

**PROGRAM GEMPUR KECEMERLANGAN
SIJIL PELAJARAN MALAYSIA 2020**

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MATHEMATICS

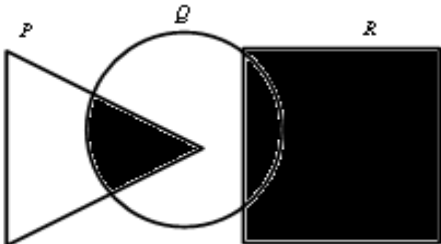
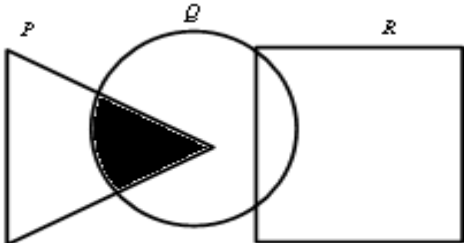
1449/2

Kertas 2

Peraturan Pemarkahan

Oktober

PERATURAN PEMARKAHAN

Question	Solution and Mark Scheme	Mark	Total
<p>1</p> <p>(a)</p> <p>(b)</p>	<p>$(X \cup Z)' \cap Y$ <i>or</i> $X' \cap Z' \cap Y$. Accept $(X \cup Z)'$</p>   <p><u>Note:</u></p> <p>1. $(P \cap Q)$ correctly shaded seen, award K1</p>	<p>P1</p> <p>K2</p>	<p>1</p> <p>2</p> <p>3</p>
<p>2</p>	<p>$3x^2 - 7x - 6 = 0$ $(x - 3)(3x + 2) = 0$ <i>or</i> equivalent</p> <p><u>OR</u></p> $\frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(-6)}}{2(3)} \quad (\text{K1})$ <p>3 $-\frac{2}{3}$</p> <p><u>Note:</u></p> <p>1. Accept without “ = 0 ” 2. Accept three correct terms on the same side, in any order</p>	<p>K1 K1</p> <p>N1 N1</p>	<p>4</p>

Question	Solution and Mark Scheme	Mark	Total
5	<p>$4x + 12y = 72$ <u>or</u> equivalent $10x + 20y = 140$ <u>or</u> equivalent</p> <p>$\begin{pmatrix} 4 & 12 \\ 10 & 20 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 72 \\ 140 \end{pmatrix}$ <u>or</u> equivalent</p> <p>$\frac{1}{4(20) - 12(10)} \begin{pmatrix} 20 & -12 \\ -10 & 4 \end{pmatrix} \begin{pmatrix} 72 \\ 140 \end{pmatrix}$ <u>or</u> equivalent</p> <p><u>Note :</u></p> <p>1. $\begin{pmatrix} * \\ \text{Inverse} \\ \text{matrix} \end{pmatrix} \begin{pmatrix} 72 \\ 140 \end{pmatrix}$ award K1</p> <p>2. Do not accept $\begin{pmatrix} * \\ \text{Inverse} \\ \text{matrix} \end{pmatrix} = \begin{pmatrix} 4 & 12 \\ 10 & 20 \end{pmatrix}$ or $\begin{pmatrix} * \\ \text{Inverse} \\ \text{matrix} \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$</p> <p>$x = 6$ $y = 4$</p> <p><u>Note :</u></p> <p>1. Accept any two different symbol for price of a white tile and price of a black tile.</p> <p>2. $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 6 \\ 4 \end{pmatrix}$ as the final answer, award N1.</p> <p>3. Do not accept any solution solved not using matrix method.</p>	<p>P1 P1</p> <p>P1</p> <p>K1</p> <p>N1 N1</p>	<p>6</p>
6	<p>(a) Some // Sebilangan</p> <p>(b) <u>Implication 1 // Implikasi 1:</u> If number of subset for set P is 8 then $n(P) = 3$ <i>Jika bilangan subset bagi set P ialah 8 maka $n(P) = 3$</i></p> <p><u>Implication 2 // Implikasi 2 :</u> If $n(P) = 3$ then number of subset for set P is 8 <i>Jika $n(P) = 3$ maka bilangan subset bagi set P ialah 8</i></p> <p>(c) $(7 - 2) \times 180^\circ$ <u>or</u> $5 \times 180^\circ$ <u>or</u> 900°</p> <p><u>Note :</u> If K0, $(7 - 2) \times 180^\circ$ <u>or</u> $5 \times 180^\circ$ <u>or</u> 900° seen, award K1</p>	<p>P1</p> <p>P1</p> <p>P1</p> <p>K2</p>	<p>1</p> <p>2</p> <p>2</p> <p>5</p>

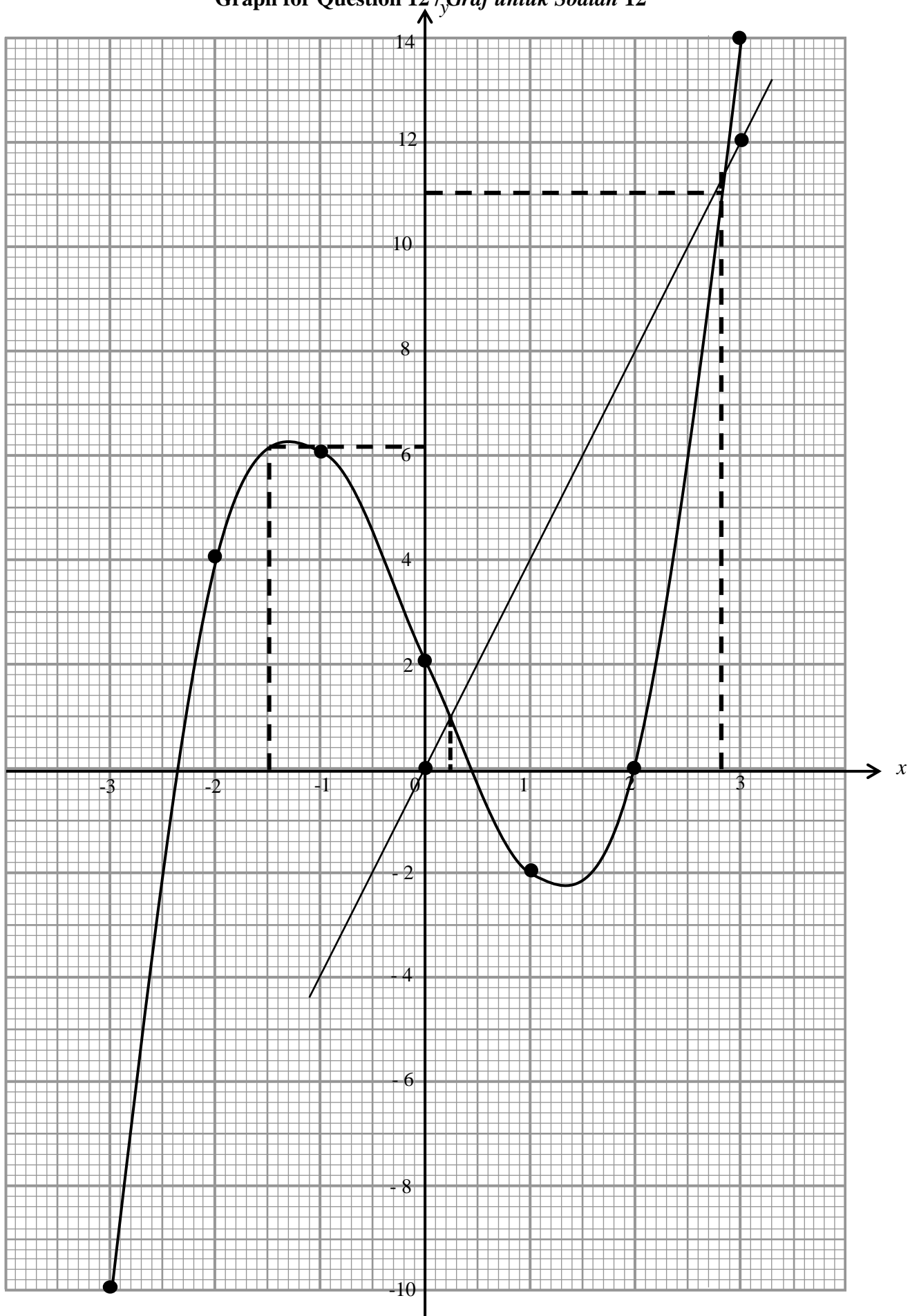
7	(a)	$m = -\frac{3}{2}$ $4 = \left(-\frac{3}{2}\right)(-8) + c \text{ or } c = -8$ $y = -\frac{3}{2}x - 8$	P1 K1 N1	3																				
	(b)	$0 = \left(-\frac{3}{2}x - 8\right) \text{ or equivalent}$ $-\frac{16}{3}$	K1 N1	2																				
				5																				
8	(a)	178	P1	1																				
	(b)	$\frac{350}{7} \text{ or equivalent}$ 50	K1 N1	2																				
	(c)	$\frac{178}{86} \text{ or equivalent}$ 2.07	K1 N1	2																				
				5																				
9	(a)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Tempat / Baucer</th> <th>Langkawi (L)</th> <th>Pulau Pinang (P)</th> <th>Cameron Highlands (C)</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>(L, 50)</td> <td>(P, 50)</td> <td>(C, 50)</td> </tr> <tr> <td>80</td> <td>(L, 80)</td> <td>(P, 80)</td> <td></td> </tr> <tr> <td>100</td> <td>(L, 100)</td> <td>(P, 100)</td> <td>(C, 100)</td> </tr> <tr> <td>150</td> <td></td> <td>(P, 150)</td> <td>(C, 150)</td> </tr> </tbody> </table>	Tempat / Baucer	Langkawi (L)	Pulau Pinang (P)	Cameron Highlands (C)	50	(L, 50)	(P, 50)	(C, 50)	80	(L, 80)	(P, 80)		100	(L, 100)	(P, 100)	(C, 100)	150		(P, 150)	(C, 150)	P2	2
		Tempat / Baucer	Langkawi (L)	Pulau Pinang (P)	Cameron Highlands (C)																			
50	(L, 50)	(P, 50)	(C, 50)																					
80	(L, 80)	(P, 80)																						
100	(L, 100)	(P, 100)	(C, 100)																					
150		(P, 150)	(C, 150)																					
<p>Note :</p> <p>1. Allow two mistakes for P1</p> <p>(i) $\{(L,50), (L,80), (L,100), (L,150), (P,100), (C,100)\}$</p> $\frac{6}{12} \text{ or } \frac{1}{2}$	K1 N1	2																						

	<p>(b)</p> <p>(ii) $\{(L,50),(L,80)(L,100)(L,150)(P,50)(P,80),(P,100)(P,150),\}$ $\{(C,50),(C,80),(C,100)\}$</p> <p>$= \frac{11}{12}$</p> <p><u>Note :</u></p> <ol style="list-style-type: none"> 1. Accept correct answer without working from listing. 2. Accept correct listing without brackets and commas 	K1	2
		N1	6
10	<p>(a) $\frac{5}{9} \times \frac{22}{7} \times 9^2 \times t$ <u>or</u> equivalent</p> <p>$\frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 9^3$ <u>or</u> equivalent</p> <p>$\frac{5}{9} \times \frac{22}{7} \times 9^2 \times t = \frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 9^3$</p> <p>10.8 cm</p> <p><u>Note :</u></p> <ol style="list-style-type: none"> 1. Accept π for K mark 2. Accept correct value from incomplete substitution for K mark 3. Correct answer from incomplete working, award Kk2 	K1	4
		K1	
		K1	
		K1	
		N1	

Question	Solution and Mark Scheme	Mark	Total
11	(a) $\frac{270}{360} \times 2 \times \frac{22}{7} \times 15$ <u>or</u> $\frac{90}{360} \times 2 \times \frac{22}{7} \times 10$ <u>or equivalent</u>	K1	3
	$\frac{270}{360} \times 2 \times \frac{22}{7} \times 15 + \frac{90}{360} \times 2 \times \frac{22}{7} \times 10 + 15 + 15 + 10 + 10$	K1	
	<u>or equivalent</u>		
	$\frac{955}{7}$ <u>or</u> $136\frac{3}{7}$ <u>or</u> 136.4	N1	
	(b) $\frac{270}{360} \times \frac{22}{7} \times 15^2$ <u>or</u> $\frac{90}{360} \times \frac{22}{7} \times 10^2$ <u>or equivalent</u>	K1	
	$\frac{270}{360} \times \frac{22}{7} \times 15^2 - \frac{90}{360} \times \frac{22}{7} \times 10^2$ <u>or equivalent</u>	K1	
$\frac{6325}{14}$ <u>or</u> $451\frac{11}{14}$ <u>or</u> 451.6 – 451.8	N1	3	
		6	
<p><u>NOTE:</u></p> <ol style="list-style-type: none"> 1. Accept π for K mark 2. Accept correct value from incomplete substitution for K mark 3. Correct answer from incomplete working, award Kk2 			

Question		Solution and Mark Scheme	Mark	Total
12	(a)	4 0	K1 K1	2
	(b)	<p>Axes drawn in correct directions with uniform scale for $-3 \leq x \leq 3$ and $-10 \leq y \leq 14$.</p> <p>All 5 and *2 points correctly plotted or curve passes through all the points for $-3 \leq x \leq 3$ and $-10 \leq y \leq 14$.</p> <p><u>Note:</u> 5 <u>or</u> 6 points are correctly plotted, award K1</p> <p>Smooth and continuous curve without any straight line passes through all 7 correct points using the given scale for $-3 \leq x \leq 3$ and $-10 \leq y \leq 14$</p>	P1 K2	
	(c)	<p>(i) $5.8 \leq y \leq 6.2$</p> <p>(ii) $2.80 \leq x \leq 2.90$</p>	P1 P1	2
	(d)	<p>A straight line $y = 4x$ is correctly drawn. (Check any two points are plotted or the straight line passed through $(0,0), (1,4), (2,8), (3,12), \dots$ and accurate to $\pm \frac{1}{2}$ square grid vertically)</p> <p><u>Note:</u> Identify equation $y = 4x$ award K1</p> <p>$0.2 \leq x \leq 0.3$</p> <p>$2.80 \leq x \leq 2.90$</p> <p><u>Note:</u></p> <ol style="list-style-type: none"> 1. Allow P mark or N mark if values of x and y are shown on the graph. 2. Values of x and y are obtained by calculations, award P0 or N0. 3. Values of x and y are obtained from the wrong graph award P0 or N0. 	K2 N1 N1	
				12

Graph for Question 12 / *Graf untuk Soalan 12*

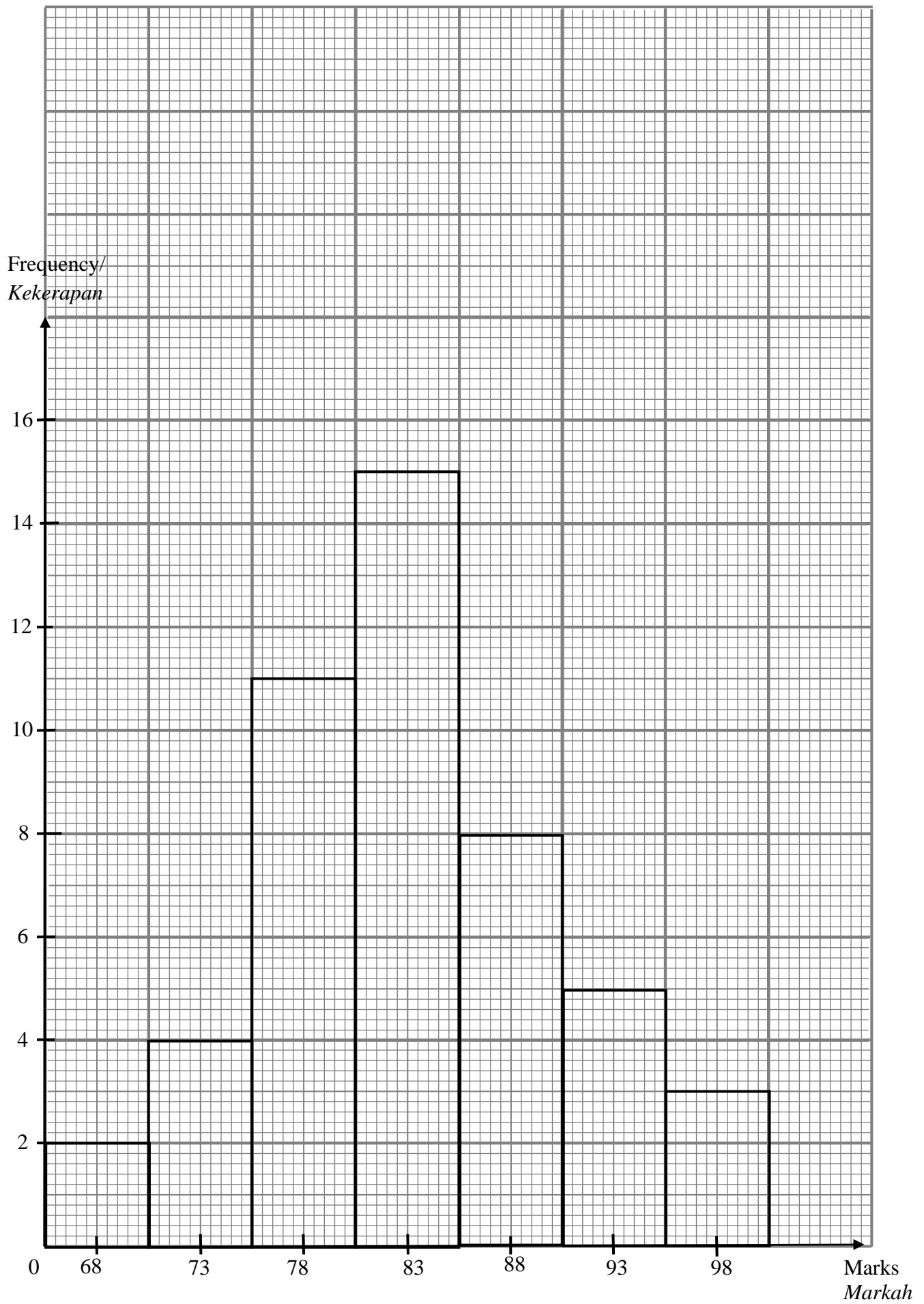


Question		Solution and Mark Scheme	Mark	Total
13	(a)	(i) (0, 5)	P1	3
		(ii) (6, -2) <u>Note:</u> (6, -2) marked on the diagram or (6, 2) seen or (6, 2) marked on the diagram, award P1.	P2	
	(b)(i)	(a) V = Rotation 90° clockwise centre (-2, 2) // <i>Putaran 90° ikut arah jam pusat (-2, 2)</i> <u>Note:</u> 1. Rotation 90° clockwise <u>or</u> Rotation centre (-2,2) // <i>Putaran 90° ikut arah jam or Putaran pusat (-2,2)</i> , award P2 2. Rotation // <i>Putaran</i> award P1 (b) W = Enlargement of scale factor 3 with centre $E(-3, 5)$ or equivalent <i>Pembesaran dengan faktor skala 3 pada pusat E (-3, 5)</i> <u>Note :</u> 1. Enlargement of scale factor 3 // <i>Enlargement with centre E (-3, 5)</i> award P2 <i>Pembesaran dengan faktor skala 3 // Pembesaran pada pusat F (-3, 5)</i> 2. Enlargement // <i>Pembesaran</i> award P1 OR equivalent.	P3	6
(b)(ii)	$x + 248 = (3)^2 \times x$ <u>or</u> equivalent OR $\frac{248}{20} \times 2.5$ (K2) OR $\frac{248}{32} \times 4$ (K2) <u>Note:</u> 1. 8 <u>or</u> $\frac{1}{8}$ seen OR $\frac{248}{20}$ OR $\frac{248}{32}$ award K1	K2	3	
		31	N1	12

Question		Solution and Mark Scheme				Mark	Total
14	(a)		Class interval (marks) <i>Selang kelas</i> (markah)	Cumulative frequency <i>Kekerapan</i> <i>Longgokan</i>	Frequency <i>Kekerapan</i>	Midpoint <i>Midpoint</i>	
		I	61 – 65	0	0	63	
		II	66 – 70	2	2	68	
		III	71 – 75	6	4	73	
		IV	76 – 80	17	11	78	
		V	81 – 85	32	15	83	
		VI	86 – 90	40	8	88	
		VII	91 – 95	45	5	93	
		VIII	96 – 100	48	3	98	
				Frequency	:	I to VIII	
		Midpoint	:	I to VIII			P1
	(b)	$\frac{*2 \times 68 + *4 \times 73 + *11 \times 78 + *15 \times 83 + *8 \times 88 + *5 \times 93 + *3 \times 98}{48}$					K2
		Note : 1. Allow two mistakes in *frequency for K1 2. Allow two mistakes for multiplication of *frequency and midpoint for K1 $\frac{1997}{24} \text{ or } 83 \frac{5}{24} \text{ or } 83.21$					N1
		Note : Correct answer from incomplete working, award Kk2. e.g $\frac{3994}{48}$					
	(c)	<u>Histogram</u> Axes are drawn in the correct directions with uniform scales for $65.5 \geq x \geq 100.5$ and $0 \geq y \geq *15$ *8 bars are correctly drawn using correct values of class boundaries/class interval/midpoint.					P1
		<u>Note:</u> *6 or *7 bars are correctly drawn, award K1. Correct histogram using the given scale.					K2
							N1
	(d)	*35.42 <u>Note :</u> *17 seen award K1 Do not accept answer without histogram					K2
							12

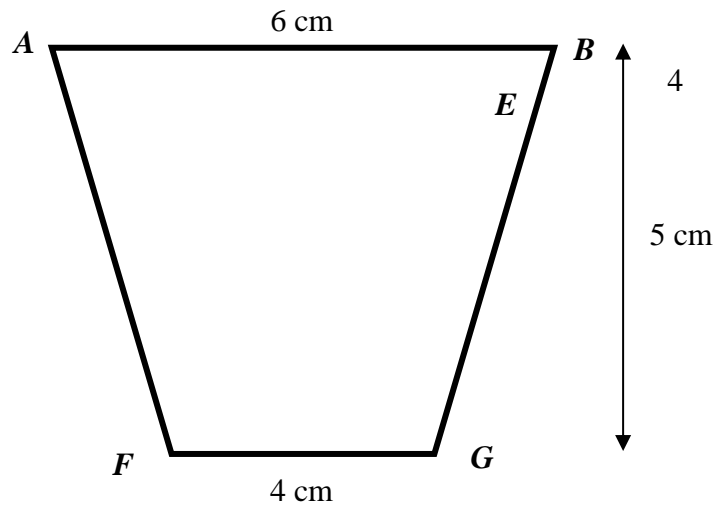
Graph for question 14

Graf untuk soalan 14



Question	Solution and Mark Scheme	Mark	Total
15	<p><u>Note:</u></p> <ol style="list-style-type: none"> 1. Accept drawing only (Not sketch) 2. Accept diagram without labels and ignore wrong labels. 3. Accept correct rotation of diagram. 4. Lateral inversions are not accepted. 5. If more than 1 diagram are drawn, award mark to the correct ones only. 6. For extra line (dotted/dashed or solid) except construction lines, no KN mark is awarded. 7. If other scale is used, award K marks only. 8. Accept small gaps or extension. For each part attempted: <ol style="list-style-type: none"> (i) If $0.1 \text{ cm} \leq \text{small gaps/extension} \leq 0.4 \text{ cm}$, deduct 1 mark from the N mark obtained. (ii) If $> 0.4 \text{ cm}$, no N mark is awarded. 9. If construction lines cannot be differentiated from the lines: <ol style="list-style-type: none"> (i) <u>Dotted line</u> If outside the diagram, award the N mark. If inside the diagram, award NO. (ii) <u>Solid line</u> If outside the diagram, award NO. If inside the diagram, no KN mark is awarded. 10. For double line, non collinear lines, bold lines and crooked lines, deduct 1 mark from the N mark obtained, for each part attempted. 11. If drawn on graph paper, award K mark only. 		

(a)



Correct shape trapezium $ABGF$. All solid line. No right angle in all vertices.

$JK > AB > FG, AF = BG$

Measurement ± 0.2 cm (one way)

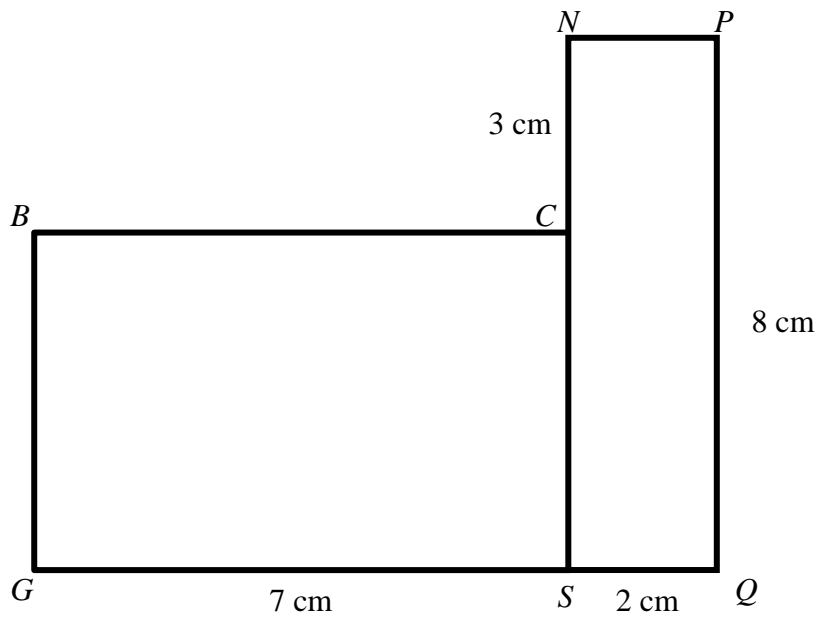
K1

K1

N1

3

(b)



Correct shape with rectangle $BCSG$ and rectangle $NPQS$. All solid line.

$PQ > GS > BG > NC > NP$

Measurement ± 0.2 cm (one way), and all angles at vertices $= 90^\circ \pm 1^\circ$

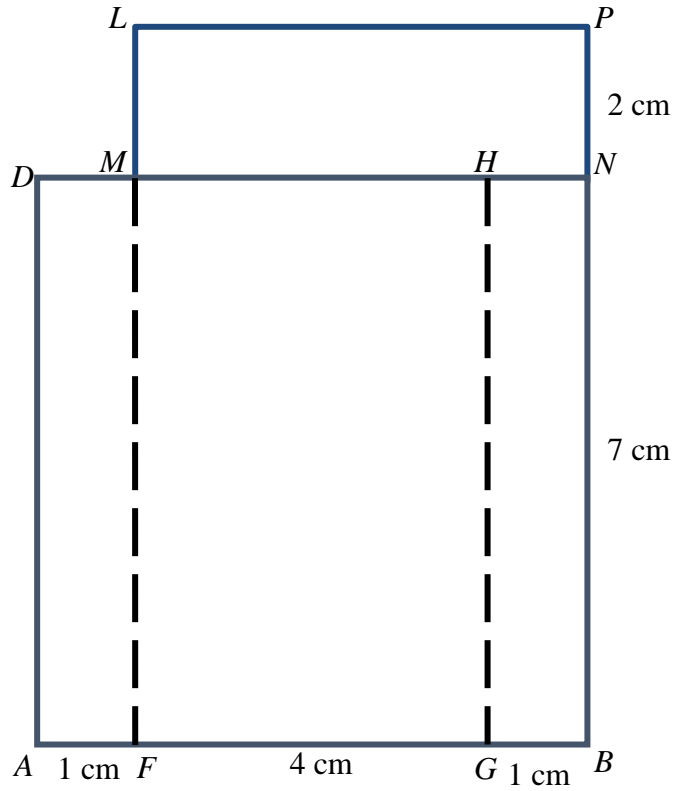
K1

K1

N2

4

(ii)



Correct shape with rectangle $LPNM$ and rectangle $DNBA$. All solid line.

K1

(Ignore line MF and line HG)

$M-F$ and $H-G$ are joined with dotted line to form rectangles $ADMF$, $FMHG$ and $GHNB$

K1

$DA > LP > FG > LM > AF = GB$

K1

Measurement ± 0.2 cm (one way), and all angles at vertices $= 90^\circ \pm 1^\circ$

N2

5

Question		Solution and Mark Scheme	Mark	Total
16	(a)	$(40^\circ S, 106^\circ E) // (40^\circ S, 106^\circ T)$ <u>Note:</u> $(40^\circ S, \theta^\circ E) // (40^\circ S, \theta^\circ T)$ <u>or</u> $(40^\circ S, 106^\circ W) // (40^\circ S, 106^\circ B)$ award P1P1	P1P2	3
	(b)	$(180^\circ - 40^\circ - 40^\circ) \times 60$ 6000	K1 N1	2
	(c)	$(25^\circ + 106^\circ) \times 60 \times \cos 40^\circ$ <u>Note:</u> $(25^\circ + 106^\circ)$ <u>or</u> $\cos 40^\circ$ correctly used, award K1 6021	K2 N1	3
	(d)	$(80^\circ \times 60)$ $\frac{*6021 + (80 \times 60)}{500}$ <u>Note:</u> $*6021 + (80 \times 60)$ award K1 21.64	K1 K2 N1	4
				12