1(a)	(2, 7)	**1**	
1(b)(i)	$\dfrac{3}{2}$ oe	**2**	**M1** for $\dfrac{13-1}{6--2}$ oe
1(b)(ii)	$-\dfrac{1}{their\,\mathbf{(b)(i)}}$ oe	**1**	Strict FT *their* **(b)(i)**
2(a)	$(\;e-6)^2 + (e-4)^2$ oe or $\sqrt{(e-6)^2+(e-4)^2}$ oe	**M1**	
	$e^2 - 10e + 16\;[=0]$ or $2e^2 - 20e + 32\;[=0]$	**A2**	**A1** for $e^2 - 6e - 6e + 36$ oe or $e^2 - 4e - 4e + 16$ oe
	$(e-2)(e-8)\;[=0]$ oe or $\dfrac{-(-10) \pm \sqrt{(-10)^2 - 4 \times 1 \times 16}}{2 \times 1}$ oe	**M1**	**FT** for factorising or correct use of formula for *their* 3-term quadratic
	(2, 2) and (8, 8)	**B1**	
2(b)(i)	2 nfww	**4**	**B1** for [grad perpendicular =] $-\dfrac{2}{3}$ soi **M2** for $\dfrac{5f-6}{-f-4} = their\left(-\dfrac{2}{3}\right)$ oe or **M1** for $\dfrac{5f-6}{-f-4}$ oe or $6 = their\left(-\dfrac{2}{3}\right) \times 4 + c$ oe
2(b)(ii)	13 with (1, 8) seen	**3**	**M1** for $\left(\dfrac{4+(-their f)}{2}, \dfrac{6+(5 \times their f)}{2}\right)$ **M1** for substituting *their* (1, 8) into $2y = 3x + k$ oe
3(a)	(a, a) with $a \neq 1$, 3 or 5	**2**	**SC1** for answer (1, 1) or (5, 5)
3(b)	$y = -\dfrac{1}{2}x - \dfrac{1}{2}$ oe nfww	**5**	**M1** for [gradient AB =] $\dfrac{3-(-5)}{3-(-1)}$ oe **M1** for [gradient M =] $-\dfrac{1}{their\,\text{gradient}\,AB}$ **B1** for (1, –1) **M1** for *their* (1, –1) substituted into $y = their\left(-\dfrac{1}{2}\right)x + c$ oe

4(a)	–8	2	**M1** for $3 \times 7 + 2h = 5$ oe
4(b)	$y = \dfrac{3}{2}x + 19$ oe	4	**B1** for gradient of original line $-\dfrac{2}{3}$ soi **M1** for $-\dfrac{1}{\textit{their} \text{ gradient}}$ **M1** for substituting (*their* –8, 7) in $y = \textit{their}\left(\dfrac{3}{2}\right)x + c$

5(a)	$(7 - (-1))^2 + (0 - 6)^2$	**M1**	
	$BC = 10$	**B1**	
	correct completion to $AB = BC\ [= 10]$	**A1**	
5(b)	40	2	**M1** for $\dfrac{1}{2} \times \textit{their}(BC) \times (\ 7 - (-1))$ oe
6(a)	$(\ 1,\ 2\tfrac{1}{2}\ )$	1	
6(b)	$-\dfrac{3}{8}$ oe	1	
6(c)	P, with supporting evidence, nfww e.g. $OP = 5$, $OR = 6$	2	**B1** for $OR = 6$ nfww or **M1** for $\sqrt{(-3)^2 + 4^2}$, or better

7(a)	$(-1,\ \dfrac{1}{2})$ or $(-1, 0.5)$ cao	1	
7(b)	$\dfrac{1}{2}$ oe	1	
7(c)	[Gradient of BC =] $\dfrac{-8}{4}$	**M1**	<u>Alternative 1:</u> **M1** for $\dfrac{1}{2} \times m_{BC} = -1$ or $m_{BC} = -\dfrac{1}{0.5}$ oe leading to $m_{BC} = -2$ **A1** for gradient of $BC = \dfrac{-8}{4} = -2$ hence perpendicular <u>Alternative 2:</u> **M1** for $\overrightarrow{AB} = \begin{pmatrix} 6 \\ 3 \end{pmatrix}$ oe and $\overrightarrow{AC} = \begin{pmatrix} 10 \\ -5 \end{pmatrix}$ oe **A1** for $(4^2+8^2) + (6^2+3^2) = (10^2+5^2)$ hence perpendicular
	$\dfrac{1}{2} \times \dfrac{-8}{4} = -1$ hence perpendicular	**A1**	

8(a)	–2	**1**	
8(b)	$y = -2x + 4$ or FT $y = (their(a)) x + 4$ or $y = (their(a)) (x + 3) + 10$	**1**	
8(c)	(3, –2)	**2**	**C1** for one correct coordinate
9(a)	$y = 2x + 3$ oe	**2**	**C1** for $y = 2x + c$ o.e. or $y = mx + 3$ oe $m \neq 0$ or $2x + 3$ or **M1** for gradient = 2 or intercept = 3 soi
9(b)	9	**2**	**M1** for $\dfrac{5--1}{1-p} = -\dfrac{3}{4}$ oe or for $5 = -\dfrac{3}{4} \times 1 + c$ **and** $-1 = -\dfrac{3}{4} \times p + c$ seen
10 **(a)**	(–4, 2) (6, 2)	1	Both correct
(b)	(–3, –1) (5, 5)	2	**C1** for one correct or for two x-values or two y-values correct or for **both** (4, 6) **and** (–2, –2)
11 **(a)**	$(4, -\dfrac{1}{2})$	1	
(b)	$\dfrac{5}{6}$	1	
(c) (i)			
(ii)	–2.5, or any equiv.	1	

12 **(i)**	$\dfrac{1}{2}$ or 0.5 cao	1	
(ii)	$y = 1$ final answer	1	
(iii)	Line from (6, 1) to (4, 3)	1	
(iv)	$y = -x + 7$ final answer	2	**B1** for any equation with grad –1 and/or intercept 7
(v)	(0, 6)	2	**B1** for line from (2, 2) with y-intercept between 5 and 7 soi Or for correct (unsimplified) equation ($y = -2x + 6$)

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13	(a)	$\left(-\dfrac{1}{2}, 1\right)$		1	
	(b)	$-\dfrac{6}{7}$		1	
	(c)	(i) $(10, -8)$		2	**C1** for one correct coordinate
		(ii) $\dfrac{1}{3}$		1	
14	(a)	$(2, 1)$		1	
	(b)	$-\dfrac{2}{3}$ or any equiv. **value**		1	
	(c)				**C1** for ($\surd$) 52 or **M1** for $6^2 + (-4)^2$, or for $6^2 + (4)^2$, etc.
15	(a)	$-\dfrac{1}{3}$		1	
	(b)	-1		1	
16	(a)	$(-3, 2.5)$ oe	1		
	(b)	$y = \dfrac{1}{2}x + 4$ isw	2		**B1** for $m = \dfrac{1}{2}$ or $c = 4$ soi
17	(a)	$\begin{pmatrix} 6 \\ 2 \end{pmatrix}$		1	
	(b)	$\dfrac{1}{3}$ oe isw		1	
	(c)	$P = -3$ $Q = 21$		2	**M1** for $7P + Q = 0$ or $9P + Q = -6$ or **B1** for an equation with $m =$ their **(b)** or $c = 7$
	(d)	(i) $(18, -5)$		1	
		(ii) $(\pm) 13$		1	
		(iii) (a) $(12, 11)$		2	**B1** for $(x =)$ 12
18	(a)	$(0.5, 4)$ oe	1		
	(b)	1.2 oe	1		
	(c)	(i) 4	2		B1 for substitution of $(-2,1)$ in $2y + 3x + k = 0$ SC1 for answer -23 or any correct ft after substitution of $(\pm 2, \pm 1)$
		(ii) -1.5 oe	1		

19	(a) –2 5.5	1	
	(b) $y = -0.75x + 4$	2	C1 for $y = -0.75x + c$ or $y = mx + 4$ or B1 for $m = -0.75$ or $c = 4$ soi or a line through either point (–8, 10) or (4, 1)