

Question			Answer	Marks	AO	Guidance	
11	(a)		$\left(2 + \frac{dy}{dx}\right)(y - 1) + (2x + y)\frac{dy}{dx} = 0$	M1	1.1	Attempt to differentiate both sides of the equation RHS = 0 soi	May see multiplied out (either before or after differentiation)
				M1	1.1	Attempt to use the product rule for LHS Not dependent on first M1	Or attempt to differentiate a term in xy from their multiplied-out LHS.
			$(2y + 2x - 1)\frac{dy}{dx} + 2y - 2 = 0$	M1	2.1	Collects terms. Independent of previous M marks	
			$\frac{dy}{dx} = \frac{2(1 - y)}{2y + 2x - 1}$	A1	2.1	Convincing argument including RHS=0 seen above	AG
				[4]			
11	(b)		At (2, 2), $\frac{dy}{dx} = -\frac{2}{7}$	B1	1.1		soi
			Gradient of normal is $\frac{7}{2}$	B1FT	1.1	FT their value for $\frac{dy}{dx}$	Soi Allow $-\frac{2y+2x-1}{2(1-y)}$
			So equation of the normal is $y - 2 = \frac{7}{2}(x - 2)$	B1	1.1	Any form eg $y = 3.5x - 5$	
				[3]			
11	(c)		If the tangent is parallel to the axis				
			$\frac{dy}{dx} = \frac{2(1-y)}{2y+2x-1} = 0$	M1	3.1a	Equates $\frac{dy}{dx} = 0$ and attempts to solve . Award if $2 - 2y = 0$ seen	
			So $y = 1$	B1	1.1	Award if seen	
			When $y = 1, (y - 1) = 0$				
			$(2x + y)0 = 6$ which is not possible	A1	2.1	Clear evidence this is not possible	Eg $0 \neq 6$ seen
				[3]			