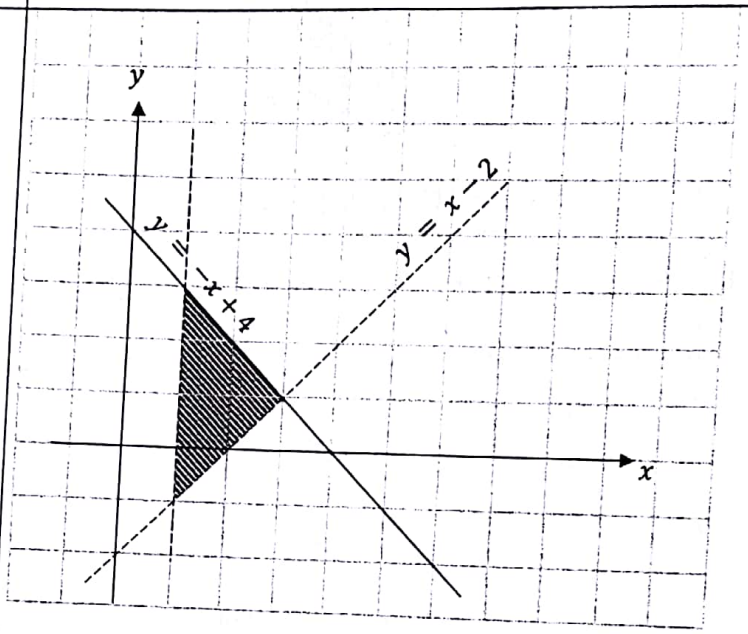
SPMRSM T5 MATEMATIK

PAPER 1 2018

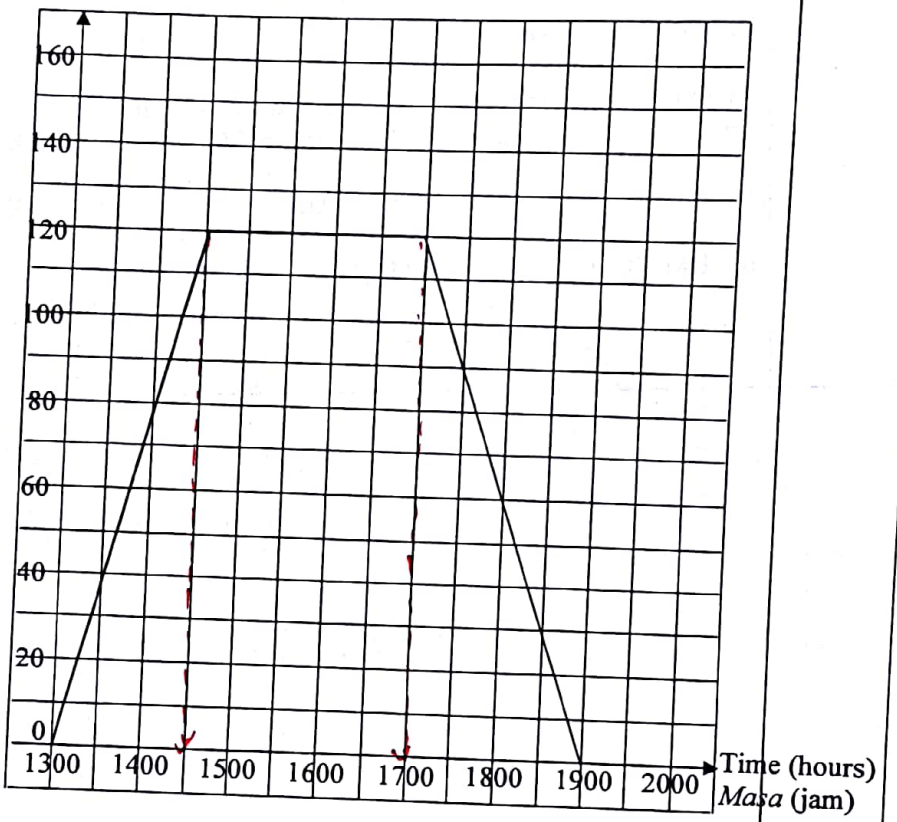
ANSWER

1 A	11 B	21 C	31 C
2 B	12 B	22 B	32 B
3 A	13 D	23 C	33 B
4 A	14 D	24 C	34 A
5 B	15 C	25 D	35 C
6 D	16 D	26 A	36 C
7 A	17 A	27 B	37 B
8 A	18 D	28 A	38 C
9 C	19 C	29 B	39 ~~C~~ D
10 B	20 C	30 C	40 C

A	B	C	D
9	10	13	6

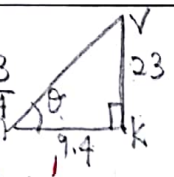
Question	Solution and Mark Scheme	Sub Marks	Mark
1			
	Straight dashed on dotted line $x=1$ correctly drawn	K1	
	The region is correctly shaded	P2	
	Note: 1. Award P1 to shaded region bounded by any two lines. 2. If solid line drawn, award K1 P2 and deduct 1.		3

2	$12b + 24w = 342$ or $2b + 4w = 57$ or $20b + 16w = 354$ or $10b + 8w = 177$ Substitution method $10\left(\frac{57 - 4w}{2}\right) + 8w = 177$ $12w = 108$ or $216 - 24w = 24w$ **OR** Elimination method Attempt to equate the coefficient one of the unknown $4b + 8w = 114$ or $10b + 20w = 285$ (K1) $6b = 63$ or $12w = 108$ (K1) b = RM 10.50 and w = RM 9.00	K1 K1 K1 N1	4

3 (a)	$80 \times 1\frac{1}{2}$ 120 m	K1 N1	
(b)	Distance (km) *Jarak* (km)  All straight lines correctly drawn Note : Two straight lines draw correctly, award K1	K2	
(c)	$\frac{120 + 120}{6}$ 40 km/h	K1 N1	6

4(a)	$\frac{443}{1035}$ = 0.43	N1	
(b)	$\frac{344}{592} \times \frac{343}{591}$	K1	
	0.34	N1	
(c)	$\left(\frac{98}{250} \times \frac{97}{249}\right) + \left(\frac{152}{250} \times \frac{151}{249}\right)$	K2	
	Note : $\left(\frac{98}{250} \times \frac{97}{249}\right)$ *or* $\left(\frac{152}{250} \times \frac{151}{249}\right)$ award K1		
	0.52	N1	6
5	$x(2x-6)-(x-6)(x-5)=74$	K1	
	$x^2+5x-104=0$	K1	
	$(x-8)(x+13)=0$	K1	
	OR		
	$\frac{-5\pm\sqrt{5^2-4(1)(-104)}}{2(1)}$ (K1)		
	Height = 8	N1	
	Note : Accept without " = 0 " for K1		4
6 (a)	All	P1	
(b)	If the value of cos W is negative, then W is an obtuse angle.	P1	
	False	P1	
(c)	$3(n+1)^n$, n = 1, 2, 3, …	K2	
	Note : $3(n+1)^n$, award K1		5

S | A
T | C

7(a)	$m = -2$ Note : Accept $-\frac{12}{6}$ or $\frac{18-6}{-6-0}$	P1	
	$8 = -2(6) + c$ *or* $c = 20$ *or* equivalent	K1	
	$y = -2x + 20$ *or* equivalent	N1	
(b)	$\frac{0+6}{2}$ *or* $\frac{6+8}{2}$ *or* $\left(\frac{0+6}{2}, \frac{6+8}{2}\right)$	K1	
	$(3, 7)$	N1	5
8(a)	$\angle VMK$ *or* $\angle KMV$	P1	
(b)	$\tan\theta = \frac{23}{19.4}$ tan ∠VMK = 23/9.4 	K1	
	~~49.85°~~ *or* ~~49°52′~~ 67°46′ or 67.77°	N1	3
9(a)	$\frac{90}{360} \times 2 \times \frac{22}{7} \times 14$ *or* equivalent	K1	
	$8 \times \frac{90}{360} \times 2 \times \frac{22}{7} \times 14$ *or* equivalent **OR** $2 \times 2 \times \frac{22}{7} \times 14$ (K2)	K1	
	$176\ cm$	N1	3
✳ (b)	$\frac{1}{4} \times \frac{22}{7} \times 14^2$ *or* $\frac{1}{2} \times 14 \times 14$ *or* equivalent or 22/7 × 14² or ½ × 22/7 × 14 × 14 or 28 × 28	K1	
	$8\left[\left(\frac{1}{4} \times \frac{22}{7} \times 14^2\right) - \left(\frac{1}{2} \times 14 \times 14\right)\right]$ *or* equivalent	K1	
	$448\ cm^2$	N1	3
	NOTE : 1. Accept π for K mark. 2. Accept correct value from incomplete substitution, for K mark.		6

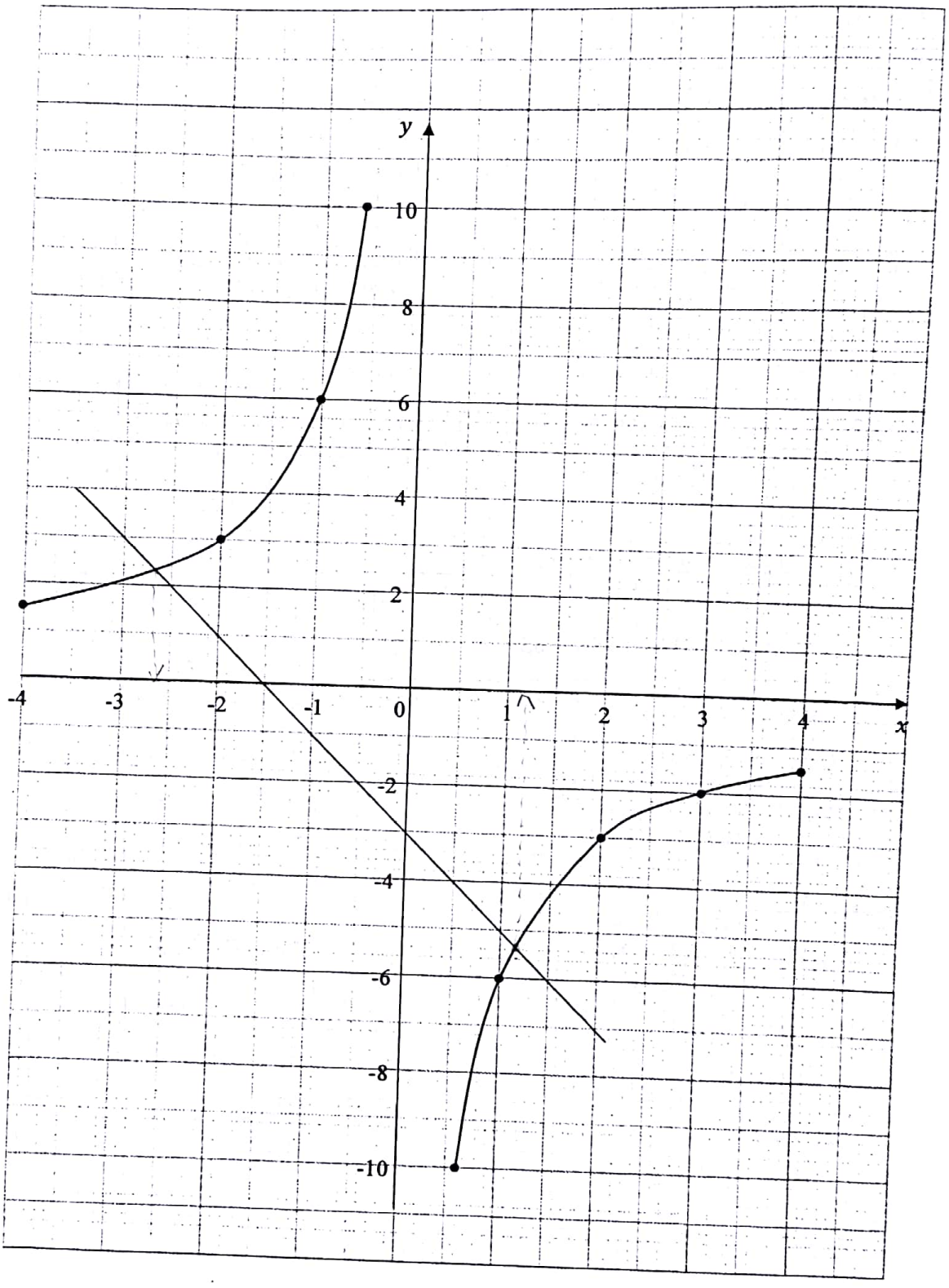
10(a)	$-\frac{1}{10}\begin{pmatrix}-1 & -\frac{3}{2}\\ -6 & 1\end{pmatrix}$ *or* $\begin{pmatrix}\frac{1}{10} & \frac{3}{20}\\ \frac{3}{5} & -\frac{1}{10}\end{pmatrix}$ Note : $\frac{1}{(1)(-1)-\left(\frac{3}{2}\right)(6)}$ *(matrix (2 x 2)) *or* $\frac{1}{*determinant}\begin{pmatrix}-1 & -\frac{3}{2}\\ -6 & 1\end{pmatrix}$ seen, award P1	P2	2
(b)	$\begin{pmatrix}1 & \frac{3}{2}\\ 6 & -1\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}-4\\ 16\end{pmatrix}$	P1	
	$\begin{pmatrix}x\\ y\end{pmatrix}=\frac{1}{(1)(-1)-\left(\frac{3}{2}\right)(6)}\begin{pmatrix}-1 & -\frac{3}{2}\\ -6 & 1\end{pmatrix}\begin{pmatrix}-4\\ 16\end{pmatrix}$ *or* $\frac{1}{2(-1)-6(3)}\begin{pmatrix}-1 & -3\\ -6 & 2\end{pmatrix}\begin{pmatrix}-8\\ 16\end{pmatrix}$ *(inverse matrix) $\begin{pmatrix}-4\\ 16\end{pmatrix}$	K1	
	$x = 2$	N1	
	$y = -4$	N1	4
	Note : 1. Do not accept *(inverse matrix) = $\begin{pmatrix}1 & \frac{3}{2}\\ 6 & -1\end{pmatrix}$ *or* *(inverse matrix) = $\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}$ 2. $\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}2\\ -4\end{pmatrix}$ as a final answer, award N1 3. Do not accept any solutions solved not using matrix method.		6
11	108×21	K1	
	$\frac{1}{2}\times\frac{22}{7}\times 4^2\times 21$	K1	
	$(108\times 21)-\left(\frac{1}{2}\times\frac{22}{7}\times 4^2\times 21\right)$	K1	
	1 740 - 1 740.21	N1	4
	Note : 1. Accept π for K mark.		

12(a)	x | -2 | 3 y | 3 | -2	K1 K1	2
(b)	Graph Axes drawn in correct directions with uniform scales for $-4 \le x \le 4$ and $-10 \le y \le 10$ All 7 points and *2 points correctly plotted or the curve passes through all the 9 points for $-4 \le x \le 4$ and $-10 \le y \le 10$ Note: If 7 or 8 points are plotted correctly, award K1. Smooth and continuous curve without any straight line passing through all 9 correct points using the given scales for $-4 \le x \le 4$ and $-10 \le y \le 10$ Note : Ignore curve out of range.	P1 K2 N1	4
(c)	(i) $y = -3.3 \pm 0.1$ (ii) $x = -1.35 \pm 0.05$	P1 P1	2
(d)	Straight line $y = -2x - 3$ correctly drawn Note: Identify equation $y = -2x - 3$, award K1 $x = 1.15 \pm 0.05$ $x = -2.65 \pm 0.05$	K2 N1 N1	4
	Note [for (c) and (d)] : 1. Allow P mark or N mark if values of x and of y are shown on graph. 2. Values of x and of y obtained by calculations, award P0 or N0.		12

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

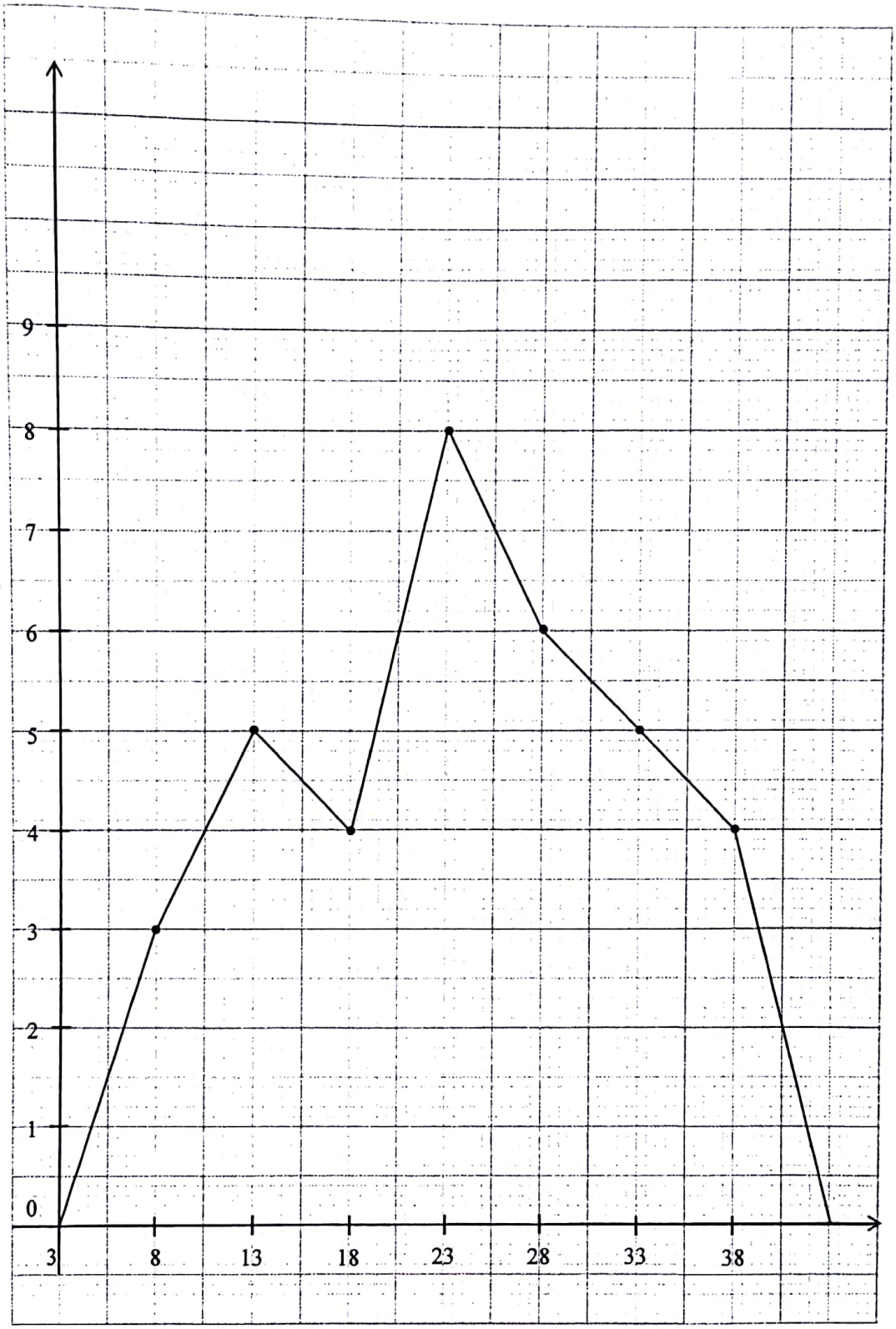
$-\frac{6}{x} = (2x + 3)$

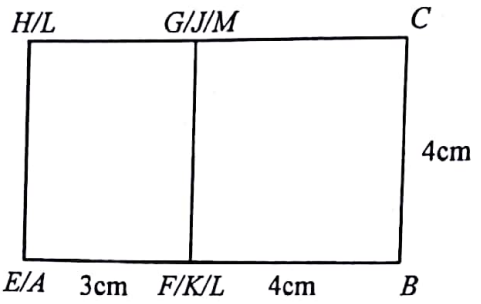
$y = -2x - 3$

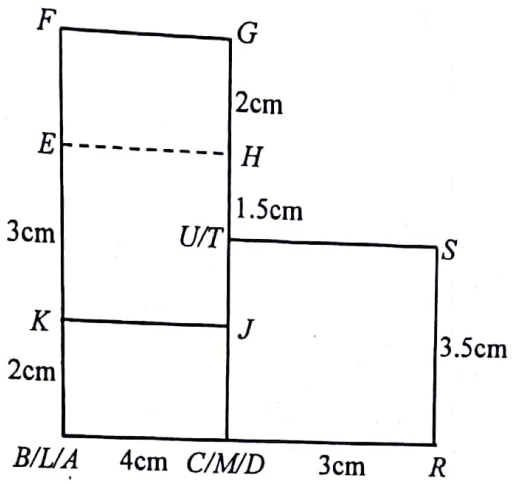


13(a)	(i) 10		P1	
	(ii) (a) (0, 10)		P1	
	Note : (0, 10) seen on diagram or (0, 10) marked on diagram, award P1			
	(iii) (b) (−3, 15)		P2	4
	Note: (−3, 15) seen on diagram or (−3, 15) marked on diagram or (−2,6) seen or (−2,6) marked on diagram, award P1			
(b)	(i) (a) **D** : Reflection in the line $x = -1$		P2	
	Note: Reflection, award P1			
	(b) **E** :Enlargement with scale factor of $\frac{1}{2}$ about centre (4, 2) / R		P3	
	Note : 1. Enlargement with scale factor $\frac{1}{2}$ or enlargement about centre (4, 2) , award P2			
	2. Enlargement, award P1			
	(ii) $\frac{25.7}{\left(\frac{1}{2}\right)^2} - 25.7$		K2	
	Note : $102.8 = \frac{25.7}{\left(\frac{1}{2}\right)^2}$, award K1			
	77.1		N1	8
				12

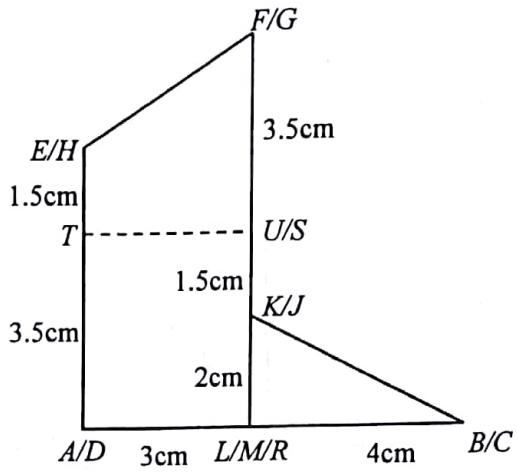
14(a)	(i) **Frequency** | **Midpoint** **0** | **3** 3 | 8 5 | 13 4 | 18 8 | 23 6 | 28 5 | 33 4 | 38 Frequency : II to VIII Midpoint : II to VIII Note : Allow 2 mistakes in frequency for P1 (ii) 21 – 25	P2 P1 N1	4
(b)	$\frac{(8 \times 3) + (5 \times 13) + (4 \times 18) + (8 \times 23) + (6 \times 28) + (5 \times 33) + (4 \times 38)}{35}$ Note : Allow 2 mistakes for the product of frequency and midpoint for K1. 23.71 or $\frac{166}{7}$	K2 N1	3
(c)	Frequency polygon Axes drawn in the correct directions with uniform scales for $3 \leq x \leq 43$ and $0 \leq y \leq^{*} 8$ 1 point and *7 points correctly plotted or straight line passes through all the points for $3 \leq x \leq 43$ and $0 \leq y \leq^{*} 8$. Note : 7 or 6 points correctly plotted, award K1 Frequency polygon with correct scale	P1 K2 N1	4
(d)	26	N1	1
			12



15(a)	 Correct shape with rectangle *EFGH* and square *FBCG*. All solid lines. $EF < FB = BC$ Measurements correct to ± 0.2 cm (one way) and right angles at vertices = 90° ± 1°	K1 K1 N1	3

(b)	(i)  Correct shape with rectangles *BCJK*, *KJGF*, and *CRSU*. All solid lines. (Ignore *EH*) *E-H* joined by a dashed line to form rectangle *EHGF* $JU = UH < CJ < BC < RS = HG < CR$ Measurements correct to ± 0.2 cm (one way) and all angles at vertices of rectangles = 90° ± 1°	K1 K1 N2	4

(ii)



Correct shape with trapezium *ALFE* and right angle triangle *LBK*.
All solid lines.
(Ignore *TU*) — K1

T-U joined by a dashed line to form rectangle *ALUT*. — K1

$KU = TE < LK < AL < AT = UF < LB$ — K1

Measurements correct to ± 0.2 cm (one way) and all angles at vertices of rectangles = 90° ± 1° — N2 — 5

12

16(a)	$(40°S, 150°W)$ Note : $40°S$ or $150°W$, award P1	P2	2
(b)	$\frac{6000}{60}$ $100° - 40°$ $60°N$	K1 K1 N1	 3
(c)	$180° \times 60 \times \cos 40°$ Note : Using cos 40 ° correctly, award K1 8273	K2 N1	 3
(d)	$\frac{6000+°8273}{800}$ Note : 6000+°8273 , award K1 2010 – 1750 0220 or 2.20	~~K2~~ K1 K1 K1 N1	 4
			12

Distance = 200 x 60
= 12 000 n.m
$\frac{12000}{800}$ = 15 h
2010 - 1500
0510 or 5.10 a.m