

Q	Marking Instructions	AO	Marks	Typical Solution
9(a)(i)	Selects an appropriate routine procedure; evidence of quotient rule or product rule	AO1.1a	M1	$\frac{dy}{dx} = \frac{2(4x^2 + 7) - 8x(2x + 3)}{(4x^2 + 7)^2}$
	Obtains correct derivative (no need for simplification)	AO1.1b	A1	
(a)(ii)	States clearly that $\frac{dy}{dx} > 0 \Rightarrow y$ is increasing	AO2.4	R1	$y \text{ is increasing} \Leftrightarrow \frac{dy}{dx} > 0$ $\frac{2(4x^2 + 7) - 8x(2x + 3)}{(4x^2 + 7)^2} > 0$ $(4x^2 + 7)^2 > 0 \text{ for all } x$ $\therefore 2(4x^2 + 7) - 8x(2x + 3) > 0$ $8x^2 + 14 - 16x^2 - 24x > 0$ $4x^2 + 12x - 7 < 0 \text{ (AG)}$
	Forms inequality from 'their' $\frac{dy}{dx} > 0$	AO3.1a	B1	
	Deduces numerator must be positive	AO2.2a	R1	
	Considers denominator alone and sets out clear argument to justify given inequality AG Only award this mark if they have a completely correct solution, which is clear, easy to follow and contains no slips	AO2.1	R1	
(b)	Solves the correct quadratic inequality (accept evidence of factorising, completing the square, use of formula, or correct critical values stated)	AO1.1a	M1	$(2x + 7)(2x - 1)$ $x = -\frac{7}{2}, \frac{1}{2}$ $-\frac{7}{2} < x < \frac{1}{2}$ Or $x \in \left(-\frac{7}{2}, \frac{1}{2}\right)$ Or $x \in \left[x: -\frac{7}{2} < x < \frac{1}{2}\right]$
	Obtains fully correct answer, given as an inequality or using set notation	AO1.1b	A1	
Total			8	