

Q	Marking Instructions	AO	Marks	Typical Solution
8(a)	Uses the product rule for either term	AO1.1a	M1	$y = 2x\cos 3x + (3x^2 - 4)\sin 3x$
	Uses the product rule for both terms	AO1.1a	M1	$\frac{dy}{dx} = 2\cos 3x - 6x\sin 3x$ $+ 6x\sin 3x + 3(3x^2 - 4)\cos 3x$
	Differentiates both terms correctly	AO1.1b	A1	$= (9x^2 - 10) \cos 3x$
	Rearranges to correct form CAO	AO1.1b	A1	
(b)	Finds $\frac{d^2y}{dx^2}$ from 'their' first derivative and equates to zero	AO3.1a	M1	$\frac{d^2y}{dx^2} = 18x\cos 3x - 3(9x^2 - 10)\sin 3x$
	Applies product rule correctly on 'their' $\frac{dy}{dx}$ FT only applies if both M1 marks awarded in part (a)	AO1.1b	A1F	point of inflection $\Rightarrow \frac{d^2y}{dx^2} = 0 \Rightarrow$ $18x\cos 3x - 3(9x^2 - 10)\sin 3x = 0$ $\Rightarrow \frac{\cos 3x}{\sin 3x} = \frac{3(9x^2 - 10)}{18x}$
	Arrives at a result using 'their' second derivative through correct algebraic manipulation that is correct for 'their' second derivative FT only applies if both previous marks in (b) have been awarded.	AO1.1b	A1F	$\Rightarrow \cot 3x = \frac{9x^2 - 10}{6x}$
	Constructs a clearly explained rigorous mathematical argument, to show the required result This must include a concluding statement or an explanation of reasoning at the start. AG	AO2.1	R1	(AG)
Total			8	