

Question number	Scheme	Marks
3 (a)	(Midpoint of $AB =) (5, 5)$	B1
	(Gradient of $AB =) \frac{3-7}{9-1} = \left(-\frac{1}{2}\right)$ oe	M1
	(Gradient of $l =) -\left(\frac{1}{-\frac{1}{2}}\right) (= 2)$	A1ft
	$y - "5" = "2"(x - "5")$ oe	M1 A1 (5)
ALT	Let $D(x, y)$ be any point on the line	
	$x - 1^2 + y - 7^2 = x - 9^2 + y - 3^2$	{B1}
	$x^2 - 2x + 1 + y^2 - 14y + 49 = x^2 - 18x + 81 + y^2 - 6y + 9$	{M1} {A1ft}
	$16x - 40 = 8y \rightarrow (y = 2x - 5)$	M1 A1
(b)	$x = \frac{5}{2}$	B1ft
	(length of C to midpoint of $AB =) \sqrt{("5"-0)^2 + ("5"-2.5)^2} \left(= \frac{5\sqrt{5}}{2} \right)$	M1
	(length of $AB =) \sqrt{8^2 + 4^2} (= 4\sqrt{5})$	B1 (A1 on ePen)
	$\frac{1}{2} \times 4\sqrt{5} \times \frac{5\sqrt{5}}{2}$	M1
	25	A1 [5]
ALT1	Use of determinant	
	$x = \frac{5}{2}$	B1ft
	$\frac{1}{2} \begin{vmatrix} 1 & 9 & "2.5" & 1 \\ 7 & 3 & 0 & 7 \end{vmatrix}$	M1 A1
	$\left(\frac{1}{2}\right) \left (1 \times 3 + 9 \times 0 + "2.5" \times 7) - (1 \times 0 + "2.5" \times 3 + 9 \times 7) \right $ oe	M1
	25	A1 [5]

ALT2	Area of rectangle – (sum of areas of 3 triangles)	
	$x = \frac{5}{2}$	B1ft
	$\frac{1}{2} \times \left(\frac{5}{2} - 1 \right) \times 7 + \frac{1}{2} \times \left(9 - \frac{5}{2} \right) \times 3 + \frac{1}{2} (9-1)(7-3)$ $\left(= \frac{21}{4} + \frac{39}{4} + 16 = 31 \right)$	M1
	$(9-1) \times 7 = 56$	A1
	$56 - "31"$	M1
	35	A1 [5]
Total 10 marks		

Part	Marks	Notes
(a)	B1	For midpoint of $AB = (5, 5)$
	M1	For correctly finding the unsimplified gradient of $AB = \frac{3-7}{9-1}$ oe
	A1ft	For correctly finding the unsimplified gradient of line l , use of their gradient for AB to find the negative reciprocal. $-\left(\frac{1}{-\frac{1}{2}}\right)$
	M1	For a correct method to find the equation of l using their midpoint and their gradient, which must have involved finding the negative reciprocal of the gradient of AB
	A1	For $y - 5 = 2(x - 5)$ ft oe
ALT	B1	For correctly equating the two expressions for AD^2 and AB^2 to give the equation shown
	M1	For an expansion of either their LHS or their RHS provided their equation is in the form. $x - a^2 + y - b^2 = x - c^2 + y - d^2$ Allow one numerical or algebraic slip.
	A1ft	For a correct expansion of both their LHS and their RHS provided their equation is in the form. $x - a^2 + y - b^2 = x - c^2 + y - d^2$
	M1	For simplifying leading to a linear equation
	A1	For $y = 2x - 5$ oe
(b)	B1ft	For $x = \frac{5}{2}$ ft their equation from part (a) with $y = 0$
	M1	For finding the unsimplified length of C to midpoint of $AB = \sqrt{("5"-0)^2 + ("5"- "2.5")^2} \left(= \frac{5\sqrt{5}}{2} \right)$ Allow use of their $(5, 5)$ and their C
	B1 (A1 on ePen)	For finding the unsimplified length of $AB = \sqrt{8^2 + 4^2} (= 4\sqrt{5})$
	M1	For area of triangle $= \frac{1}{2} \times 4\sqrt{5} \times \frac{5\sqrt{5}}{2}$
	A1	For 25
ALT1	B1ft	As main
	M1	For the determinant set up with their C
	A1	For the determinant set up fully correctly
	M1	For correctly evaluating their determinant, with their C , full working must be shown.
	A1	25
ALT2	B1ft	As main
	M1	For the correct calculation of the three areas using their C
	A1	For the correct rectangle area