Page 4Mark SchemeSyllabusPaperGCE AS LEVEL - October/November 20129709221EITHERState or imply non-modular inequality $(2x + 1)^2 < (2x - 5)^2$, or corresponding equation or pair of linear equations Obtain critical value 1A1State correct answer $x < 1$ A1ORState the critical value $x = 1$, by solving a linear equation (or inequality) or from a graphical method or by inspectionB22Use quotient rule or product rule, correctlyM1Obtain correct derivative in any formA1Equate derivative to zero and solve for x M1Obtain $x = \frac{\pi}{8}$ A13(i) Attempt division by $x^2 - 3x + 2$ or equivalent, and reach a partial quotient of $x^2 + kx$ M1Obtain $x^2 - x - 2$ with no errors seenA131(i) Correct solution method for either quadratic e.g. factorisation A11 solutions $x = 2, x = 1$ and $x = -1$ given and no othersM14(i) State or imply correct ordinates $1.4142, 1.1370, 1$ Use correct formula, or equivalent, correctly with $h = \frac{\pi}{4}$ and three ordinatesM1Obtain answer 1.84 with no errors seenA1[3](ii) Use the iterative formula correctly at least once Obtain final answer 1.06 A1(ji) Use the iterative formula correctly at least once Obtain final answer 1.06 A1(ji) Use the iterative formula correctly at least once Obtain final answer 1.06 A1(ji) Use the iterative formula correctly at least once Obtain final answer 1.06 A1(ji) Use the iterative formula correctly at least once Obtain $h = 3.5$					9709	<u>w12</u> ms	<u>s 2</u> 2
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(a)) Obtain ir Correct i	ntegral $ke^{-\frac{1}{2}x}$ with any non-zero k ntegral		M1 A1	[2]
(b)	State cor	efinite integral of the form $k \ln (3x - 1)$, where $k = 2, 6$ or 3 rect integral 2 ln $(3x - 1)$ e limits correctly (must be a function involving a logarithm)		M1 A1 M1	
		for the logarithm of a power or a quotient iven answer correctly		M1 A1	[5
(i)	State 4y	$\frac{\mathrm{d}y}{\mathrm{d}x}$ as derivative of $2y^2$, or equivalent		B1	
	State 4y	$+4x\frac{dy}{dx}$ as derivative of 4xy, or equivalent		B1	
		erivative of LHS to zero and solve for $\frac{dy}{dx}$		M1	
	Obtain g	iven answer correctly		A1	[4
(ii)		mply that the coordinates satisfy $3x - 2y = 0$		B1	
	Solve an	n equation in x^2 (or y^2) d obtain $x^2 = 4$ (or $y^2 = 9$)		M1 A1	
		wer $(2, 3)$ wer $(-2, -3)$		A1 A1	[5
(a)) Use tan ((A + B) formula to obtain an equation in tan B		M1	
		hation $\frac{t + \tan B}{1 - t \tan B} = 4$, or equivalent		A1	
	Solve to	obtain $\tan B = \frac{4-t}{1+4t}$		A1	[3
(b)) State equ	vation $2\left(\frac{\tan 45 - \tan x}{1 + \tan 45 \tan x}\right) = 3 \tan x$, or equivalent		B1	
	Transfor	m to a quadratic equation		M1	
		$tan^2 x + 5tan x - 2 = 0$ (or equivalent) e quadratic and calculate one angle, or establish that $tan x = \frac{1}{3}$, -	-2	A1 M1	
	Obtain of	ne answer, e.g. $x = 18.4^{\circ}$		A1	ГZ
	Obtain o	ther 3 answers 116.6°, 198.4°, 296.6° and no others in range		A1	[6