

MEGA LECTURE

Q1.

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

Q2.

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

Q3.

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 $\rightarrow a = 6, b = 3$	M1 A1 M1 A1 A1 [5]	M1 even if sign(s) incorrect. Correct values a and b (both)
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Q4.

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<p>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 $B = (3, 0)$</p>	<p>B1B1</p>	<p>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</p>
<p>(ii) grad of $AB = -\frac{2}{6}$; grad of $BC = \frac{6}{2}$ oe $m_1m_2 = -1 (\Rightarrow AB \perp AC)$</p>	<p>M1✓ A1</p>	<p>At least one correct ✓ AG Allow omitted conclusion</p>
<p>(iii) $D = (-1, 8)$ $AD = \sqrt{40}$ or 6.32</p>	<p>B1 B1</p>	<p>[5] [2] [2]</p>

Q5.

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

Q6.

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

Q7.

MEGA LECTURE

<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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