8	**(a)**		$\frac{d}{dx}\left(e^{2x}\right) = 2e^{2x}$	**B1**	**1.1**	Seen anywhere in solution	
			$6xe^{2x} + (2 + 3x^2)(2e^{2x})$	**M1**	**1.1a**	Attempt product rule	Could expand first
			$e^{2x}(6x^2 + 6x + 4)$	**A1**	**1.1**	Obtain any fully correct expression	
				[3]			
	(b)		$e^{2x} > 0$ for all x	**B1**	**2.1**		B0 if clearly considering $f(x)$ or $f''(x)$ and not $f'(x)$
			$6x^2 + 6x + 4 = 6\left(x+\frac{1}{2}\right)^2 + \frac{5}{2}$	**M1**	**2.1**	Attempt to show that their 3 term quadratic factor is > 0 for all x	Complete the square or consider discriminant
			minimum value is $\frac{5}{2}$ so > 0 for all x				Could be multiple or fraction of their quadratic

Question			Answer	Marks	AO	Guidance	
				A1	**2.4**	Full justification that quadratic factor is always positive	Show minimum point > 0, or show that quadratic is always positive
			Gradient $e^{2x}(6x^2 + 6x + 4) > 0$ for all x so it is increasing for all x	**A1**	**2.4**	Justify increasing function as $f'(x) > 0$ for all x	
				[4]			**OR** B1 $e^{2x} \neq 0$ M1 Show that quadratic $\neq 0$ (detail required) M1 Show gradient is positive at one point, as part of attempt to show $f'(x) \neq 0$ A1 Conclude that gradient must hence be positive for all x, so increasing function