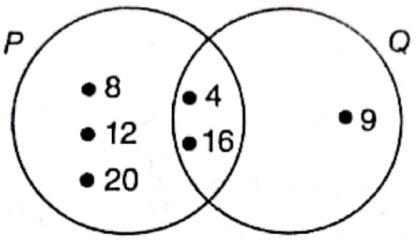
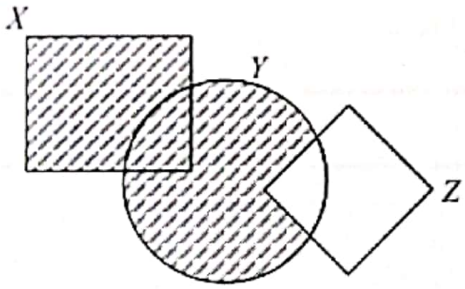
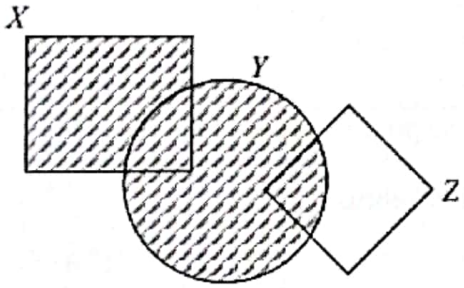
MARKING SCHEME TRIAL SPM MATHEMATICS PAPER 2

1.	(a)		1m
	(b)	 Note :  $X \cup Y$ award K1	2m
2.		$\frac{1}{3} \times \frac{22}{7} \times r^2 \times 2r$	1m
		$\frac{1}{2}(8+14) \times 12 \times 10$	1m
		$\frac{1}{2} \times (8+14) \times 12 \times 10 - \frac{1}{3} \times \frac{22}{7} \times r^2 \times 2r = 1230\frac{1}{6}$	1m
		$\frac{44r^3}{21} = \frac{539}{6}$ or equivalent	
		$r^3 = \frac{343}{8}$ *or* $42\frac{7}{8}$ or equivalent	
		3.5 cm	1m

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3.		$\frac{36}{360} \times \frac{22}{7} \times 10^2$ *or* $\frac{36}{360} \times \frac{22}{7} \times 7^2$ *or* equivalent	1m
		$\frac{36}{360} \times \frac{22}{7} \times 10^2 - \frac{36}{360} \times \frac{22}{7} \times 7^2$ *or* equivalent	1m
		$\frac{561}{35}$ *or* $16\frac{1}{35}$ *or* 16.03	1m
		Note : 1. Accept π for K mark. 2. Accept correct value from incomplete substitution, for K mark. 3. Correct answer from incomplete working, award Kk2.	
4.	(a)	$y = 6$	1m
	(b)	$m = \frac{1}{2}$ *or* equivalent	1m
		$3 = \frac{1}{2}(0) + c$ *or* $c = 3$	1m
		$y = \frac{1}{2}x + 3$	1m
5.		Let the price of 1 litre of petrol in March be x and the price of petrol in February be $(x - 10)$. Total of petrol used in March – total of petrol used in February = 100.	
		$\frac{63\,000}{x} - \frac{40\,000}{x-10} = 100$ *or* equivalent	1m
		$\frac{630}{x} - \frac{400}{x-10} = 1$	
		$x^2 - 240x + 6300 = 0$	1m
		$(x - 210)(x - 30) = 0$	1m
		$x = 210$, $x = 30$ (reject)	
		∴ the price of 1 litre of petrol in March is RM2.10	1m
6.	(a)	False	1m
	(b)	Implication 1 : If $m + 4 = 11$ then $m = 7$	1m
		Implication 2 ; If $m = 7$ then $m + 4 = 11$	1m
	(c)	$\frac{(n-2) \times 180°}{n}$	1m
		$n = 3, 4, 5, \ldots$	1m

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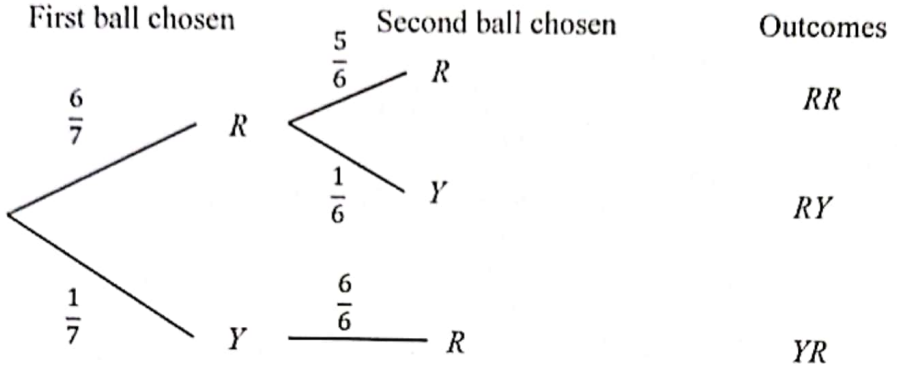
7.	$\frac{1}{2}(9+18)\times 4+(t-4)\times 18$ *or* $\frac{1}{2}(9+18)\times t$	1m
	$\frac{1}{2}(9+18)\times 4+(t-4)\times 18 - \frac{1}{2}(9+18)\times t = 27$	1m
	$t = 10$ seconds	1m
8. (a)		1m
(b)	(i) P (RY)	
	$\left(\frac{6}{7}\times\frac{1}{6}\right)$	1m
	$\frac{1}{7}$	1m
	(ii) P (RR)	
	$\left(\frac{6}{7}\times\frac{5}{6}\right)$	1m
	$\frac{5}{7}$	1m
9.	$4x+2y=68$ $x-y=5$	1m 1m
	$\begin{bmatrix}4 & 2\\1 & -1\end{bmatrix}\begin{bmatrix}x\\y\end{bmatrix}=\begin{bmatrix}68\\5\end{bmatrix}$	
	$\begin{bmatrix}x\\y\end{bmatrix}=\frac{1}{4(-1)-2(1)}\begin{bmatrix}-1 & -2\\-1 & 4\end{bmatrix}\begin{bmatrix}68\\5\end{bmatrix}$	1m
	∴ The price of a movie ticket for adult = RM13 The price of a movie ticket for children = RM8	1m 1m
	or $x=13$ $y=8$	
	Note : 1. Do not accept * $\begin{pmatrix}inverse\\matrix\end{pmatrix}=\begin{pmatrix}4 & 2\\1 & -1\end{pmatrix}$	

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		2. $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 13 \\ 8 \end{pmatrix}$ as final answer, award N1. 3. Do not accept any solutions solved not using matrix method.	
10	(i)	$\frac{80}{100} \times$ RM300 000	1m
		RM240 000	1m
	(ii)	$\frac{\text{RM180 000}}{\text{RM240 000}} \times$ RM70 000 − RM4000	1m
		RM48 500	1m
11	(a)	− 16 − 13 9	1m 1m 1m
	(b)	<u>Graph</u> Axes drawn in correct directions with uniform scales for $-3 \leq x \leq 4$ and $-33 \leq y \leq 44$	1m
		All 6 points and *3 points correctly plotted or curve passes through all the points $-3 \leq x \leq 4$ and $-33 \leq y \leq 44$ <u>Note :</u> 1. 8 or 7 points correctly plotted, award K1 2. Ignore curve out of range	2m
		Smooth and continuous curve without any straight line passing through all 9 correct points using the given scales for $-3 \leq x \leq 4$ and $-33 \leq y \leq 44$	1m
	(c)	(i) $y = -19 \leq x \leq -17$ $(y = -18)$	1m
		(ii) $x = 2.7 \leq y \leq 2.9$ $(x = 2.8)$ <u>Note</u>: 1. Allow P mark or N mark if values of x and of y are shown on graph. 2. Values of x and y obtained by calculations, award **P0** or **N0**. 3. Values of x and of y obtained from wrong graph, award **P0**.	1m

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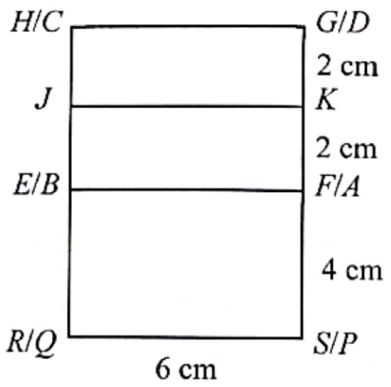
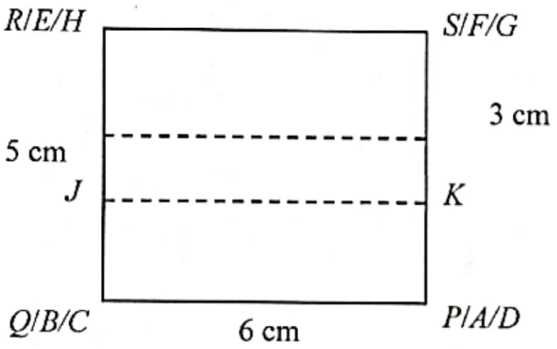
12	(a)	Plan  Correct shape with rectangle *PQDC*, *PQAB*, *ABKJ* and *KJDC* All solid lines. $QC > QP > PA = AD$ Measurements correct to $\pm$ 0.2 cm (one way) and all angles at vertices of rectangles = 90° $\pm$ 1°.	1m 1m 2m
	(b)	Elevation from *Y*  Correct shape with rectangle *PQSR* All solid lines. (Ignore *JK*) $J \rightarrow K$ joined by a dashed line to form rectangle *PQKJ* and *KJSR* $PQ > QR > JR > QJ$ Measurements correct to $\pm$ 0.2 cm (one way) and all angles at vertices of rectangles = 90° $\pm$ 1°.	1m 1m 1m 2m
13	(a)	$\frac{15}{100} \times$ RM7560 RM1134	1m

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(a) 1134

(b)

Income and Expenses	RM	
Net income	7 560	
Total monthly income	7 560	
Minus savings for emergency fund	**1 134**	
Income balance		**6426**
Minus monthly fixed expenses		
Housing loan instalment	1 200	
Car loan instalment	700	
Insurance	350	
Total monthly fixed expenses		**2250**
Minus monthly variables expenses		
Groceries + Utility bills	400	
Petrol	300	
Allowance for parents	500	
Children	250	
Food	1450	
Total monthly variable expenses		**2900**
Surplus of income		**1276**

1m

1m

1m

1m

2250 or **2900** — 1m

(c) Savings in 6 months = RM 1276 × 6
= RM 7656
or
Savings in 5 years = RM 1276 × 5 × 12
= RM 76 560 — 1m

RM 7656 > RM 5000
∴ short term can be achieved — 1m

Net savings = RM 76 560 – RM 5000
= RM 71 560

RM 71 560 > RM 55 000
∴ long term can be achieved — 1m

14 (a) (i) **S** = is a reflection on line $x = 3$ — 2m

Note :
1. Reflection award P1

R : is an enlargement with scale factor of 3 about centre *J or* (10, 5) — 3m

<u>Note :</u>
1. Enlargement, scale factor 3 award P2
2. Enlargement, centre *J or* (10, 5) award P2

Enlargement award P1

(b) $40 \times 3^2 - 40$ — 2m

<u>Note :</u>
$40 \times (3)^2$, award K1

$320\ m^2$ — 1m

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15 (a)

	Jisim (kg) *Mass (kg)*	Kekerapan *Frequency*	Titik tengah *Midpoint*	Sempadan atas *Upper boundary*	Kekerapan longgokan *Cumulative frequency*
	30 – 39	0	34.5	39.5	0
I	40 – 49	8	44.5	49.5	8
II	50 – 59	15	54.5	59.5	23
III	60 – 69	30	64.5	69.5	53
IV	70 – 79	27	74.5	79.5	80
V	80 – 89	14	84.5	89.5	94
VI	90 – 99	6	94.5	99.5	100

Upper boundary : (I to VI) — 1m
Cumulative frequency : (I to VI) — 1m

(b) Graph

Axes drawn in the correct direction, uniform scale for $39.5 \le x \le 99.5$ and $0 \le y \le 100$ — 1m

7 points plotted correctly *or* the ogive passed through them. — 2m

Note :
5 or 6 points plotted correctly award K1

Smooth curve passing through 7 points — 1m

(c) Mean = 68.7 — 1m

$\sum fx^2 = 488\ 605$ — 1m

$\sqrt{\frac{488\ 605}{100} - 68.7^2}$ — 1m

12.8981 or 12.90 — 1m

16 (a)

(i) $x = \dfrac{-\frac{6}{25}}{2\left(-\frac{3}{12500}\right)}$ — 1m

$-\dfrac{3}{12500}(500)^2 + \dfrac{6}{25}(500)$ — 1m

60 m — 1m

(ii) $b(x) = \frac{3}{100}x$ — 1m

(iii) $= -\dfrac{3}{12\ 500}x^2 + \dfrac{6}{25}x = \dfrac{3}{100}x$ — 1m

$x(x - 875) = 0$ — 1m

$x = 875$ *or* $y = 26.25$ — 1m

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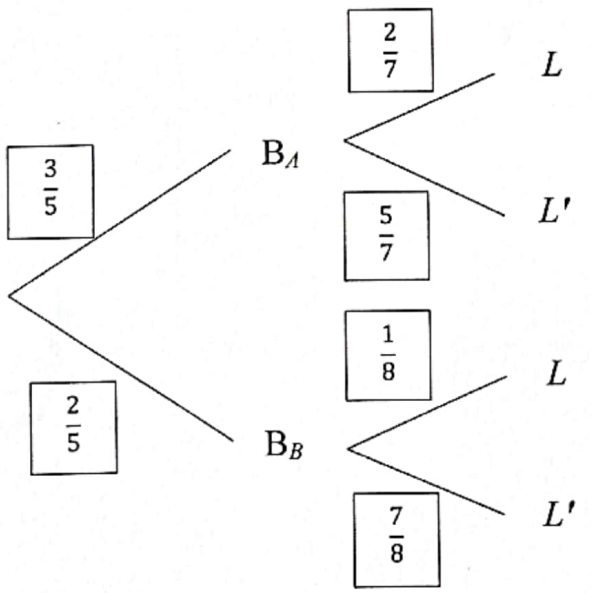
		(875 , 26.25)	1m
	(b)	(i) $\frac{19+18+15+14+17+16+13}{7}$ 16	1m 1m
		(ii) $\frac{19^2+18^2+15^2+14^2+17^2+16^2+13^2}{7} - 16^2$ 4	2m 1m
		(iii) New variance = 16 New standard deviation = 4	1m 1m
17	(a)	(i) 5 minutes	1m
		(ii) 32 km	1m
		(iii) $\frac{32-0}{m-20} = \frac{55-0}{35-20}$ $m = 28.73$ $\frac{55-32}{\left(\frac{45-28.73}{60}\right)}$ 84.82 kmh^{-1}	1m 1m 1m 1m
	(b)	(i)  Note : $B_A = \frac{3}{5}$ and $Bas_B = \frac{2}{5}$ award K1 $B_A\ L = \frac{2}{7}$ and $B_A\ L' = \frac{5}{7}$ award K1 $B_B\ L = \frac{1}{8}$ and $B_B\ L' = \frac{7}{8}$ award K1	3m

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		(ii) $\frac{3}{5} \times \frac{2}{7}$	1m
		$\frac{6}{35}$	1m
		(iii) (a) $\left(\frac{3}{5} \times \frac{2}{7}\right) + \left(\frac{2}{5} \times \frac{1}{8}\right)$	1m
		$\frac{31}{140}$	1m
		(b) $1 - \frac{31}{140}$ <u>*or*</u> $\left(\frac{3}{5} \times \frac{5}{7}\right) + \left(\frac{2}{5} \times \frac{7}{8}\right)$	1m
		$\frac{109}{140}$	1m

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