan adalah sebanyak RM3 975 <i>Savings of 5 months is RM3 975</i></td> </tr> <tr> <td data-bbox="235 842 299 917">T</td> <td data-bbox="299 842 978 917">Dalam 5 bulan <i>Within 5 months</i></td> </tr> </table> <p>Hayati mencapai matlamatnya kerana dia mempunyai lebih RM1 175 selepas membayar RM2 800. <i>Hayati achieved her goal because she had surplus of RM1 175 after paying RM2 800.</i></p>	M	Membayar RM2 800 <i>Pay RM2 800</i>	A	RM2 800 boleh dibayar dalam 5 bulan <i>RM2 800 can be paid within 5 months</i>	R	Simpanan 5 bulan adalah sebanyak RM3 975 <i>Savings of 5 months is RM3 975</i>	T	Dalam 5 bulan <i>Within 5 months</i>	<p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>15</p>
M	Membayar RM2 800 <i>Pay RM2 800</i>										
A	RM2 800 boleh dibayar dalam 5 bulan <i>RM2 800 can be paid within 5 months</i>										
R	Simpanan 5 bulan adalah sebanyak RM3 975 <i>Savings of 5 months is RM3 975</i>										
T	Dalam 5 bulan <i>Within 5 months</i>										
17	<p>(a) (i)</p>  <p>(Terima mana-mana jawapan yang munasabah) <i>(Accept any reasonable answers)</i></p> <p>(ii)</p>  <p>(Terima mana-mana jawapan yang munasabah) <i>(Accept any reasonable answers)</i></p>	<p>3</p> <p>1</p>									

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
(b) (i)	<p>Jarak (km) Distance (km)</p>  <p>Masa (jam) Time (hour)</p> <p>(ii) Laju / Speed = $\frac{140 - 110}{12 - 9}$ = 10 km j⁻¹ / km h⁻¹</p> <p>(iii) 100 km</p>	3 1 1 1	
(c) (i)	<p>RM30 000 – RM600 = RM29 400 RM29 400 × $\frac{20}{100}$ + RM600 = RM6 480</p> <p>(ii) RM0 Kos rawatan RM450 adalah kurang daripada deduktibel RM600. <i>The treatment cost of RM450 is less than the deductible of RM600.</i></p>	1 1 1 1 1	15

KERTAS 1

1 D

$$7(-15 + 20) + \frac{3}{5} \div 2.5 = 35 + 0.24$$

$$= \frac{881}{25}$$

2 D

A: 1, 4, 9, 16, ...

$$\begin{array}{cccc} & +3 & +5 & +7 \\ & \curvearrowright & \curvearrowright & \curvearrowright \\ 1 & & 4 & 9 & 16 & \dots \end{array}$$

B: 2, 4, 6, 8, ...

$$\begin{array}{cccc} & +2 & +2 & +2 \\ & \curvearrowright & \curvearrowright & \curvearrowright \\ 2 & & 4 & 6 & 8 & \dots \end{array}$$

C: 3, 6, 9, 12, ...

$$\begin{array}{cccc} & +3 & +3 & +3 \\ & \curvearrowright & \curvearrowright & \curvearrowright \\ 3 & & 6 & 9 & 12 & \dots \end{array}$$

D: 4, 8, 16, 32, ...

$$\begin{array}{cccc} & \times 2 & \times 2 & \times 2 \\ & \curvearrowright & \curvearrowright & \curvearrowright \\ 4 & & 8 & 16 & 32 & \dots \end{array}$$

3 B

$$\frac{3^8 \times 2^4}{12} = 8\,748$$

A: $3^7 \times 2 = 4\,374$

B: $3^7 \times 2^2 = 8\,748$

C: $3^9 \times 2^2 = 78\,732$

D: $3^9 \times 2^6 = 1\,259\,712$

4 C

A: 3 029 016 = 3.03 juta / millions

B: 2 905 421 = 2.91 juta / millions

C: 4 260 572 = 4.26 juta / millions

D: 5 118 396 = 5.12 juta / millions

5 D

$$1 \times 2^3 + 1 \times 2^2 + 1 \times 2^0 = 1101_2$$

6 A

$$245_8 = 165_{10}$$

$$165 \times \frac{100}{60} = 275$$

$$275_{10} = 423_8$$

$$\begin{array}{r|l} 8 & 275 & -3 & \uparrow \\ \hline 8 & 34 & -2 & \\ \hline 8 & 4 & -4 & \\ \hline & 0 & & \end{array}$$

7 C

Wang pendahuluan = RM63 000 – RM50 000

Down payment

$$= \text{RM}13\,000$$

Jumlah minimum simpanan = (RM13 000 – RM10 500) ÷ 5

Minimum amount of the saving

$$= \text{RM}2\,500 \div 5$$

$$= \text{RM}500$$

8 D

Jumlah cukai pintu = kadar cukai pintu \times nilai tahunan

$$\begin{aligned} \text{Total amount of the property assessment tax} &= \text{property assessment tax rate} \times \text{annual value} \\ &= 1.5 \times 6\% \times \text{RM5 820} \\ &= \text{RM523.80} \end{aligned}$$

9 D

Premium asas = RM151.20

Basic premium

$$\text{Premium kasar} = \text{RM151.20} \times \frac{55}{100}$$

Gross premium

$$= \text{RM83.16}$$

10 D

$$\begin{aligned} (x + 3y)(y - 3x) &= xy - 3x^2 + 3y^2 - 9xy \\ &= 3y^2 - 8xy - 3x^2 \end{aligned}$$

11 A

$$V = \pi r^2 h$$

$$r^2 = \frac{V}{\pi h}$$

$$r = \sqrt{\frac{V}{\pi h}}$$

12 B

$$OR = \frac{3}{4} OS$$

$$OR = \frac{3}{4} (8)$$

$$OR = 6$$

$$m = -\frac{\text{pintasan-}y / y\text{-intercept}}{\text{pintasan-}x / x\text{-intercept}}$$

$$= -\frac{6}{8}$$

$$= -\frac{3}{4}$$

13 C

$$y = ax^2 + 9x + c$$

$$y = -x^2 + 9x - 18$$

$$y = -(x^2 - 9x + 18)$$

$$y = -(x - 3)(x - 6)$$

$$a = -1, \text{ bentuk / shape } \text{ (parabola opening downwards) }$$

$$x = 3 \text{ atau / or } x = 6$$

14 A

2x lebih berat daripada y + 5.

2x is heavier than y + 5.

15 C

A: $y \leq 0$ dan $y \geq -x$ adalah salah.

$y \leq 0$ and $y \geq -x$ are wrong.

B: $y \leq 0$, $y \geq -x$, $y < x - 3$ dan $x < 5$ adalah salah.

$y \leq 0$, $y \geq -x$, $y < x - 3$ and $x < 5$ are wrong.

D: $y \geq -x$, $y < x - 3$ dan $x < 5$ adalah salah.

$y \geq -x$, $y < x - 3$ and $x < 5$ are wrong.

16 B

$$\text{Kadar perubahan laju} = -\frac{v-0}{12-3}$$

The rate of change of speed

$$-14\frac{2}{3} = -\frac{v}{9}$$

$$\frac{44}{3} = \frac{v}{9}$$

$$v = 132 \text{ m s}^{-1}$$

17 D

$$x \propto y^2$$

$$x = ky^2$$

$$\frac{2}{5} = k\left(\frac{1}{2}\right)^2$$

$$\frac{2}{5} = k\left(\frac{1}{4}\right)$$

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

$$x = \frac{8}{5}y^2$$

18 C

$$R \propto \frac{1}{j^2}$$

$$R = \frac{k}{j^2}$$

$$0.5 = \frac{k}{0.1^2}$$

$$k = \frac{1}{200}$$

$$R = \frac{1}{200j^2}$$

$$2 = \frac{1}{200j^2}$$

$$j^2 = \frac{1}{400}$$

$$j = \sqrt{\frac{1}{400}}$$

$$j = \frac{1}{20}$$

$$j = 0.05$$

19 A

Katakan tinggi = t ,

Let height

Katakan isi padu = v ,

Let volume

Katakan jejari = j ,

Let radius

$$t \propto \frac{v}{j^2}$$

$$t = \frac{kv}{j^2}$$

$$7 = \frac{k(269.5)}{(3.5)^2}$$

$$k = \frac{7}{22}$$

$$t = \frac{7v}{22j^2}$$

$$21 = \frac{7v}{22j^2}$$

$$21 = \frac{7(1\,996.5)}{22j^2}$$

$$j^2 = 30.25$$

$$j = \sqrt{30.25}$$

$$j = 5.5 \text{ cm}$$

20 A

$$M + \begin{bmatrix} 4 & 6 \\ -3 & -15 \end{bmatrix} = \begin{bmatrix} 17 & -10 \\ 6 & -5 \end{bmatrix}$$

$$M = \begin{bmatrix} 17 & -10 \\ 6 & -5 \end{bmatrix} - \begin{bmatrix} 4 & 6 \\ -3 & -15 \end{bmatrix}$$

$$M = \begin{bmatrix} 17-4 & -10-6 \\ 6-(-3) & -5-(-15) \end{bmatrix}$$

$$M = \begin{bmatrix} 13 & -16 \\ 9 & 10 \end{bmatrix}$$

21 A

$$P = Q$$

$$\begin{bmatrix} 5 & x+y \\ x & z \end{bmatrix} = \begin{bmatrix} 5 & 8 \\ 6 & x-y \end{bmatrix}$$

$$x = 6$$

$$x + y = 8$$

$$6 + y = 8$$

$$y = 8 - 6$$

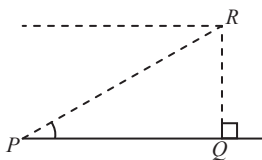
$$y = 2$$

$$z = x - y$$

$$z = 6 - 2$$

$$z = 4$$

22 A



$\angle QPR$

23 B

$$\text{Isi padu kon} = \frac{1}{3} \pi j^2 t$$

$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Isi padu hemisfera} = \frac{2}{3} \pi j^3$$

$$\text{Volume of hemisphere} = \frac{2}{3} \pi r^3$$

Isi padu gabungan pepejal

Volume of the combined solid

$$\begin{aligned} &= \frac{1}{3} \pi j^2 t + \frac{2}{3} \pi j^3 \\ &= \frac{1}{3} \left(\frac{22}{7} \right) (3)^2 (7) + \frac{2}{3} \left(\frac{22}{7} \right) (3)^3 \\ &= 66 + 56 \frac{4}{7} \\ &= 122 \frac{4}{7} \text{ cm}^3 \end{aligned}$$

24 C

$$\begin{aligned} x &= \angle L J N + \angle J L M \\ &= 60^\circ + 32^\circ \\ &= 92^\circ \end{aligned}$$

25 D

$P \rightarrow S$: Pantulan / Reflection
 $S \rightarrow R$: Translasi / Translation

26 A

$$\begin{aligned} k &= \frac{\text{panjang sisi imej / a side of an image}}{\text{panjang sisi objek / a side of an object}} \\ k &= \frac{3}{6} \\ k &= \frac{1}{2} \end{aligned}$$

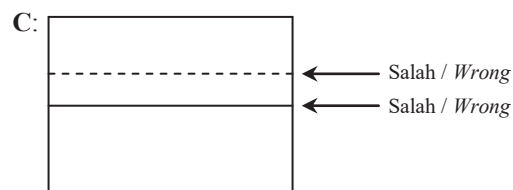
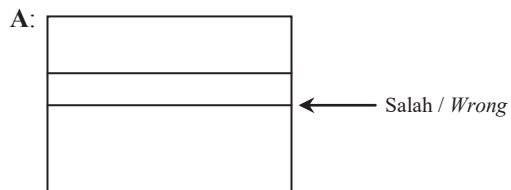
Arah bertentangan, $\therefore k = -\frac{1}{2}$
Opposite direction

27 C

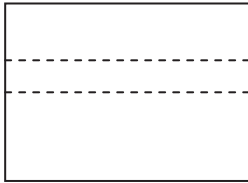
$$\begin{aligned} \sin x &= -\frac{\sqrt{3}}{2} \\ x &= -60^\circ \\ x &= 180^\circ - 60^\circ \\ x &= 120^\circ \end{aligned}$$

$$\begin{aligned} \tan 60^\circ &= \frac{m}{n} \\ m &= n \tan 60^\circ \end{aligned}$$

28 B



D:



← Salah / Wrong

29 D

A: $(a - b)^2 = a^2 - b^2$ (Palsu / False)

B: $m - 7 = 4$ (Bukan pernyataan / Not a statement)

C: $(-2)^2 = -4$ (Palsu / False)

D: $\{3, 6, 9\} \cap \{9, 16\} = \{9\}$ (Benar / True)

30 B

	Bentuk III Form III
Premis 1 <i>Premise 1</i>	Jika p , maka q <i>If p, then q</i>
Premis 2 <i>Premise 2</i>	Bukan q adalah benar <i>Not q is true</i>
Kesimpulan <i>Conclusion</i>	Bukan p adalah benar <i>Not p is true</i>

$p: x = 3$

$q: x + 2 = 5$

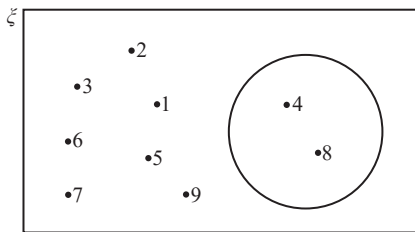
\therefore Jika $x = 3$ maka $x + 2 = 5$

If $x = 3$ then $x + 2 = 5$

31 C

$\zeta = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

Set $P = \{4, 8\}$



32 A

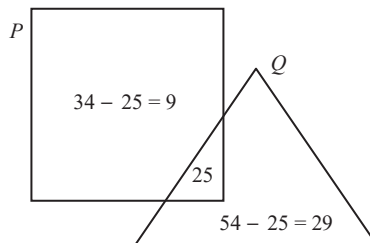
$$n(P) + n(Q) = 34 + 54$$

$$= 88$$

$$n(P \cap Q) = 88 - n(P \cup Q)$$

$$= 88 - 63$$

$$= 25$$



33 C

$$\begin{aligned} \text{A: } P_1 \rightarrow P_2 \rightarrow P_3 \rightarrow P_7 \\ &= 70 \text{ km} + 40 \text{ km} + 30 \text{ km} \\ &= 140 \text{ km} \end{aligned}$$

$$\begin{aligned} \text{B: } P_1 \rightarrow P_2 \rightarrow P_6 \rightarrow P_7 \\ &= 70 \text{ km} + 90 \text{ km} + 60 \text{ km} \\ &= 220 \text{ km} \end{aligned}$$

$$\begin{aligned} \text{C: } P_1 \rightarrow P_4 \rightarrow P_2 \rightarrow P_7 \\ &= 40 \text{ km} + 50 \text{ km} + 80 \text{ km} \\ &= 170 \text{ km} \end{aligned}$$

$$\begin{aligned} \text{D: } P_1 \rightarrow P_4 \rightarrow P_5 \rightarrow P_7 \\ &= 40 \text{ km} + 30 \text{ km} + 50 \text{ km} \\ &= 120 \text{ km} \end{aligned}$$

34 A

$$\begin{aligned} \text{Sudut sektor} &= \frac{18.42}{9.18 + 18.42 + 1.36} \times 360^\circ \\ \text{Angle of sector} &= 229^\circ \end{aligned}$$

35 B

Skor <i>Score</i>	2	3	4	5
Kekerapan <i>Frequency</i>	3	8	7	4

$$\begin{aligned} \text{Min skor baharu} &= \frac{(2 \times 3) + (3 \times 8) + (4 \times 7) + (5 \times 4)}{3 + 8 + 7 + 4} \\ \text{New mean score} &= \frac{78}{22} \\ &= 3.55 \end{aligned}$$

36 B

Kebarangkalian memilih sebiji guli bukan berwarna hijau / *Probability of choosing marble that is not green*

$$\begin{aligned} &= \frac{6 + 4}{6 + 4 + 9} \\ &= \frac{10}{19} \end{aligned}$$

37 D

Kotak Q tidak mengandungi bola biru.

Box Q does not consist of blue balls.

38 D

$$\begin{aligned} x + 5 + x + 2x + 3 &= 40 \\ 4x + 8 &= 40 \\ 4x &= 32 \\ x &= 8 \end{aligned}$$

$$\begin{aligned} \text{Kebarangkalian peserta mengambil bahagian dalam kedua-dua kuiz} &= \frac{8}{40} \\ \text{Probability of the participant takes part in both quizzes} &= \frac{1}{5} \end{aligned}$$

39 B

A: Titik 60 dan 80 adalah salah

Points 60 and 80 are wrong

C: 65 bukan median

65 is not a median

D: Titik 35 dan 85 adalah salah

Points 35 and 85 are wrong

40 B

$$\text{Persentil ke-40} = \frac{40}{100} \times 60$$

40th percentile

$$= 24$$

Dari graf, markah ialah 61.5.

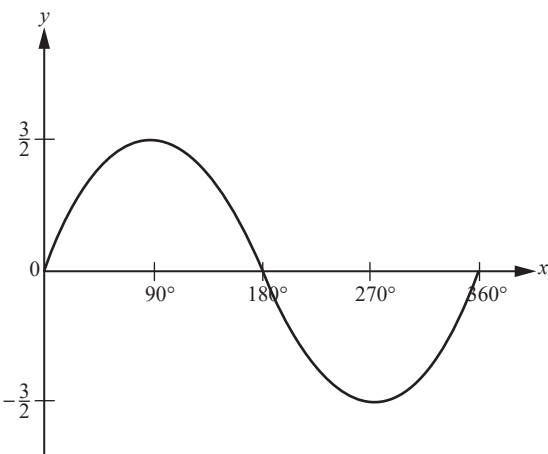
From the graph, the marks is 61.5.

KERTAS 2

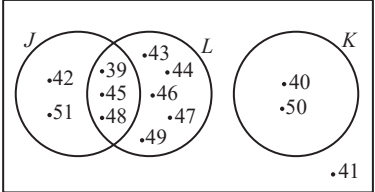
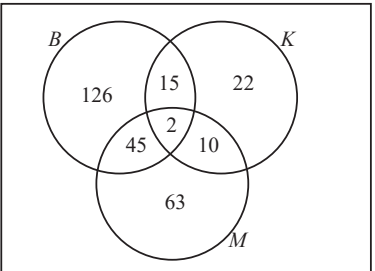
Bahagian A

No.	Skema Pemarkahan <i>Marking Scheme</i>	Markah <i>Marks</i>	Markah Total <i>Total Marks</i>
1	<p>(a)</p> <p>R ditanda di (3, 6) atau (3, -4). <i>R is marked at (3, 6) or (3, -4).</i></p> <p>(b) Jarak antara titik R dan titik Q <i>Distance between points R and Q</i> $= \sqrt{[3 - (-2)]^2 + (6 - 1)^2}$ atau / or $\sqrt{[3 - (-2)]^2 + (-4 - 1)^2}$ $= 7.07$ unit</p>	1	3
2	<p>(a) $Q_1 = 5$</p> <p>(b) Julat antara kuartil / <i>Interquartile range</i> $= Q_3 - Q_1$ $= 16 - 5$ $= 11$</p>	1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
3	(a) Akas: Jika $2x - 3 = 5$, maka $x = 4$. <i>Converse: If $2x - 3 = 5$, then $x = 4$.</i>	1	4
	Kontrapositif: Jika $2x - 3 \neq 5$, maka $x \neq 4$. <i>Contrapositive: If $2x - 3 \neq 5$, then $x \neq 4$.</i>	1	
	(b) $8(n)^2 - 4$, $n = 1, 2, 3, 4, \dots$	2	
4	(a) Y: Menilai kedudukan kewangan. <i>Evaluating financial status.</i>	1	4
	(b) Aliran tunai / <i>Cash flow</i> $= \text{RM}8\,500 + \text{RM}1\,200 - \left(\frac{12}{100} \times 8\,500\right) - \text{RM}4\,350 - \text{RM}3\,610$ $= \text{RM}720$	2 1	
5	$\left[\frac{1}{2}(50 + QP)(24)\right] - (10 \times 8) = 628$ $600 + 12QP = 708$ $QP = 9 \text{ m}$	2	3
		1	
6	(a) $\frac{80}{100} \times 300\,000 = 240\,000$ Bayaran pampasan / <i>Amount of compensation</i> $= \frac{\text{Jumlah insurans yang telah dibeli}}{\text{Jumlah insurans yang harus dibeli}} \times \text{Jumlah kerugian} - \text{Deduktibel}$ $= \frac{\text{Amount of insurance purchased}}{\text{Amount of insurance to be purchased}} \times \text{Total loss} - \text{Deductible}$ $= \frac{200\,000}{240\,000} \times 30\,000 - 2\,500$ $= \text{RM}22\,500$	1 1 1	4
	(b) Penalti ko-insurans / <i>Co-insurance penalty</i> $= 30\,000 - \left(\frac{200\,000}{240\,000} \times 30\,000\right)$ $= \text{RM}5\,000$	1	
7	Luas kolam renang – Luas bahagian kanak-kanak = Luas bahagian dewasa <i>Area of the swimming pool – Area of children's section = Area of adults' section</i> $\left[(7x - 2)\left(2 \times \frac{5}{2}x\right)\right] - 12\frac{4}{7} = 107\frac{3}{7}$ $35x^2 - 10x - 120 = 0$ $(7x + 12)(x - 2) = 0$ $x = -\frac{12}{7}$ atau / or $x = 2$ $\therefore x = 2$	1	4
		1	
		1	
		1	
8	Katakan pelitup muka = m <i>Let face mask = m</i> Katakan pensanitasi tangan = k <i>Let hand sanitizer = k</i> $3m + 4k = 148.40$ $2(2m + 6k) = 301.20$ $4m + 12k = 301.20$	1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	$\begin{bmatrix} 3 & 4 \\ 4 & 12 \end{bmatrix} \begin{bmatrix} m \\ k \end{bmatrix} = \begin{bmatrix} 148.40 \\ 301.20 \end{bmatrix}$ $\begin{bmatrix} m \\ k \end{bmatrix} = \frac{1}{(3)(12) - (4)(4)} \begin{bmatrix} 12 & -4 \\ -4 & 3 \end{bmatrix} \begin{bmatrix} 148.40 \\ 301.20 \end{bmatrix}$ $\begin{bmatrix} m \\ k \end{bmatrix} = \frac{1}{20} \begin{bmatrix} (12 \times 148.40) + (-4 \times 301.20) \\ (-4 \times 148.40) + (3 \times 301.20) \end{bmatrix}$ $\begin{bmatrix} m \\ k \end{bmatrix} = \frac{1}{20} \begin{bmatrix} 576 \\ 310 \end{bmatrix}$ $\begin{bmatrix} m \\ k \end{bmatrix} = \begin{bmatrix} 28.8 \\ 15.5 \end{bmatrix}$ <p>$m = \text{RM}28.80$ $k = \text{RM}15.50$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>5</p>
9	<p>(a) (i) $M' = (3, 0)$</p> <p>(ii) Putaran lawan arah jam pada pusat $(-4, 2)$. <i>Anticlockwise rotation at centre $(-4, 2)$.</i></p> <p>atau / or</p> <p>Putaran ikut arah jam pada pusat $(1, -7)$. <i>Clockwise rotation at centre $(1, -7)$.</i></p> <p>(b) Translasi / Translation $\begin{pmatrix} 11 \\ 11 \end{pmatrix}$</p> <p>atau / or</p> <p>Pantulan pada garis $y = -x$. <i>Reflection on line $y = -x$.</i></p>	<p>1</p> <p>2</p> <p>2</p>	<p>5</p>
10	<p>(a)</p>  <p>(b) (i) $PR = \sqrt{30^2 + 15^2}$ $= 33.54 \text{ cm}$</p> <p>(ii) $\cos / \cos y^\circ = \frac{30}{33.54}$ (Sukuan / <i>Quadrant II</i>) $\cos / \cos y^\circ = -0.89$</p>	<p>2</p> <p>1</p> <p>1</p> <p>1</p>	<p>5</p>

Bahagian B

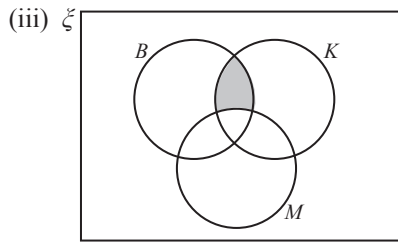
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
11	<p>(a) (i) $2y = -3x + 8$ $y = -\frac{3}{2}x + 4$ $m = -\frac{3}{2}$</p> <p>(ii) $2(0) = -3x + 8$ $x = \frac{8}{3}$ \therefore Pintasan-x / x-intercept = $\frac{8}{3}$</p>	1 1 1	8
	<p>(b) (i) $m = \frac{3-2}{0-(-2)}$ $= \frac{1}{2}$ $y = mx + c$ $y = \frac{1}{2}x + 3$ $y = \frac{1}{2}(8) + 3$ $y = 7$ Koordinat zoo / The coordinates of zoo = (8, 7)</p> <p>(ii) $7 = -\frac{1}{4}(8) + c$ $c = 9$ $y = -\frac{1}{4}x + 9$</p>	1 1 1 1	
12	<p>(a) (i) $J = \{39, 42, 45, 48, 51\}$ $L = \{39, 43, 44, 45, 46, 47, 48, 49\}$</p> <p>(ii) ζ</p> 	1 1 3	
	<p>(b) (i) ζ</p>  <p>(ii) Bilangan responden yang tidak memilih sebarang syarikat penerbangan <i>Number of respondents who do not choose any airlines</i> $= 300 - 126 - 15 - 22 - 2 - 45 - 10 - 63$ $= 17$</p>	2 1 1	

No.

Skema Pemarkahan
Marking Scheme

Markah
Marks

Markah Total
Total Marks



$(B \cap K) \cap M' = 15$

1

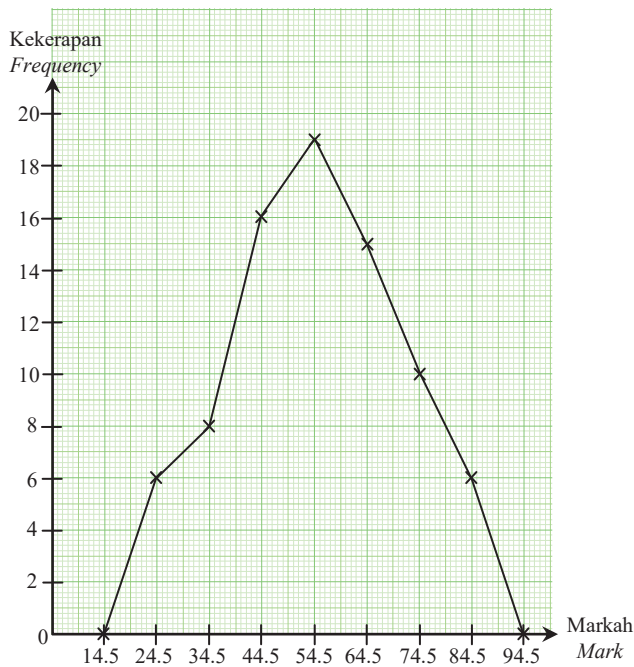
10

13 (a) (i)

Kekerapan <i>Frequency</i>
0
6
8
16
19
15
10
6
0

2

(ii)



4

(b) (i)

$$x = \sqrt{\frac{6(24.5)^2 + 8(34.5)^2 + 16(44.5)^2 + 19(54.5)^2 + 15(64.5)^2 + 10(74.5)^2 + 6(84.5)^2}{80}} - 54.75^2$$

$$= 16.65$$

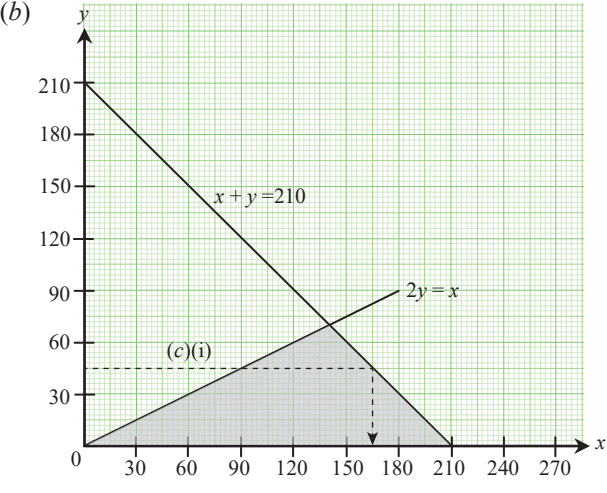
2

1

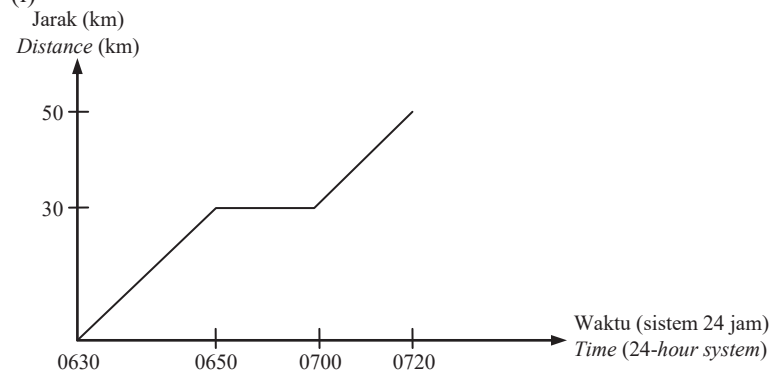
(ii) Prestasi murid pada tahun 2021 lebih konsisten.
The students performance in 2021 is more consistent.

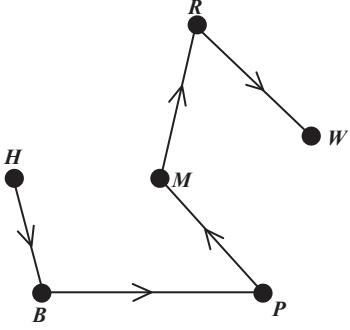
1

9

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
14	<p>(a) $x + y \leq 210$ $x \geq 2y$</p> <p>(b) </p> <p>(c) (i) Bilangan maksimum murid sekolah menengah = 165 <i>The maximum number of secondary school students</i></p> <p>(ii) Jumlah yuran minimum yang diterima penganjur <i>Total minimum fees received by the organiser</i> = $(90 \times \text{RM}150) + (45 \times \text{RM}120)$ = RM18 900</p>	<p>1 1</p> <p>4</p> <p>1 1</p>	<p>9</p>
15	<p>(a) Pendapatan bercukai Encik Farqan / <i>Encik Farqan's chargeable income</i> = RM77 600 – RM12 600 – RM9 000 – RM3 360 – RM2 500 = RM50 140</p> <p>(b) Cukai pendapatan / <i>Income tax</i> = $\text{RM}1\,800 + \left[(\text{RM}50\,140 - \text{RM}50\,000) \times \frac{13}{100} \right] - \text{RM}840$ = $\text{RM}1\,800 + \text{RM}18.20 - \text{RM}840$ = RM978.20</p> <p>(c) (i) Potongan cukai bulanan (PCB) pada tahun tersebut <i>Monthly tax deduction (PCB) in that year</i> = $\text{RM}120 \times 12$ = RM1 440</p> <p>Tidak perlu, RM1 440 melebihi RM978.20. <i>No need, RM1 440 exceeds RM978.20.</i></p> <p>(ii) LHDN perlu memulangkan lebih kepada Encik Farqan. <i>IRB should refund the excess deduction to Encik Farqan.</i></p>	<p>1 1</p> <p>2 1</p> <p>1 1 1</p>	<p>8</p>

Bahagian C

No.	Skema Pemarkahan <i>Marking Scheme</i>	Markah <i>Marks</i>	Markah Total <i>Total Marks</i>
16	<p>(a) (i) $15 : 18 = 5 : 6$</p> <p>(ii) $18x + 15(14) = 390$ $18x = 390 - 210$ $x = \frac{180}{18}$ $x = 10$</p>	1 1 1	
	<p>(b) (i)</p>  <p>(ii) Laju van / <i>Speed of the van</i> = $\frac{30 - 0}{50 - 30}$ $= \frac{3}{2} \text{ km min}^{-1}$</p>	3 1	
	<p>(c) Min / <i>Mean</i> = $\frac{23(2) + 24(2) + 26(3) + 28(4) + 30(2) + 32(2) + 35(2) + 36(4) + 38(3)}{2 + 2 + 3 + 4 + 2 + 2 + 2 + 4 + 3}$ $= 30 \frac{2}{3}$</p> <p>∴ Setuju dengan kenyataan pemain tersebut. <i>Agree with the player's statement.</i></p>	2 1 1	
	<p>(d) Kebarangkalian pasukan lelaki = $\left(\frac{2}{5} \times \frac{7}{15}\right) + \left(\frac{3}{5} \times \frac{8}{15}\right) + \left(\frac{2}{5} \times \frac{8}{15}\right)$ <i>Probability of boys team</i> $= \frac{54}{75}$</p> <p>Kebarangkalian pasukan perempuan = $\left(\frac{3}{7} \times \frac{5}{8}\right) + \left(\frac{4}{7} \times \frac{3}{8}\right) + \left(\frac{3}{7} \times \frac{3}{8}\right)$ <i>Probability of girls team</i> $= \frac{36}{56}$</p> <p>Kedua-dua pasukan lelaki dan perempuan berpeluang ke peringkat seterusnya kerana kedua-dua kebarangkalian melebihi $\frac{3}{5}$.</p> <p><i>Both boys and girls team get the chance to the next stage because both the probability exceeds $\frac{3}{5}$.</i></p>	1 1 1 1	15
17	<p>(a) (i) $25 \text{ km j}^{-1} / \text{ km h}^{-1}$</p> <p>(ii) Jarak yang dilalui = $\frac{1}{2} \times 25 \times 0.5$ <i>Distance travelled</i> $= 6.25 \text{ km}$</p>	1 1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
(b) (i)		2	
	(ii) Masa paling panjang = 17 + 15 + 72 + 10 + 45 minit / minutes The longest time	1	
	= 2 jam 39 minit / 2 hours 39 minutes	1	
(c)	Jarak kayuhan santai / Distance of the recreational ride $= 12.5 \text{ km} \times 1\,000$ $= 12\,500 \text{ m}$ Jejari tayar basikal R / Radius of tyre of bicycle R $= \left(\frac{1}{2} \times \frac{600 \text{ mm}}{1\,000} \right) + (3 \text{ cm} \div 100)$ $= 0.3 \text{ m} + 0.03 \text{ m}$ $= 0.33 \text{ m}$ Jejari basikal S / Radius of bicycle S $= \left[\left(\frac{3}{4} \times 0.6 \text{ m} \right) \div 2 \right] + (3 \text{ cm} \div 100)$ $= 0.225 \text{ m} + 0.03 \text{ m}$ $= 0.255 \text{ m}$ Beza bilangan putaran lengkap antara kedua-dua roda basikal itu Difference of the number of complete rotations between both bicycle wheels $= \left(\frac{12\,500 \text{ m}}{2 \times \frac{22}{7} \times 0.255} \right) - \left(\frac{12\,500 \text{ m}}{2 \times \frac{22}{7} \times 0.33} \right)$ $= 1\,772.403176$ $= 1\,772$	1	
	(d) Harga basikal di kedai TT Cycles / The price of a bicycle at TT Cycles shop		
	$= \left(\frac{95}{100} \times 650 \right) + \left(\frac{85}{100} \times 650 \right)$ $= \text{RM}1\,170$	1	
	Harga basikal di kedai The Wheel / The price of a bicycle at The Wheel shop $= \left[\frac{85}{100} \times 2 \left(\frac{5\,500}{7.9} \right) \right] + \frac{790}{7.9}$ $= \frac{93\,500}{79} + 100$ $= \text{RM}1\,283.54$	1	
	Kedai TT Cycles akan menjadi pilihan Encik Faez kerana lebih murah. TT Cycles shop will be Encik Faez's choice because it is cheaper.	1	
			15

KERTAS 1

1 D

A: $-0.32, -0.16, -0.8, -0.4, \dots$
 $-0.32 \div 2 = -0.16$
 $-0.16 \div 2 = -0.08$ (salah / *wrong*)

B: $21, 63, 126, 387, \dots$
 $21 \times 3 = 63$
 $63 \times 3 = 189$ (salah / *wrong*)

C: $92, 88, 84, 79, \dots$
 $92 - 4 = 88$
 $88 - 4 = 84$
 $84 - 4 = 80$ (salah / *wrong*)

D: $100, 116, 132, 148, \dots$
 $100 + 16 = 116$
 $116 + 16 = 132$
 $132 + 16 = 148$ (betul / *correct*)

2 B

$$\text{RM}120 - 3 \times \text{RM}15 = \text{RM}120 - \text{RM}45$$

$$= \text{RM}75$$

$$100\% - 25\% = 75\%$$

Harga selepas diskaun / *Price after discount*

$$= \frac{75}{100} \times \text{RM}40$$

$$= \text{RM}30$$

$$2 \times \text{RM}30 = \text{RM}60$$

$$3 \times \text{RM}30 = \text{RM}90$$

\therefore Jumlah maksimum kek keju yang boleh dibeli ialah 2 biji.

The maximum number of cheesecake that he can buy is 2.

3 D

$$\text{Jumlah luas 16 keping jubin} = 16 \times 80 \text{ cm} \times 65 \text{ cm}$$

Total area of 16 tiles

$$= 83\,200 \text{ cm}^2$$

$$= 8.32 \times 10^4$$

4 C

$$A = P + Prt$$

$$= 100\,000 + \left(100\,000 \times \frac{4.18}{100} \times 8\right)$$

$$= 133\,440$$

Ansuran bulanan / *Monthly instalment*

$$= \frac{133\,440}{8 \times 12}$$

$$= \text{RM}1\,390$$

5 D

$$1 \times 5^5 + 4 \times 5^3 + 2 \times 5^1$$

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

$$= 104020_5$$

6 **B**

$$220002_3$$

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

$$= 650$$

$$\frac{6}{100} \times 650 = 39$$

$$\begin{array}{r|l} 4 & 39 - 3 \uparrow \\ \hline 4 & 9 - 1 \\ \hline 4 & 2 - 2 \\ \hline & 0 \end{array}$$

$$39_{10} = 213_4$$

7 **D**

Cukai jalan: kereta

Road tax: car

Cukai pendapatan: pendapatan tahunan

Income tax: annual income

Cukai pintu: banglo

Property assessment tax: a bungalow

8 **C**

Cukai pintu / Property assessment tax

$$= \frac{1}{2} \times \text{RM}5\,880 \times \frac{5}{100}$$

$$= \text{RM}147$$

9 **A**

Premium asas / Basic premium

$$= \text{RM}243.90 + \text{RM}20.30 \times \left(\frac{120\,000 - 1\,000}{1\,000} \right)$$

$$= \text{RM}2\,659.60$$

Premium kasar / Gross premium

$$= \text{RM}2\,659.60 \times (100\% - 45\%)$$

$$= \text{RM}2\,659.60 \times \left(\frac{55}{100} \right)$$

$$= \text{RM}1\,462.78$$

10 **C**

$$3 - 2x \leq 1$$

$$-2x \leq 1 - 3$$

$$-2x \leq -2$$

$$x \geq 1$$

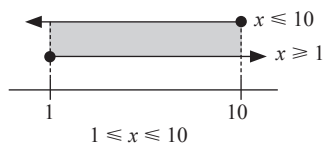
$$4x - 3 \leq 37$$

$$4x \leq 37 + 3$$

$$4x \leq 40$$

$$x \leq 10$$

$$\therefore 1 \leq x \leq 10$$



11 B

$$F = \frac{9}{5}C + 32$$
$$19.04 = \frac{9}{5}C + 32$$
$$-12.96 = \frac{9}{5}C$$
$$C = -7.2$$

12 C

$$45 \text{ minit / minutes} \times \frac{1 \text{ jam / hour}}{60 \text{ minit / minutes}} = 0.75 \text{ jam / hour}$$

$$\text{Jarak / Distance} = 96 \frac{\text{km / j}}{\text{km / h}} \times 2.75 \text{ jam / hours}$$
$$= 264 \text{ km}$$

$$15 \text{ minit / minutes} \times \frac{1 \text{ jam / hour}}{60 \text{ minit / minutes}} = 0.25 \text{ jam / hour}$$

$$\text{Laju purata / Average speed} = \frac{264 \text{ km}}{2.25 \text{ j / h}}$$
$$= 117.33 \frac{\text{km / j}}{\text{km / h}}$$

13 A

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

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

$$f(0) = -2(1)(-3)$$

$$f(0) = 6$$

$$x = -1, \quad x = 3$$

$$a = -2 < 0, \quad \cap$$

14 B

Katakan / Let x = lelaki / boys

Katakan / Let y = perempuan / girls

$$x + y \leq 36$$

$$x \geq 3y$$

$$x \geq 3(6)$$

$$x \geq 18 \text{ (minimum)}$$

$$36 - 6 = 30 \left(\begin{array}{l} \text{maksimum} \\ \text{maximum} \end{array} \right)$$

15 D

A: $2y \leq x$

B: $x + y \leq 180$

C: Bilangan maksimum ban sardin ialah 120 biji.

The maximum number of sardine buns is 120.

D: Bilangan maksimum ban kacang ialah 60 biji.

The maximum number of bean buns is 60.

16 C

RS: Bergerak pada arah sama dan laju berkurang.

Moves in the same direction and speed decreases.

Masa dari Q ke R / Time from Q to R

$$= 18 \text{ minit / minutes} - 8 \text{ minit / minutes}$$

$$= 10 \text{ minit / minutes}$$

QR: Bergerak dengan laju seragam selama 10 minit.

Moves at a uniform speed for 10 minutes.

17 B

$$\text{Laju / Speed} = \frac{\text{Jarak / Distance}}{\text{Masa / Time}}$$

$$4 = \frac{y - 10}{20 - 0}$$

$$80 = y - 10$$

$$y = 90$$

18 A

$$M = \frac{12}{L}$$

$$6 = \frac{12}{2}$$

$$6 = 6$$

$$M = \frac{12}{L}$$

$$4 = \frac{12}{3}$$

$$4 = 4$$

19 A

$$P \propto \frac{Q^2}{R}$$

$$P = \frac{kQ^2}{R}$$

$$18 = \frac{k(3)^2}{2}$$

$$36 = k(9)$$

$$k = 4$$

$$P = \frac{4Q^2}{R}$$

$$10 = \frac{4(4)^2}{R}$$

$$R = \frac{64}{10}$$

$$R = \frac{32}{5}$$

20 B

$$P = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -3 & 4 \\ -1 & 0 & 6 \\ 3 & 7 & 2 \\ 6 & 3 & 11 \end{bmatrix} \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix}$$

$$4 \times 3, P_{23} = 6$$

21 A

$$\begin{bmatrix} x & -1 \\ 4 & 1 \end{bmatrix} - 3 \begin{bmatrix} -\frac{1}{3} & -\frac{1}{6} \\ -2 & -\frac{2}{3} \end{bmatrix} + \begin{bmatrix} -8 & 1 \\ -1 & -5 \end{bmatrix} = \begin{bmatrix} -5 & \frac{1}{2} \\ 3 & y \end{bmatrix}$$

$$\begin{bmatrix} x & -1 \\ 4 & 1 \end{bmatrix} - \begin{bmatrix} -1 & -\frac{1}{2} \\ -6 & -2 \end{bmatrix} + \begin{bmatrix} -8 & 1 \\ -1 & -5 \end{bmatrix} = \begin{bmatrix} -5 & \frac{1}{2} \\ 3 & y \end{bmatrix}$$

$$x - (-1) + (-8) = -5$$

$$x + 1 - 8 = -5$$

$$x - 7 = -5$$

$$x = -5 + 7$$

$$x = 2$$

$$1 - (-2) + (-5) = y$$

$$1 + 2 - 5 = y$$

$$y = -2$$

22 A

$$QR : PS = \frac{1}{5} : \frac{1}{4}$$

$$\frac{QR}{PS} = \left(\frac{1}{5} \right) / \left(\frac{1}{4} \right)$$

$$\frac{QR}{15} = \frac{4}{5}$$

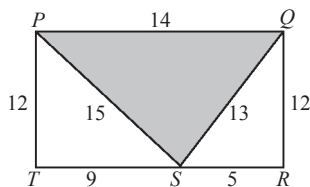
$$QR = 12$$

$$RS : QR = \frac{1}{12} : \frac{1}{5}$$

$$\frac{RS}{QR} = \left(\frac{1}{12} \right) / \left(\frac{1}{5} \right)$$

$$\frac{RS}{12} = \frac{5}{12}$$

$$RS = 5$$



$$QS = \sqrt{5^2 + 12^2}$$

$$QS = 13$$

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

$$TS = 9$$

$$PQ = 9 + 5$$

$$PQ = 14$$

$$PQ + PS + QS$$

$$= 14 + 15 + 13$$

$$= 42$$

23 C

Sudut pedalaman / Interior angle

$$= \frac{(n-2) \times 180^\circ}{n}$$

$$= \frac{(6-2) \times 180^\circ}{6}$$

$$= 120^\circ$$

$$\angle STV = 120^\circ - 40^\circ$$

$$= 80^\circ$$

$$\angle TVR = 360^\circ - 80^\circ - 120^\circ - 50^\circ$$

$$= 110^\circ$$

$$\angle TVU = 180^\circ - 40^\circ - 40^\circ$$

$$= 100^\circ$$

$$x = 360^\circ - 110^\circ - 100^\circ$$

$$= 150^\circ$$

24 B

$$4x^\circ + \frac{x^\circ}{2} = 180^\circ$$

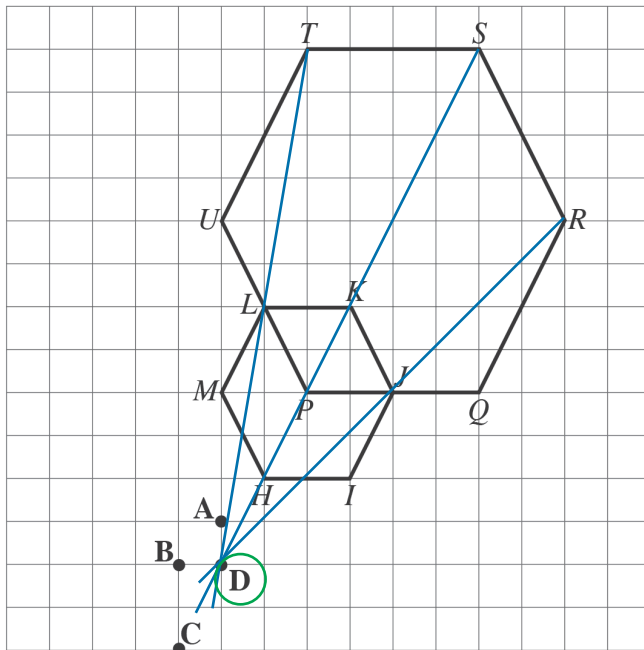
$$8x^\circ + x^\circ = 360^\circ$$

$$9x^\circ = 360^\circ$$

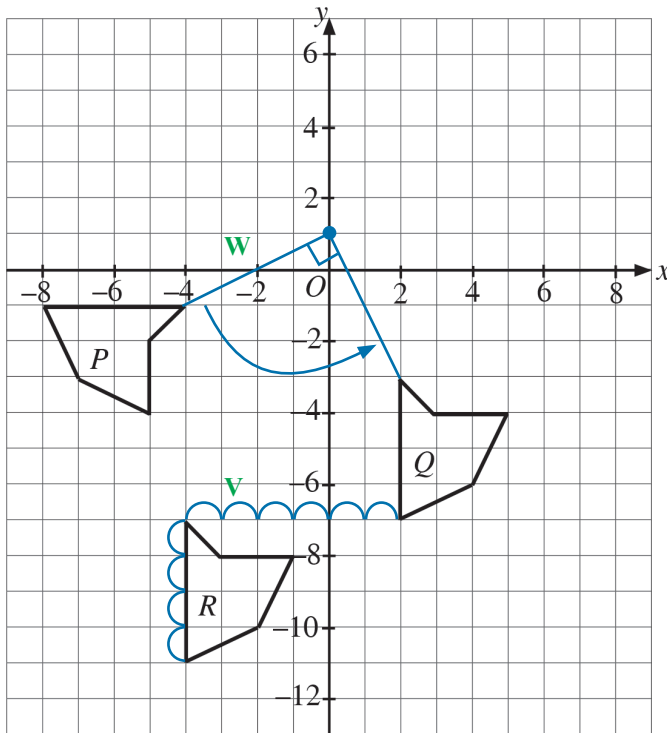
$$x^\circ = \frac{360^\circ}{9}$$

$$x^\circ = 40^\circ$$

25 D



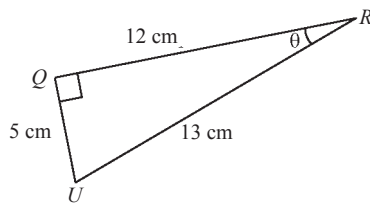
26 C



27 A

$$\begin{aligned} QR &= 4RS \\ &= 4(3) \\ &= 12 \text{ cm} \end{aligned}$$

$$\begin{aligned} QU &= \sqrt{13^2 - 12^2} \\ &= 5 \text{ cm} \end{aligned}$$



$$\begin{aligned} \tan x^\circ &= -\theta \\ &= -\frac{5}{12} \end{aligned}$$

28 A

A: $y = \cos / \cos \frac{3}{2}x, c = 1$

B: $y = -\cos / \cos \frac{3}{2}x, c = -1$

C: $y = \sin \frac{3}{2}x, c = 1$

D: $y = -\sin \frac{3}{2}x, c = -1$

29 C

- A: Palsu atau benar = benar
False or true = true
- B: Benar atau palsu = benar
True or false = true
- C: Benar dan palsu = palsu
True and false = false
- D: Benar dan benar = benar
True and true = true

30 C

$$p: k = 7$$

$$q: 2k - 11 = 3$$

Kontrapositif: Jika $\sim q$, maka $\sim p$.

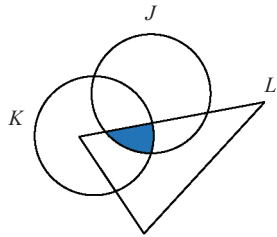
Contrapositive: If $\sim q$, then $\sim p$.

\therefore Jika $2k - 11 \neq 3$, maka $k \neq 7$

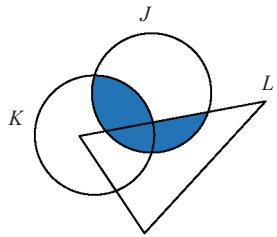
If $2k - 11 \neq 3$, then $k \neq 7$

31 D

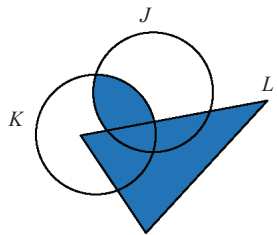
A: $K \cap L \cap J$



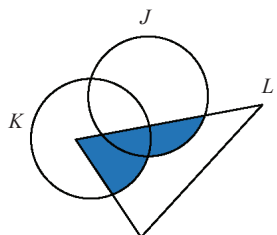
B: $(K \cup L) \cap J$



C: $(K \cap J) \cup L$



D: $(K \cup J) \cap L$



32 C

$$n(P) = n(R)$$

$$y + 3 + x = 3 + x + 2 + 4$$

$$y = 6$$

$$y - x = 1$$

$$6 - x = 1$$

$$-x = -5$$

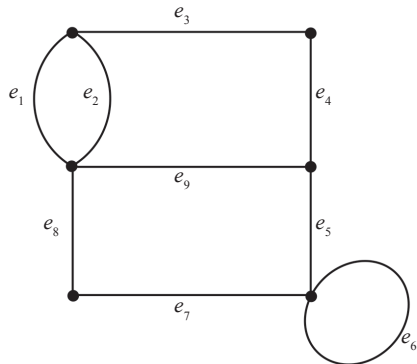
$$x = 5$$

$$n(P \cup Q) = y + 3 + x + 2$$

$$n(P \cup Q) = 6 + 3 + 5 + 2$$

$$n(P \cup Q) = 16$$

33 A



$$E = \{e_1, e_2, e_3, e_4, e_5, e_6, e_7, e_8, e_9\}$$

$$n(E) = 9$$

Jumlah darjah / Sum of degree

$$\sum d(v) = 2(E)$$

$$= 2(9)$$

$$= 18$$

34 B

Jenama Brand	Jumlah jualan enam bulan pertama Total sales in the first six months	Jumlah jualan enam bulan terakhir Total sales in the last six months	Jumlah Total
Q	150	600	750
R	250	750	1 000
S	250	500	750
T	350	0	350

35 C

$$10 + x = 11 + 5 + 4$$

$$x = 20 - 10$$

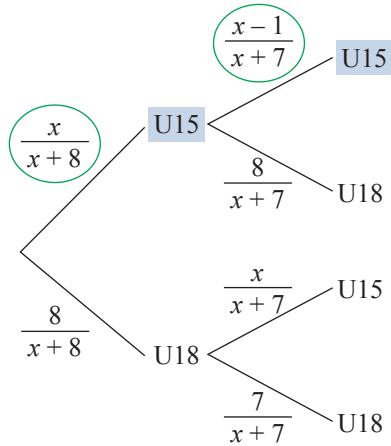
$$x = 10$$

36 B

$$Q_1 = 22, \quad Q_3 = 71$$

$$\begin{aligned} \text{Julat antara kuartil / Interquartile range} \\ &= 71 - 22 \\ &= 49 \end{aligned}$$

37 D



$$\frac{x}{x+8} \times \frac{x-1}{x+7} = \frac{5}{17}$$

$$\frac{x^2 - x}{x^2 + 15x + 56} = \frac{5}{17}$$

$$17x^2 - 17x = 5x^2 + 75x + 280$$

$$12x^2 - 92x - 280 = 0$$

$$3x^2 - 23x - 70 = 0$$

$$(x - 10)(3x + 7) = 0$$

$$x = 10, x = -\frac{7}{3} \text{ (abaikan / ignore)}$$

Jumlah ahli pasukan badminton sekolah / Total number of badminton team members

$$= 10 + 8 + 7 + 15$$

$$= 40$$

38 C

$$\begin{aligned} P(L, L) + P(P, P) &= \left(\frac{10}{24} \times \frac{9}{23}\right) + \left(\frac{14}{24} \times \frac{13}{23}\right) \\ &= \frac{34}{69} \end{aligned}$$

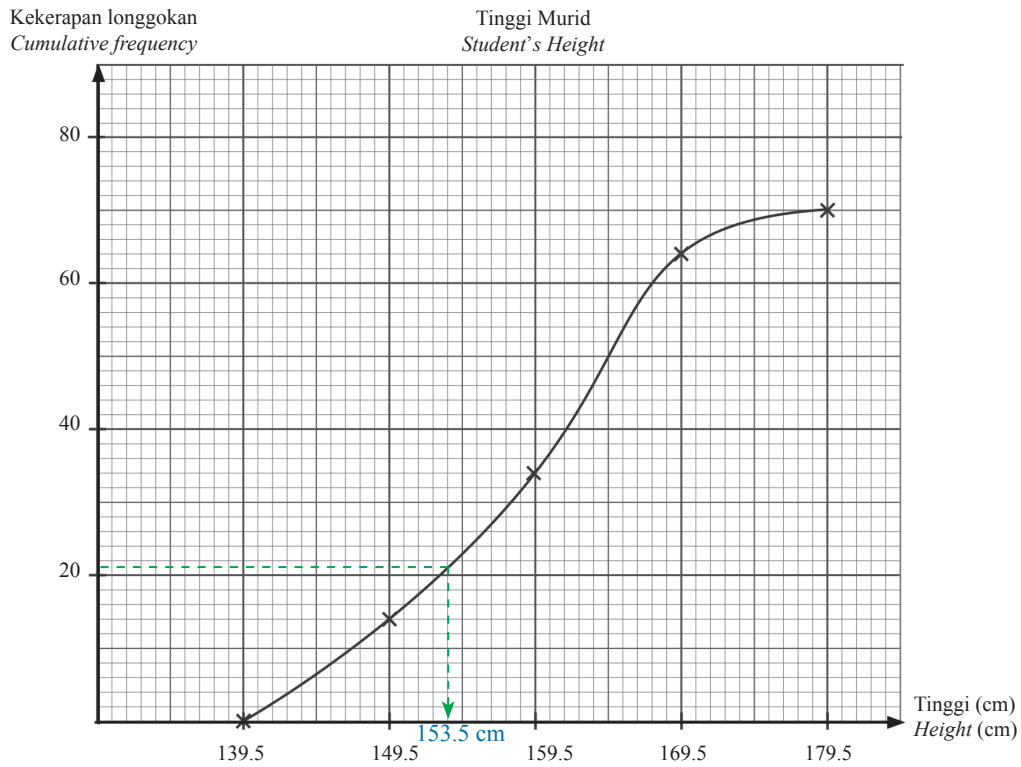
39 D

$$\sigma^2 = \frac{\sum fx^2}{\sum f} - \bar{x}^2$$

$$= \frac{107.98}{100} - \left(\frac{100.4}{100}\right)^2$$

40 A

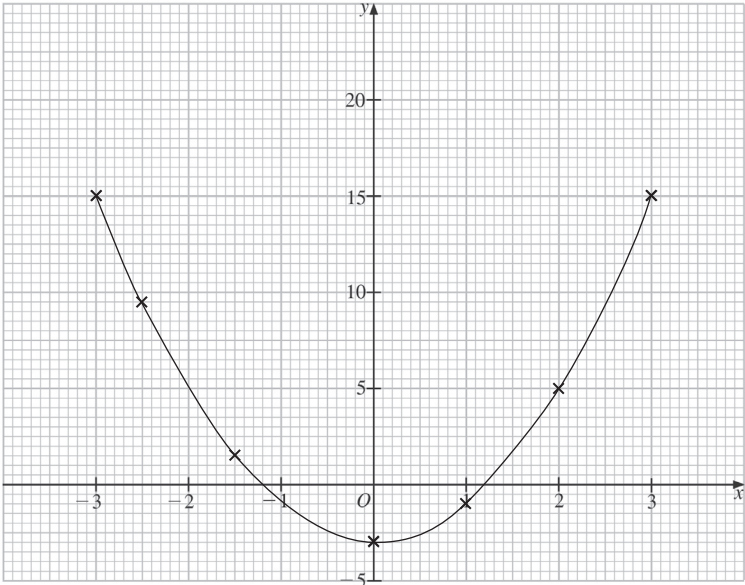
$$\begin{aligned} \text{Persentil ke-30} &= \frac{30}{100} \times 70 \\ \text{30}^{\text{th}} \text{ percentile} & \\ &= 21 \end{aligned}$$



Dari graf, tinggi ialah 153.5 cm.
From the graph, the height is 153.5 cm.

KERTAS 2

Bahagian A

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks										
1	(a) 12	1	3										
	(b) 46	1											
	(c) Nilai maksimum ialah 54 minit. <i>The maximum value is 54 minutes.</i>	1											
2	(a) <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>x</td> <td>-2.5</td> <td>-1.5</td> <td>1</td> <td>2</td> </tr> <tr> <td>y</td> <td>9.5</td> <td>1.5</td> <td>-1</td> <td>5</td> </tr> </table>	x	-2.5	-1.5	1	2	y	9.5	1.5	-1	5	1	3
	x	-2.5	-1.5	1	2								
y	9.5	1.5	-1	5									
(b) 	1 1												
3	Kecerunan = $\frac{4-2}{3-0}$ Gradient = $\frac{2}{3}$	1	3										
	$y = mx + c$ $-1 = \left(\frac{2}{3}\right)(1) + c$ $c = -\frac{5}{3}$	1											
	$y = \frac{2}{3}x - \frac{5}{3}$	1											
4	(a) Cuka epal mempunyai nilai pH < 7. <i>Apple vinegar has a pH value < 7.</i>	1											

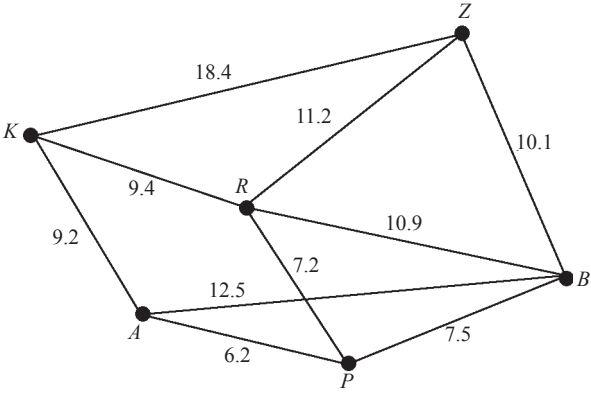
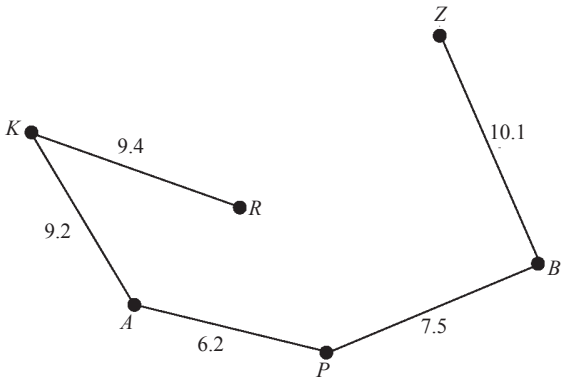
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	<p>(b) (i) $915 - 600 = 315$ $600 - 315 = 285$ $y = 315x + 285, x = 1, 2, 3, 4, 5, \dots$</p> <p>(ii) $y = 315x + 285$ $3\,500 = 315x + 285$ $x = 10.21$ $x = 11$ bulan / months</p>	2 1 1	5
5	<p>(a) Mewarna Colouring</p> <p>Menyanyi Singing</p> <p>Memasak Cooking</p>	2	5
	<p>(b) (i) $12 + 6 + 11 = 29$ (ii) $12 + 4 + 6 + 10 + 11 = 43$</p>	1 1 1	
6	<p>(a) Laju seragam Constant speed</p>	1	4
	<p>(b) $\frac{1}{2}(17 + 13)(10) + \frac{1}{2}(25)(17)$ $= 362.5$</p>	2 1	
7	<p>(a) Tidak, kerana nilai deduktibel adalah lebih tinggi daripada kos rawatan. No, because the deductible value is higher than the cost of treatment.</p>	1	4
	<p>(b) $\frac{15}{100}(29\,900 - 1\,500) + 1\,500$ $= \text{RM}5\,760$</p>	2 1	
8	<p>(a) $y \geq 10$</p>	1	4
	<p>(b)</p> <p>– Garis $x = 30$ dilukis dengan betul. The $x = 30$ line is drawn correctly.</p> <p>– Garis $y = 10$ dilukis dengan betul. The $y = 10$ line is drawn correctly.</p> <p>– Rantau dilorek dengan betul. The region is correctly shaded.</p>	1 1 1	

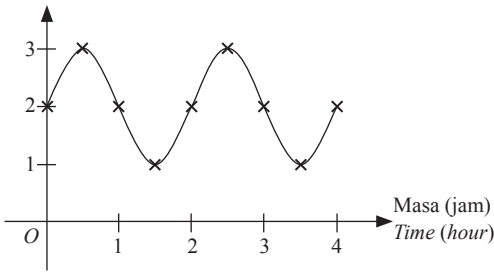
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
9	(a) Ya / Yes $AB = BC$	1	4
	(b) Pembesaran pada pusat (3, 2) dengan faktor skala $-\frac{1}{2}$. <i>Enlargement at center (3, 2) with a scale factor of $-\frac{1}{2}$.</i>	3	
10	(a) Salah, kerana Puan Ilham tidak perlu menolak rebat cukai. <i>Wrong, because Puan Ilham does not need to subtract tax rebate.</i>	1	5
	(b) Pendapatan bercukai / <i>Chargeable income</i> = RM69 200 – RM18 500 – RM470 = RM50 230 Cukai pendapatan / <i>Income tax</i> = RM1 800 – (RM50 230 – RM50 000) \times $\left(\frac{13}{100}\right)$ – 1 260 = RM569.90	1 2 1	

Bahagian B

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
11	(a) Jangka pendek dan jangka panjang <i>Short term and long term</i>	1	8
	(b) (i) RM4 322 + RM500 – (RM900 + RM600 + RM200) – (RM180 + RM550 + RM350 + RM200) = RM1 842 Aliran tunai positif. <i>Positive cash flow.</i>	1	
		1	
		1	
	(ii) (a) $\frac{10\ 850 + 13\ 000}{12} - 1\ 842$ = RM145.50	1	
	(b) – Mengurangkan perbelanjaan makanan dan minuman. <i>Reduce food and drinks expenses.</i> – Mengurangkan belanja petrol dengan menggunakan pengangkutan awam. <i>Reduce petrol expenses by using public transport.</i>	1 1	
12	(a) (i) Saiz selang kelas / <i>Class interval</i> : 10 Julat / <i>Range</i> : $\left[\left(\frac{130 + 139}{2}\right) - \left(\frac{70 + 79}{2}\right)\right] = 60$	1 1	
	(ii) $x = 68 - 2 - 4 - 3 - 8 - 14 - 20$ = 17	1 1	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
(b)	<p data-bbox="188 245 368 295">Bilangan pelanggan Number of customer</p> <p data-bbox="768 1324 996 1375">Jumlah perbelanjaan (RM) Total expenditure (RM)</p> <p data-bbox="235 1387 539 1446">– 7 titik diplot dengan betul. 7 points are plotted correctly.</p> <p data-bbox="235 1452 886 1511">– 9 titik yang betul dilalui oleh poligon kekerapan. The correct 9 points are passed through by the frequency polygon.</p>	2	
(c) (i)	<p data-bbox="235 1530 462 1583">– Bentuk loceng Bell-shaped</p> <p data-bbox="235 1589 476 1642">– Pencong ke kiri Left-skewed</p>	1	
13	<p data-bbox="235 1654 908 1707">(ii) Hari kedua. Pelanggan membelanjakan lebih banyak wang. Second day. Customers spent more money.</p> <p data-bbox="235 1726 462 1787">(a) (i) Mendaki / Hiking (ii) Pandian</p>	1	10

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	<p>(b) (i)</p>  <p>– 10 tepi dilukis dengan betul. <i>10 edges are drawn correctly</i></p> <p>– Semua pemberat dilabel dengan betul. <i>All weightages are labelled correctly.</i></p> <p>(ii)</p>  <p>– 5 tepi dilukis dengan betul. <i>5 edges are drawn correctly.</i></p> <p>– Semua pemberat dilabel dengan betul. <i>All weightages are labelled correctly.</i></p> <p>(iii) $10.1 + 7.5 + 6.2 + 9.2 = 33$ km $11.2 + 7.2 + 6.2 + 9.2 = 33.8$ km</p> <p>$Z \rightarrow B \rightarrow P \rightarrow A \rightarrow K$ $Z \rightarrow R \rightarrow P \rightarrow A \rightarrow K$</p>	<p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>9</p>

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks																		
14	(a) (i) 1 (ii) $3 - 1 = 2$	1 1																			
	(b) (i) $b = \frac{360}{4}$ $= 90$ $y = a \sin bx + c$ $y = (1) \sin (90)x + 2$ $y = \sin 90x + 2$	1 1																			
	(ii) $y = \sin 90\left(\frac{150}{60}\right) + 2$ $y = 1.29$	1																			
	(c) (i) <table border="1" data-bbox="279 599 993 678"> <tr> <td>x</td> <td>0</td> <td>0.5</td> <td>1</td> <td>1.5</td> <td>2</td> <td>2.5</td> <td>3</td> <td>3.5</td> <td>4</td> </tr> <tr> <td>y</td> <td>2</td> <td>3</td> <td>2</td> <td>1</td> <td>2</td> <td>3</td> <td>2</td> <td>1</td> <td>2</td> </tr> </table> $b = \frac{360}{2} = 180$ $y = \sin 180x + 2$ Kedalaman (m) Depth (m)  Graf dilengkapi dengan 2 titik minimum, 2 titik maksimum dan lengkung sinus yang betul. <i>The graph is completed with 2 minimum points, 2 maximum points and 2 sine curves correctly.</i> (ii) Rajah 8 menunjukkan bilangan melepaskan air dalam masa 4 jam ialah satu kali manakala Rajah (c)(i) menunjukkan bilangan melepaskan air dalam masa 4 jam ialah dua kali. <i>Diagram 8 shows the number of water releases in 4 hours is one time whereas Diagram (c)(i) shows the number of water releases in 4 hours is two times.</i>	x		0	0.5	1	1.5	2	2.5	3	3.5	4	y	2	3	2	1	2	3	2	1
x	0	0.5	1	1.5	2	2.5	3	3.5	4												
y	2	3	2	1	2	3	2	1	2												
15	(a) $x + 3 = -1$ $x = -4$ $5y = -2$ $y = -\frac{2}{5}$	1 1	8																		

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	(b) (i) $3x + 2y = 55$ $4x + 3y = 55 + 20$ $4x + 3y = 75$	1	
	$\begin{bmatrix} 3 & 2 \\ 4 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 55 \\ 75 \end{bmatrix}$	1	
	$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{(3)(3) - (2)(4)} \begin{bmatrix} 3 & -2 \\ -4 & 3 \end{bmatrix} \begin{bmatrix} 55 \\ 75 \end{bmatrix}$	1	
	$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} (3 \times 55) + (-2 \times 75) \\ (-4 \times 55) + (3 \times 75) \end{bmatrix}$		
	$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 15 \\ 5 \end{bmatrix}$		
	Sekotak sushi / <i>A box of sushi</i> = RM15	1	
	Seketul ayam goreng / <i>A piece of fried chicken</i> = RM5	1	
	(ii) $15 \times \frac{80}{100} = \text{RM}12$	1	
	$5 \times \frac{60}{100} = \text{RM}3$		
	$[2 \ 8] \begin{bmatrix} 12 \\ 3 \end{bmatrix} = \text{RM}48$	1	
Dia mempunyai wang cukup kerana hanya RM48 diperlukan. <i>She has enough money as only RM48 is needed.</i>	1	10	

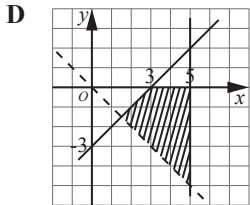
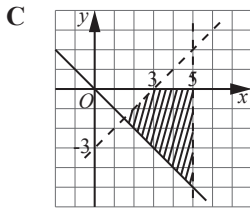
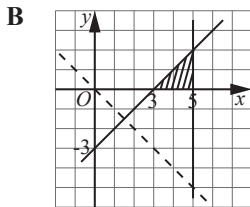
Bahagian C

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
16	(a) (i) Segi tiga bersudut tegak <i>Right-angled triangle</i>	1	
	(ii) $\sqrt{2.5^2 + 6^2}$ $= 6.5$	1	
		1	
	(b) (i) $\frac{3}{5} \times \frac{5}{9} + \frac{2}{5} \times \frac{4}{9} + \frac{3}{5} \times \frac{4}{9}$ $= \frac{7}{9}$	2	
		1	
	(c) $f(x) = -\frac{13}{200}x^2 + \frac{39}{20}x$ $x = -\frac{b}{2a}$ $= -\frac{\left(\frac{39}{20}\right)}{2\left(-\frac{13}{200}\right)}$ $= 15$	1	
		1	
	$f(15) = -\frac{13}{200}(15)^2 + \frac{39}{20}(15)$ $= 14.625$	1	
		1	

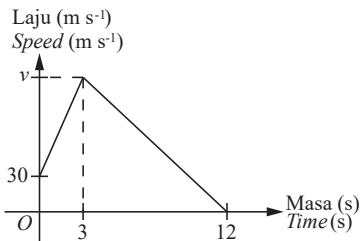
No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	<p>Tinggi maksimum / <i>Maximum height</i> $= 14.625 \text{ m} + 1.2 \text{ m}$ $= 15.825 \text{ m}$ $= 15.83 \text{ m}$</p> <p>(d) $\bar{x} = \frac{19(6) + 21(7) + 24(8) + 6(9) + 2(10)}{19 + 21 + 24 + 6 + 2}$ $= 7.319$</p> <p>Zarif menunjukkan prestasi yang baik secara purata. <i>Zarif performs better on average.</i></p> <p>$\sigma = \sqrt{\frac{19(6)^2 + 21(7)^2 + 24(8)^2 + 6(9)^2 + 2(10)^2}{19 + 21 + 24 + 6 + 2} - 7.319^2}$ $= 1.042$</p> <p>Syafi lebih konsisten. <i>Syafi is more consistent.</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>15</p>
17	<p>(a) (i) $a < 0$</p> <p>(ii) $x = \frac{8}{2}$ $= 4$</p> <p>Koordinat titik maksimum / <i>Coordinates of the maximum point</i> $= (4, 5)$</p> <p>(d) $\bar{x} = \frac{5(17) + 3(22) + 6(27) + 2(32)}{5 + 3 + 6 + 2}$ $= 23.56$</p> <p>$\sigma = \sqrt{\frac{5(17)^2 + 3(22)^2 + 6(27)^2 + 2(32)^2}{5 + 3 + 6 + 2} - 23.56^2}$ $= 5.23$</p> <p>(c) Jejari / <i>Radius</i> $= \frac{10}{2}$ $= 5$</p> <p>Isi padu hemisfera / <i>Volume of hemisphere</i> $= \frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 5^3$ $= \frac{5\,500}{21} \text{ cm}^3$</p> <p>Isi padu silinder / <i>Volume of cylinder</i> $= \frac{22}{7} \times 5^2 \times 4 \times 5$ $= \frac{11\,000}{7} \text{ cm}^3$</p> <p>Isi padu kon / <i>Volume of cone</i> $= \frac{1}{3} \times \frac{22}{7} \times 5^2 \times 5$ $= \frac{2\,750}{21} \text{ cm}^3$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	

No.	Skema Pemarkahan Marking Scheme	Markah Marks	Markah Total Total Marks
	<p>Isi padu botol roket / <i>Volume of rocket bottle</i> $= \frac{5\,500}{21} + \frac{11\,000}{7} + \frac{2\,750}{21}$ $= \frac{13\,750}{7} \text{ cm}^3$</p> <p>Isi padu air / <i>Volume of water</i> $= \frac{1}{3} \times \frac{13\,750}{7}$ $= \frac{13\,750}{21} \text{ cm}^3$</p> <p>Isi padu air di bahagian silinder / <i>Volume of water in a cylinder part</i> $= \frac{13\,750}{21} \text{ cm}^3 - \frac{2\,750}{21} \text{ cm}^3$ $= \frac{11\,000}{21} \text{ cm}^3$</p> <p>$\frac{22}{7} \times 5^2 \times (h - 5) = \frac{11\,000}{21}$ $h - 5 = \frac{11\,000}{21} \div \frac{550}{7}$ $h = \frac{20}{3} + 5$ $h = 11\frac{2}{3}$</p>	<p>2</p> <p>1</p> <p>1</p> <p>1</p>	
	<p>(d) $l = \frac{u^2}{g}(2 \sin \theta \cos \theta) / \frac{u^2}{g}(2 \sin \theta \cos \theta)$ $l = \frac{20^2}{10}(2 \sin 30^\circ \cos 30^\circ) / \frac{20^2}{10}(2 \sin 30^\circ \cos 30^\circ)$ $l = 40 \left(2 \times \frac{1}{2} \times \frac{\sqrt{3}}{2} \right)$ $l = 20\sqrt{3} \text{ m}$</p> <p>$l = \frac{20^2}{10}(2 \sin 45^\circ \cos 45^\circ) / \frac{20^2}{10}(2 \sin 45^\circ \cos 45^\circ)$ $l = 40 \left(2 \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \right)$ $l = 40 \text{ m}$</p> <p>\therefore Sudut pelancaran terbaik ialah 45°. <i>The best launching angle is 45°.</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>15</p>

ERRATA



16 Rajah 4 menunjukkan graf laju-masa bagi sebuah kereta dalam tempoh 12 saat.
Diagram 4 shows a speed-time graph of a car in a period of 12 seconds.



Rajah 4
Diagram 4

Diberi bahawa kadar perubahan laju dalam tempoh 9 saat yang terakhir ialah $-14\frac{2}{3} \text{ m s}^{-2}$, cari nilai v .
Given the rate of change of speed for the last 9 seconds is $-14\frac{2}{3} \text{ m s}^{-2}$, find the value of v .

- A** 102 **B** 132
C 162 **D** 176

17 Diberi bahawa x berubah secara langsung dengan y^2 . Jika $x = \frac{2}{5}$ apabila $y = \frac{1}{2}$, ungkapkan x dalam sebutan y .

It is given that x varies directly as y^2 . If $x = \frac{2}{5}$ when $y = \frac{1}{2}$, express x in terms of y .

- A** $x = \frac{1}{5}y^2$ **B** $x = \frac{1}{10}y^2$
C $x = \frac{5}{8}y^2$ **D** $x = \frac{8}{5}y^2$

18 Nilai rintangan, R ohms bagi sejenis dawai berubah secara songsang dengan kuasa dua jejariinya, j cm.

Diberi bahawa $R = 0.5$ ohms apabila $j = 0.1$ cm, cari nilai j apabila $R = 2$ ohms.

The value of resistance, R ohms of a wire varies inversely as the square of its radius, r cm.

Given that $R = 0.5$ ohms when $r = 0.1$ cm, find the value of r when $R = 2$ ohms.

- A** 0.20 **B** 0.10
C 0.05 **D** 0.025

19 Tinggi bagi sebuah pepejal berubah secara langsung dengan isi padunya dan secara songsang dengan kuasa dua jejariinya. Diberi bahawa tinggi pepejal itu ialah 7 cm apabila isi padunya ialah 269.5 cm^3 dan jejariinya ialah 3.5 cm.

Hitung jejari, dalam cm, bagi pepejal yang mempunyai tinggi 21 cm dan isi padu 1996.5 cm^3 .

The height of a solid varies directly as its volume and inversely as the square of its radius. It is given that the height of the solid is 7 cm when its volume is 269.5 cm^3 and its radius is 3.5 cm.

Calculate the radius, in cm, of a solid which has the height of 21 cm and the volume of 1996.5 cm^3 .

- A** 5.50 **B** 8.64
C 16.50 **D** 30.25

20 Diberi $M + \begin{bmatrix} 4 & 6 \\ -3 & -15 \end{bmatrix} = \begin{bmatrix} 17 & -10 \\ 6 & -5 \end{bmatrix}$.

Cari matriks M .

It is given $M + \begin{bmatrix} 4 & 6 \\ -3 & -15 \end{bmatrix} = \begin{bmatrix} 17 & -10 \\ 6 & -5 \end{bmatrix}$.

Find matrix M .

- A** $\begin{bmatrix} 13 & -16 \\ 9 & 10 \end{bmatrix}$ **B** $\begin{bmatrix} 21 & -4 \\ 3 & -20 \end{bmatrix}$
C $\begin{bmatrix} 13 & -4 \\ 3 & 0 \end{bmatrix}$ **D** $\begin{bmatrix} 21 & -16 \\ 9 & 10 \end{bmatrix}$

21 Diberi bahawa matriks $P = \begin{bmatrix} 5 & x+y \\ x & z \end{bmatrix}$ dan matriks $Q = \begin{bmatrix} 5 & 8 \\ 6 & x-y \end{bmatrix}$.

Jika $P = Q$, cari nilai x , nilai y dan nilai z .

It is given that matrix $P = \begin{bmatrix} 5 & x+y \\ x & z \end{bmatrix}$ and matrix

$Q = \begin{bmatrix} 5 & 8 \\ 6 & x-y \end{bmatrix}$.

If $P = Q$, find the value of x , y and z .

	x	y	z
A	6	2	4
B	6	2	8
C	-6	-2	-4
D	-6	-2	5

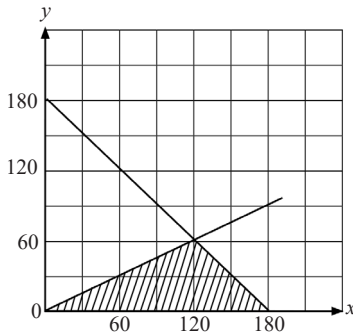
The Tourism Club of SMK Indera organises a field trip to Kuala Lumpur. The number of students who can join the trip is at most 36 and the number of boys is at least 3 times the number of girls.

Determine the minimum and maximum number of boys if the number of girls who join the trip is 6.

	Minimum Minimum	Maksimum Maximum
A	18	29
B	18	30
C	19	29
D	19	30

15 Rajah 2 menunjukkan graf yang mewakili suatu sistem ketaksamaan linear bagi x biji ban sardin dan y biji ban kacang yang didermakan oleh Encik Rajoo sempena hari koperasi sekolah.

Diagram 2 shows a graph which represents a system of linear inequalities of x sardine buns and y bean buns donated by Encik Rajoo in conjunction with school's cooperative day.



Rajah 2
Diagram 2

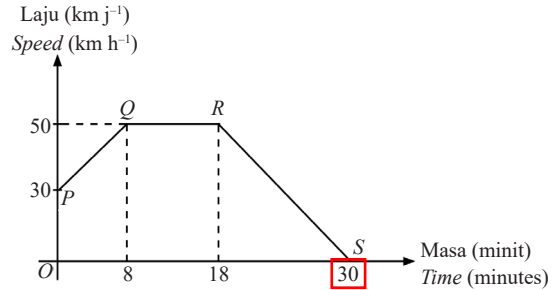
Antara berikut, yang manakah betul tentang graf tersebut?

Which of the following is correct about the graph?

- A $2y \geq x$
- B $x + y \geq 180$
- C Bilangan minimum ban sardin ialah 120 biji
The minimum number of sardine buns is 120
- D Bilangan maksimum ban kacang ialah 60 biji
The maximum number of bean buns is 60

16 Rajah 3 menunjukkan graf laju-masa bagi gerakan sebuah motosikal dari bandar P ke bandar S melalui bandar Q dan bandar R .

Diagram 3 shows the speed-time graph for the motion of a motorcycle from town P to town S through town Q and town R .



Rajah 3
Diagram 3

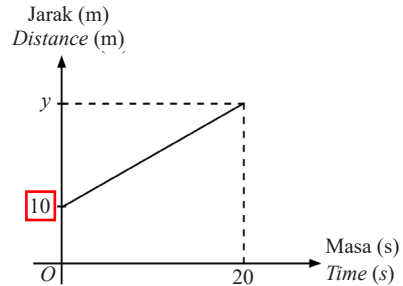
Antara pernyataan berikut, yang manakah betul tentang gerakan motosikal itu?

Which of the following statements is correct about the motion of the motorcycle?

- A RS : Bergerak pada arah bertentangan dan laju berkurang
Moves in opposite direction and speed decreases
- B RS : Bergerak pada arah sama dan laju bertambah
Moves in the same direction and speed increases
- C QR : Bergerak dengan laju seragam selama 10 minit
Moves at a uniform speed for 10 minutes
- D QR : Berhenti selama 10 minit
Stops for 10 minutes

17 Rajah 4 menunjukkan graf jarak-masa bagi seorang pelari.

Diagram 4 shows the distance-time graph of a runner.



Rajah 4/Diagram 4

Diberi bahawa laju pelari tersebut ialah 4 m s^{-1} , cari nilai y .

Given that the speed of the runner is 4 m s^{-1} , find the value of y .

- A 100
- B 90
- C 80
- D 70

18 Jadual 2 menunjukkan beberapa nilai bagi dua pemboleh ubah, L dan M .

Table 2 shows some values of two variables, L and M .

L	2	3
M	6	4

Jadual 2
Table 2

Tentukan ubahan dalam bentuk persamaan yang melibatkan M dan L .

Determine the variation in the form of equation that involves M and L .

- A $M = \frac{12}{L}$
- B $M = \frac{4}{3L}$
- C $M = 3L$
- D $M = \frac{4}{3}L$

19 P berubah secara langsung dengan kuasa dua Q dan secara songsang dengan R . Diberi bahawa $P = 18$ apabila $Q = 3$ dan $R = 2$.

Cari nilai R apabila $P = 10$ dan $Q = 4$.
 P varies directly as the square of Q and inversely as R . It is given that $P = 18$ when $Q = 3$ and $R = 2$.

Find the value of R when $P = 10$ and $Q = 4$.

- A $\frac{32}{5}$
- B $\frac{24}{5}$
- C $\frac{5}{6}$
- D $\frac{5}{8}$

20 Diberi bahawa matriks $P = \begin{bmatrix} 2 & -3 & 4 \\ -1 & 0 & 6 \\ 3 & 7 & 2 \\ 6 & 3 & 11 \end{bmatrix}$

It is given that matrix $P = \begin{bmatrix} 2 & -3 & 4 \\ -1 & 0 & 6 \\ 3 & 7 & 2 \\ 6 & 3 & 11 \end{bmatrix}$

Antara maklumat berikut, yang manakah betul tentang matriks P ?

Which of the following information is correct about matrix P ?

	Peringkat matriks Order of matrix	Unsur P_{23} Element P_{23}
A	4×3	7
B	4×3	6
C	3×4	7
D	3×4	6

21 Diberi:

Given:

$$\begin{bmatrix} x & -1 \\ 4 & 1 \end{bmatrix} - 3 \begin{bmatrix} -\frac{1}{3} & -\frac{1}{6} \\ -2 & -\frac{2}{3} \end{bmatrix} + \begin{bmatrix} -8 & 1 \\ -7 & -5 \end{bmatrix} = \begin{bmatrix} -5 & \frac{1}{2} \\ 3 & y \end{bmatrix}$$

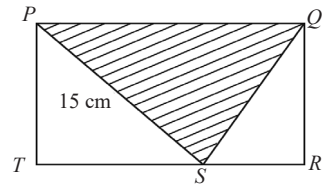
Hitung nilai x dan nilai y .

Calculate the value of x and of y .

- A $x = 2, y = -2$
- B $x = 2, y = -6$
- C $x = 4, y = -2$
- D $x = 4, y = -6$

22 Rajah 5 menunjukkan segi empat tepat $PQRT$ dan segi tiga PQS .

Diagram 5 shows rectangle $PQRT$ and triangle PQS .



Rajah 5
Diagram 5

Diberi bahawa $PS : QR : RS = \frac{1}{4} : \frac{1}{5} : \frac{1}{12}$

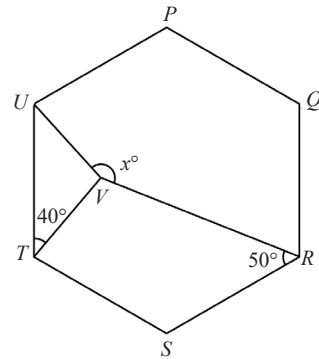
Hitung perimeter, dalam m, kawasan berlorek.

It is given that $PS : QR : RS = \frac{1}{4} : \frac{1}{5} : \frac{1}{12}$

Calculate the perimeter, in m, of the shaded region.

- A 42.00
- B 47.85
- C 52.00
- D 52.21

23 Rajah 6 menunjukkan heksagon sekata $PQRSTU$.
 Diagram 6 shows a regular heksagon $PQRSTU$.



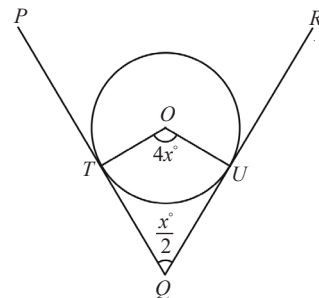
Rajah 6
Diagram 6

Diberi bahawa $UV = TV$, cari nilai x .
 Given that $UV = TV$, find the value of x .

- A 100
- B 130
- C 150
- D 160

24 Rajah 7 menunjukkan sebuah bulatan dengan pusat O . PTQ dan RUQ ialah tangen kepada bulatan itu masing-masing di T dan U .

Diagram 7 shows a circle with centre O . PTQ and RUQ are the tangents to the circle at T and U respectively.



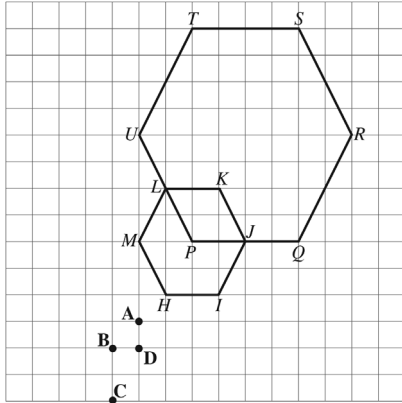
Rajah 7
Diagram 7

Cari nilai x .

Find the value of x .

- A 20
- B 40
- C 72
- D 80

- 25 Rajah 8 menunjukkan dua heksagon, $HJKLM$ dan $PQRSTU$ yang dilukis pada grid segi empat sama. Diagram 8 shows two hexagons, $HJKLM$ and $PQRSTU$ drawn on square grids.



Rajah 8
Diagram 8

Diberi bahawa $PQRSTU$ ialah imej bagi $HJKLM$ di bawah suatu pembesaran.

Antara titik **A**, **B**, **C** dan **D**, yang manakah pusat pembesaran itu?

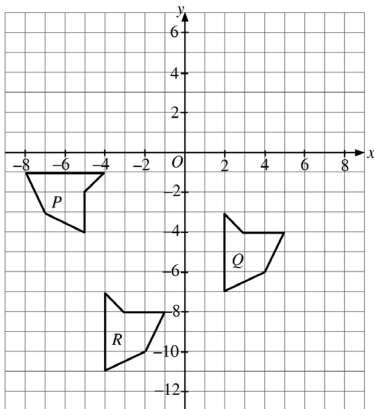
It is given that $PQRSTU$ is the image of $HJKLM$ under an enlargement.

Which of the points, **A**, **B**, **C** or **D**, is the centre of the enlargement?

- 26 Rajah 9 menunjukkan tiga pentagon yang dilukis pada grid segi empat sama.

Pentagon R ialah imej bagi pentagon P di bawah gabungan transformasi VW .

Diagram 9 shows three pentagons drawn on the square grids. Pentagon R is the image of pentagon P under the combined transformation VW .



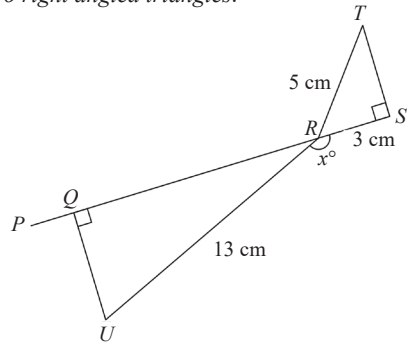
Rajah 9
Diagram 9

Apakah transformasi W dan transformasi V ?

What are transformations W and V ?

	W	V
A	Putaran 90° ikut arah jam pada pusat $(0, 1)$ Clockwise rotation of 90° about the centre $(0, 1)$	Translasi $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$ Translation $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$
B	Putaran 90° ikut arah jam pada pusat $(-1, -2)$ Clockwise rotation of 90° about the centre $(-1, -2)$	Translasi $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$ Translation $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$
C	Putaran 90° lawan arah jam pada pusat $(0, 1)$ Anticlockwise rotation of 90° about the centre $(0, 1)$	Translasi $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$ Translation $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$
D	Putaran 90° lawan arah jam pada pusat $(-1, -2)$ Anticlockwise rotation of 90° about the centre $(-1, -2)$	Translasi $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$ Translation $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$

- 27 Dalam Rajah 10, $PQRS$ ialah satu garis lurus. RQU dan RST adalah dua buah segi tiga bersudut tegak. In Diagram 10, $PQRS$ is a straight line. RQU and RST are two right angled triangles.



Rajah 10
Diagram 10

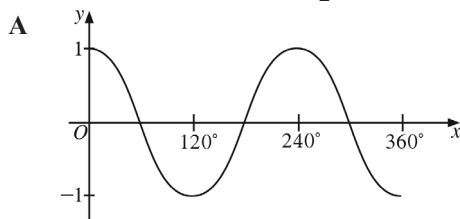
Diberi bahawa $QR = 4RS$, cari nilai bagi $\tan x^\circ$.

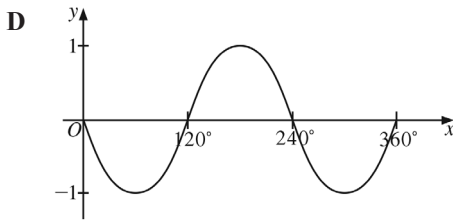
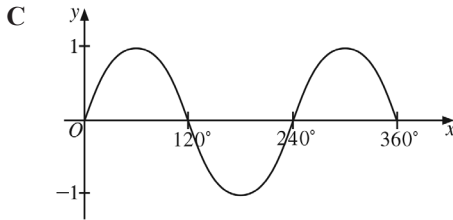
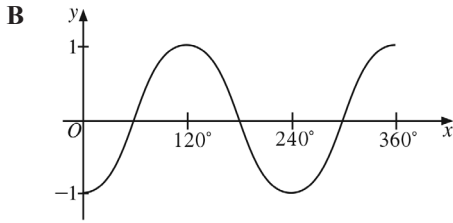
Given that $QR = 4RS$, find the value of $\tan x^\circ$.

- A $-\frac{5}{12}$
- B $-\frac{4}{3}$
- C $\frac{5}{12}$
- D $\frac{4}{3}$

- 28 Graf manakah yang mewakili $y = \cos \frac{3}{2}x$ untuk $0^\circ \leq x \leq 360^\circ$?

Which graph represents $y = \cos \frac{3}{2}x$ for $0^\circ \leq x \leq 360^\circ$?





29 Antara pernyataan majmuk berikut, yang manakah Palsu?

Which of the following compound statements is **False**?

- A $3 + 2 = 6$ atau $3 \times 2 = 6$
 $3 + 2 = 6$ or $3 \times 2 = 6$
- B $3^2 = 9$ atau $3^3 = 9$
 $3^2 = 9$ or $3^3 = 9$
- C $4 - 1 = 3$ dan $4 \div 1 = 3$
 $4 - 1 = 3$ and $4 \div 1 = 3$
- D $-7 < -3$ dan $7 > 3$
 $-7 < -3$ and $7 > 3$

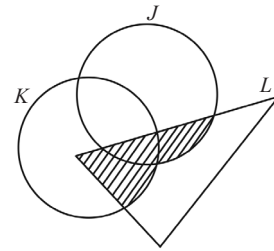
30 Tentukan kontrapositif bagi implikasi yang diberikan.
Determine the contrapositive for the given implication.

Jika $k = 7$, maka $2k - 11 = 3$
If $k = 7$, then $2k - 11 = 3$

- A Jika $2k - 11 = 3$, maka $k = 7$
If $2k - 11 = 3$, then $k = 7$
- B Jika $k \neq 7$, maka $2k - 11 \neq 3$
If $k \neq 7$, then $2k - 11 \neq 3$
- C Jika $2k - 11 \neq 3$, maka $k \neq 7$
If $2k - 11 \neq 3$, then $k \neq 7$
- D Jika $2k - 11 = 3$, maka $k \neq 7$
If $2k - 11 = 3$, then $k \neq 7$

31 Rajah 11 ialah gambar rajah Venn yang menunjukkan set J , set K dan set L dengan keadaan set semesta, $\xi = J \cup K \cup L$.

Diagram 11 is a Venn diagram that shows set J , set K and set L such that the universal set, $\xi = J \cup K \cup L$.



Rajah 11
Diagram 11

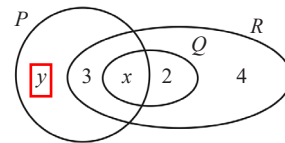
Set manakah mewakili rantau berlorek?

Which set represents the shaded region?

- A $K \cap L \cap J$
- B $(K \cup L) \cap J$
- C $(K \cap J) \cup L$
- D $(K \cup J) \cap L$

32 Rajah 12 ialah gambar rajah Venn yang menunjukkan bilangan unsur dalam set P , set Q dan set R dengan keadaan set semesta, $\xi = P \cup Q \cup R$.

Diagram 12 is a Venn diagram that shows the number of elements in set P , set Q and set R such that the universal set, $\xi = P \cup Q \cup R$.



Rajah 12
Diagram 12

Diberi bahawa $n(P) = n(R)$ dan $y - x = 1$.

Cari $n(P \cup Q)$.

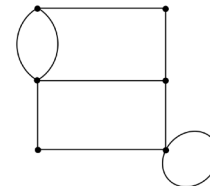
It is given that $n(P) = n(R)$ and $y - x = 1$.

Find $n(P \cup Q)$.

- A 10
- B 12
- C 16
- D 18

33 Rajah 13 menunjukkan satu graf yang mempunyai gelung dan berbilang tepi.

Diagram 13 shows a graph with a loop and multiple edges.

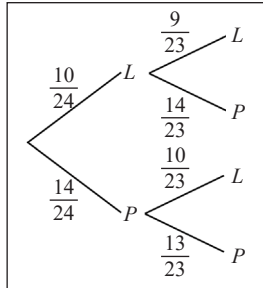


Rajah 13
Diagram 13

Tentukan bilangan tepi dan jumlah darjah bagi graf tersebut.

Determine the number of edges and sum of degree of the graph.

- 38 Terdapat 10 orang murid lelaki, L dan 14 orang murid perempuan, P dalam Kelas 5 Proaktif. Dua orang murid dipilih secara rawak untuk menyertai jawatankuasa kebajikan kelas. Rajah 16 ialah gambar rajah pokok yang menunjukkan cara pemilihan dua orang murid tersebut.
There are 10 boys, L and 14 girls, P in Class 5 Proaktif. Two students are chosen at random to join the welfare committee of the class. Diagram 16 is a tree diagram that shows the selection method of the two students.



Rajah 16
Diagram 16

Hitung kebarangkalian bahawa dua orang murid yang dipilih itu adalah jantina yang sama.
Calculate the probability that the two chosen students are of the same gender.

- A $\frac{15}{92}$
- B $\frac{17}{36}$
- C $\frac{34}{69}$
- D $\frac{37}{72}$

- 39 Jadual 6 ialah jadual kekerapan yang menunjukkan jisim buah mangga, dalam kg, yang diperolehi dari sebuah kebun.
Table 6 is a frequency table that shows the mass of mangoes, in kg, obtained from a farm.

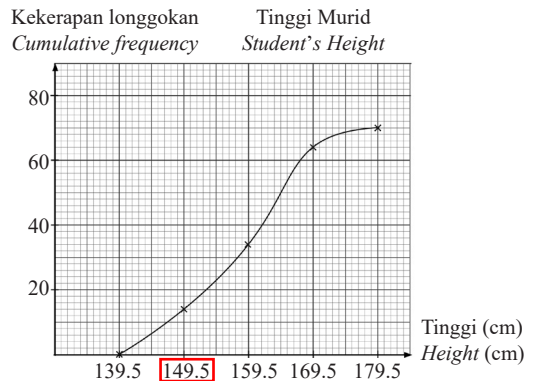
Jisim (kg) Mass (kg)	Kekerapan Frequency	Titik tengah Midpoint	Kekerapan \times Titik tengah Frequency \times Midpoint	(Titik tengah) ² (Midpoint) ²	Kekerapan \times (Titik tengah) ² Frequency \times (Midpoint) ²
0.4 – 0.6	12	0.5	6	0.25	3
0.7 – 0.9	25	0.8	20	0.64	16
1.0 – 1.2	46	1.1	50.6	1.21	55.66
1.3 – 1.5	17	1.4	23.8	1.96	33.32
Jumlah Total	100		100.4		107.98

Jadual 6
Table 6

Antara berikut, yang manakah pengiraan varians yang betul bagi data tersebut?
Which of the following is the correct calculation of variance of the data?

- A $\frac{107.98}{100.4} - \left(\frac{107.98}{100}\right)^2$
- B $\frac{107.98}{100.4} - \left(\frac{100.4}{100}\right)^2$
- C $\frac{107.98}{100} - \left(\frac{107.98}{100}\right)^2$
- D $\frac{107.98}{100} - \left(\frac{100.4}{100}\right)^2$

- 40 Rajah 17 ialah sebuah ogif yang menunjukkan tinggi, dalam cm, bagi 70 orang murid.
Diagram 17 is an ogive that shows the height, in cm, of 70 students.



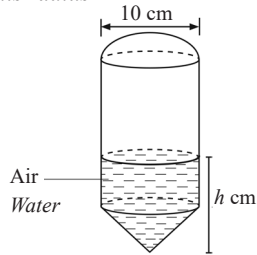
Rajah 17
Diagram 17

Cari nilai bagi persentil ke-30.
Find the value of the 30th percentile.

- A 153.5
- B 156.5
- C 157.5
- D 161.5

- (c) Rajah 13 menunjukkan reka bentuk bagi botol roket air yang terdiri daripada gabungan sebuah hemisfera, sebuah silinder dan sebuah kon. Diberi bahawa ketiga-tiga bentuk ini mempunyai jejari yang sama. Tinggi silinder adalah empat kali jejarinya dan tinggi kon adalah sama dengan jejarinya.

Diagram 13 shows the design of the water rocket bottle which consists of the combination of a hemisphere, a cylinder and a cone. It is given that all the three shapes have the same radius. The height of the cylinder is four times its radius and the height of the cone is the same as its radius.



Rajah 13
Diagram 13

Jika $\frac{1}{3}$ daripada isi padu botol roket ini diisi dengan air, hitung nilai h .

[5 markah]

If $\frac{1}{3}$ of the volume of the bottle is filled with water, calculate the value of h .

[5 marks]

(Guna / Use $\pi = \frac{22}{7}$)

Jawapan / Answer:

(c)

- (d) Hubungan antara sudut pelancaran roket air, θ dan jarak pendaratan, l boleh diwakili oleh suatu rumus trigonometri iaitu $l = \frac{u^2}{g} (2 \sin \theta \cos \theta)$ dengan keadaan u ialah halaju awal roket air dan g ialah pecutan graviti.

Seorang murid ingin menentukan sama ada 30° atau 45° sebagai sudut pelancaran roket airnya supaya roket air mencapai jarak yang lebih jauh.

Diberi bahawa $u = 20 \text{ ms}^{-1}$ dan $g = 10 \text{ ms}^{-2}$. Tanpa menggunakan kalkulator, tentukan sudut pelancaran manakah yang terbaik bagi roket air itu. [4 markah]

The relationship between the launching angle of the water rocket, θ and the landing distance, l is represented by a trigonometric formulae, $l = \frac{u^2}{g} (2 \sin \theta \cos \theta)$ where u is the initial velocity of the water rocket and g is the gravitational acceleration.

A student wants to determine either 30° or 45° as the launching angle of his water rocket so that the water rocket will land further.

*It is given that $u = 20 \text{ ms}^{-1}$ and $g = 10 \text{ ms}^{-2}$. Without using a calculator, determine **which** is the best launching angle for the water rocket.* [4 marks]

Jawapan / Answer:

(d)