

Q1.

<p>8 (i) y-step \div x-step = 2 $\rightarrow m = 1$</p>	<p>M1 A1 [2]</p>	<p>Gradient = y-step \div x step used co</p>
<p>(ii) Eqn of AC $y + 2 = -2(x - 3)$ Eqn of BC $y - 22 = -(x - 15)$ Sim eqns $y + 2x - 4$, $y - x + 7$ $\rightarrow C(-1, 6)$</p>	<p>M1 A1 \checkmark A1 \checkmark A1 [4]</p>	<p>Correct form of one of lines. \checkmark to his m \checkmark to his m co</p>
<p>(iii) M is $(9, 10)$ Perp gradient is $-\frac{1}{2}$ $\rightarrow 2y + x - 29$, $y - x + 7$ Sim eqns $\rightarrow D(5, 12)$</p>	<p>B1 M1 M1 A1 [4]</p>	<p>co Use of $m_1 m_2 = -1$ Solve sim eqns for their BC & perp. bis co</p>

Q2.

<p>8 (i) Mid-point of $AC = (2, 3)$ Gradient of $AC = \frac{1}{3}$ Gradient of $BD = -3$ Equation $y - 3 = -3(x - 2)$</p>	<p>B1 M1 A1 [3]</p>	<p>Co Use of $m_1 m_2 = -1$ Co</p>
<p>(ii) If $x = 0$, $y = 9$, $B(0, 9)$ Vector move $D(4, -3)$</p>	<p>B1 \checkmark M1 A1 [3]</p>	<p>\checkmark on his equation. Valid method. co.</p>
<p>(iii) $AC = \sqrt{40}$ $BD = \sqrt{160}$ Area = 40 (or by matrix method M2 A1)</p>	<p>M1 M1 A1 [3]</p>	<p>Correct use on either AC or BD, Full and correct method. co</p>

Q3.

<p>3 $\frac{x}{a} + \frac{y}{b} = 1$ $P(a, 0)$ and $Q(0, b)$ Distance $\rightarrow \sqrt{a^2 + b^2} = \sqrt{45}$ Gradients $\rightarrow \frac{-a}{b} = \frac{-1}{2}$ Solution of sim eqns $\rightarrow a = 6, b = 3$</p>	<p>M1 A1 M1 A1 A1 [5]</p>	<p>M1 even if sign(s) incorrect. Correct values a and b (both)</p>
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Q4.

9	(i) $M = (1, 4)$ gradient = $\frac{1}{2}$ soi grad of $MB = -2$ soi Equation $MB: y - 4 = -2(x - 1)$ When $y = 0, x = 3$ or $B = (3, 0)$	B1B1 M1 A1 ✓ A1 ✓ [5]	Use of $m_1m_2 = -1$ Or $y = -2x + 6$ ft on <i>their</i> $\frac{1}{2}$ or M ft result of putting $y = 0$ into <i>their</i> eqn
	(ii) grad of $AB = -\frac{2}{6}$; grad of $BC = \frac{6}{2}$ oe $m_1m_2 = -1 (\Rightarrow AB \perp AC)$	M1 ✓ A1 [2]	At least one correct ✓ AG Allow omitted conclusion
	(iii) $D = (-1, 8)$ $AD = \sqrt{40}$ or 6.32	B1 B1 [2]	

Q5.

7	$A(2, 14), B(14, 6)$ and $C(7, 2)$.			
	(i) m of $AB = -\frac{2}{3}$	B1		
	m of perpendicular = $\frac{3}{2}$	M1		For use of $m_1m_2 = -1$
	eqn of $AB: y - 14 = -\frac{2}{3}(x - 2)$	M1		Allow M1 for unsimplified eqn
	eqn of $CX: y - 2 = \frac{3}{2}(x - 7)$	M1		Allow M1 for unsimplified eqn
	Sim Eqns $\rightarrow X(11, 8)$	M1 A1	[6]	For solution of sim eqns.
(ii) $AX: XB = 14 - 8 : 8 - 6 = 3 : 1$ Or $\sqrt{(9^2 + 6^2)} : \sqrt{(3^2 + 2^2)} = 3 : 1$	M1 A1	[2]	Vector steps or Pythagoras.	

Q6.

2	(i) $(3\frac{1}{2}, 2)$	B1	[1]	
	(ii) $m = \frac{-1-5}{5-2} = -2$	B1		
	$y - 6 = \frac{-1}{m}(x - 8)$	M1		Use of $m_1m_2 = -1$ and $y - k = m(x - h)$
	$x - 2y + 4 = 0$	A1	[3]	Accept any form

Q7.

<p>7 (i) mid-point = (3, 4) Grad. $AB = -\frac{1}{2} \rightarrow$ grad. of perp., = 2 $y - 4 = 2(x - 3)$ $y - 2x - 2$</p> <p>(ii) $q - 2p - 2 \checkmark \quad p^2 + q^2 - 4$ oe $p^2 + (2p - 2)^2 - 4 \rightarrow 5p^2 - 8p - 0$ {OR $\frac{1}{4}(q + 2)^2 + q^2 - 4 \rightarrow 5q^2 + 4q - 12 - 0$ }</p> <p>(0, -2) and $\left(\frac{8}{5}, \frac{6}{5}\right)$</p>	<p>B1 M1 M1 A1</p> <p>[4]</p> <p>B1 \checkmark B1 M1</p> <p>A1A1</p> <p>[5]</p>	<p>soi For use of $-1/m$ soi ft on <i>their</i> (3, 4) and 2</p> <p>ft for 1st eqn. Attempt substn (linear into quadratic) & simplify</p>
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Q8.

<p>3 (i) gradient of perpendicular = $-\frac{1}{2}$ soi $y - 1 = -\frac{1}{2}(x - 3)$</p> <p>(ii) $C = (-9, 6)$ $AC^2 = [3 - (-9)]^2 + [1 - 6]^2$ (ft on <i>their</i> C) $AC = 13$</p>	<p>B1 B1</p> <p>[2]</p> <p>B1 M1 A1</p> <p>[3]</p>	<p>soi in (i) or (ii) OR $AB^2 = [3 - (-21)]^2 + [1 - 11]^2$ M1 $AB = 26$ A1 $AC = 13$ A1</p>
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