

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	$\begin{pmatrix} 6 \\ 17 \end{pmatrix}$	2		B1 for each	
1(b)	6.4[0] or 6.403...	2		M1 for $4^2 + 5^2$	
2	(1, 2)	1			
3(a)	$\begin{pmatrix} 2 \\ 4 \end{pmatrix}$ cao	1			
3(b)	4.47 or 4.472...	2		M1 for $(their\ 2)^2 + (their\ 4^2)$	
3(c)	(7, 10)	2		B1 for each	
3(d)	$y = 2x - 4$ oe	3		M1 for gradient = $\frac{6-2}{5-3}$ oe or answer $y = mx - 4$ M1 for substituting (3, 2) or (5, 6) into $y = their\ mx + c$ or into $y - k = their\ m(x - h)$ or into $their\ y = mx - 4$	
3(e)	(0, -4)	1		FT <i>their</i> (d)	

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4	$\frac{5}{3} \mathbf{a} + \frac{1}{3} \mathbf{b}$ final answer	4		M1 for $\overrightarrow{AK} = -\frac{1}{3} \mathbf{a} + \frac{1}{3} \mathbf{b}$ or $\overrightarrow{BK} = \frac{2}{3} \mathbf{a} - \frac{2}{3} \mathbf{b}$ M1 for $\overrightarrow{AL}$ (or $\overrightarrow{OK}$) = $\mathbf{a} + \text{their } \overrightarrow{AK}$ oe soi or $\overrightarrow{OK}$ (or $\overrightarrow{AL}$) = $\mathbf{b} + \text{their } \overrightarrow{AK}$ oe soi or $\overrightarrow{BL} = \mathbf{a} + \text{their } \overrightarrow{AK}$ oe soi M1 for a correct route e.g. $\overrightarrow{OL}$, $\mathbf{a} + \overrightarrow{AL}$, $\mathbf{b} + \overrightarrow{BL}$	
5	4 : 3 oe	2		M1 for $\overrightarrow{AD} = -\frac{4}{7} \mathbf{x} + \frac{4}{7} \mathbf{y}$ oe or $\overrightarrow{DB} = -\frac{3}{7} \mathbf{x} + \frac{3}{7} \mathbf{y}$ oe	
6	5	2		M1 for $(\text{their}3)^2 + (\text{their}4)^2$ or better	
7(a)	(−0.5, 1)	2		B1 for each	

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7(b)	$\begin{pmatrix} 7 \\ -3 \end{pmatrix}$	2		B1 for each	
7(c)	7.62 or 7.615 to 7.616	2		FT <i>their (b)</i> M1 for $(\text{their } 7)^2 + (\text{their } -3)^2$ oe	
7(d)	$[y =] -4x - 1$ final answer	3		B2 for answer $-4x + c$ [oe] or for correct equation in different form or for $-4x - 1$ or for $-4m - 1$ OR M1 for $\frac{-5 - 7}{1 - -2}$ oe M1 for correct substitution shown of $(-2, 7)$ or $(1, -5)$ or <i>their</i> $(-0.5, 1)$ into $y = (\text{their } m)x + c$ oe OR M1 for $7 = -2m + c$ and $-5 = m + c$ A1 for $m = -4$ and $c = -1$	

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7(e)	$[y =] \frac{1}{4}x + \frac{11}{4}$ final answer	3		M1 for $\text{grad} = \frac{1}{4}$ oe nfwv soi, FT negative reciprocal of <i>their</i> gradient from (d) M1 for correct substitution shown of (5, 4) into $y = (\text{their } m)x + c$ oe or, if no substitution shown, (5, 4) satisfies <i>their</i> final linear equation.	
8(a)	$a - \frac{2}{5}b$ oe simplified	2		M1 for $-b + a + \frac{3}{5}b$ or a correct route	
8(b)	$\frac{5}{2}a$ oe	2		B1 for ka where $k > 1$ or $\frac{5}{2}\overrightarrow{OR}$	
9	$[\pm] 21$	3		M2 for $29^2 - 20^2$ oe or better or M1 for $20^2 + k^2 = 29^2$ oe	

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10	$\frac{5}{9}a + \frac{4}{9}b$	2		M1 for $\frac{4}{9}(b - a)$ or $\frac{5}{9}(a - b)$ or a correct route	
11(a)	13.4 or 13.41 to 13.42	3		M2 for $\sqrt{(-5 - 7)^2 + (8 - 2)^2}$ oe or M1 for $(-5 - 7)^2 + (8 - 2)^2$ oe	
11(b)	$[y =] 2x + 5$ final answer	4		M1 for [gradient of AB $=] \frac{8 - 2}{-5 - 7}$ oe M1dep for gradient $p = -1 \div their - \frac{1}{2}$ oe M1dep on previous M1 for substituting $(-1, 3)$ into $y = their px + c$ oe where $their p \neq 0$	

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11(c)	(5, 0)	4		B3 for $\overrightarrow{AD} = \begin{pmatrix} -2 \\ -2 \end{pmatrix}$ or $\overrightarrow{DA} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$ or coordinates of $C (-7, 6)$ and $\left[\overrightarrow{CD} = \right] \begin{pmatrix} 12 \\ -6 \end{pmatrix}$ oe seen or B2 for $a = b = 2$ soi or coordinates of $C (-7, 6)$ or M1 for $a = b$ oe soi or for $a^2 + b^2 = (\sqrt{8})^2$ oe or $\cos 45 = \frac{a}{\sqrt{8}}$ oe or for $\left[\overrightarrow{DC} = \right] \begin{pmatrix} -12 \\ 6 \end{pmatrix}$ or $\left[\overrightarrow{CD} = \right] \begin{pmatrix} 12 \\ -6 \end{pmatrix}$ seen or $\frac{y-8}{x-5} = 1$ oe or $\frac{y-2}{x-7} = 1$	

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12	$\mathbf{p} + \frac{3}{4} \mathbf{q}$	2		M1 for a correct route or for $\overrightarrow{AE} = \frac{3}{4} \mathbf{q}$	
13	26	2		M1 for $10^2 + (-24)^2$ or better	
14(a)	$\begin{pmatrix} -12 \\ 20 \end{pmatrix}$	1			
14(b)	$\begin{pmatrix} -13 \\ 14 \end{pmatrix}$	2		B1 for $\begin{pmatrix} -13 \\ j \end{pmatrix}$ or $\begin{pmatrix} k \\ 14 \end{pmatrix}$	
15(a)	(3, 1)	1			
15(b)	Q plotted at $(-4, 2)$	1			
15(c)	R plotted at $(1, 2)$	1			
15(d)	Line $y = 3$ drawn	1			
16(a)	$\begin{pmatrix} 3 \\ 4 \end{pmatrix}$	1			

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16(b)	$\begin{pmatrix} 12 \\ 48 \end{pmatrix}$	1			
17(a)	$(-1, 4)$	1			
17(b)	Q marked at $(2, 2)$	1			
17(c)	$\begin{pmatrix} -6 \\ -5 \end{pmatrix}$	1		FT <i>their</i> point Q	
17(d)	PR	1			
18	$\begin{pmatrix} -12 \\ 21 \end{pmatrix}$	1			
19	$\begin{pmatrix} 14 \\ -6 \end{pmatrix}$	1			
20	$\begin{pmatrix} 7 \\ -13 \end{pmatrix}$	1			
21	$(2, 4)$	1			
22(a)	$\begin{pmatrix} -6 \\ 14 \end{pmatrix}$	1			

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22(b)	$\begin{pmatrix} 3 \\ -4 \end{pmatrix}$	1			
23(a)	$\begin{pmatrix} -5 \\ 3 \end{pmatrix}$	1			
23(b)	$\begin{pmatrix} -15 \\ 9 \end{pmatrix}$	1		FT <i>their (a)</i>	
24(a)	(3, 1)	1			
24(b)	<i>D</i> plotted at (−2, −1)	1			
24(c)	<i>E</i> plotted at (1, −2)	2		B1 for <i>E</i> plotted at (1, <i>k</i>) or (<i>k</i> , −2) or $\overrightarrow{AE} = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$	
25(a)	(−1, −2)	1			
25(b)	$\begin{pmatrix} 6 \\ 0 \end{pmatrix}$	1			
25(c)	<i>C</i> marked at (3, 3)	1			

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25(d)(i)	$\begin{pmatrix} 4 \\ 5 \end{pmatrix}$	1		FT <i>their</i> (b) + $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$	
25(d)(ii)	$\overrightarrow{AC}$	1			
25(e)(i)	Correct parallelogram drawn	1		FT <i>their</i> (c) provided <i>ABCD</i> forms a parallelogram	
25(e)(ii)	30 cm ²	2		FT the area of <i>their</i> <i>ABCD</i> provided it is a parallelogram. B1 for each	
[Total: 91]					