

Question		Answer	Marks	AO	Guidance
9	(a)	$\frac{dy}{dx} = e^x - 4e^{-x} = 3$	M1	2.1	Equate to 3
		$(e^x)^2 - 3e^x - 4 = 0$	E1	2.1	AG Rearrange to quadratic in e^x Also allow $e^{2x} - 3e^x - 4 = 0$ Expression = 0 must be seen
			[2]		
9	(b)	Solve to give $e^x = [-1], 4$	M1	2.1	May be BC giving at least one root of the quadratic equation (a)
		When $e^x = 4, x = \ln 4$	A1	2.1	$x = \ln 4$ must be seen explicitly
		When $e^x = -1$ there are no real values of x , so no other points on the curve.	E1	2.1	must explain why they reject the value -1 for e^x , or state $e^x + 1$ is never zero
			[3]		
9	(c)	Equation $y = \int (e^x - 4e^{-x}) dx$			
		$[y =]e^x + 4e^{-x} [+c]$	B1	3.1a	Condone missing $+c$ in their integral
		When $x=0, y=0=1+4+c$	M1	3.1a	Attempt to evaluate c
		So $c = -5$ $[y = e^x + 4e^{-x} - 5]$	A1	1.1b	
		When $x=1, y = e^1 + 4e^{-1} - 5$	M1	2.1	Substituting $x=1$ into their expression
		$y = -0.810 < 0$ so below the x -axis	E1	2.1	AG must argue below the axis from correct y value. Must be clear that -0.81 is a y -coordinate
			[5]		