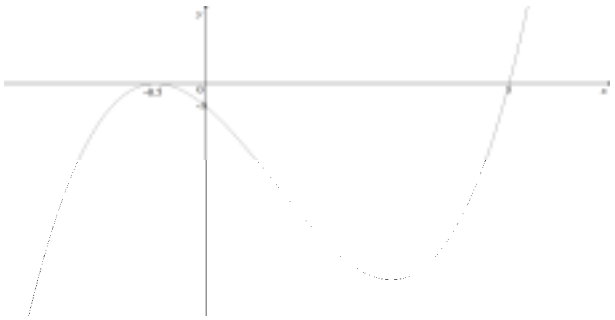
Question	Answer	Marks	Guidance
3(a)	$\frac{dy}{dx} = (2x+1)^2 + 4(2x+1)(x-3)$ or $\frac{dy}{dx} = 12x^2 - 16x - 11$	**M1**	For correct attempt to differentiate a product or expansion and then differentiate.
	$x = -\frac{1}{2}, \quad \frac{11}{6}$	**2**	**M1** for setting *their* quadratic $\frac{dy}{dx}$ to zero and attempting to solve to obtain two x values.
	$y = 0, \quad -\frac{686}{27}$ or -25.4	**A1**	For both Must be separate inequalities
3(b)		**3**	**B1** for correct shape with max on the negative x-axis and a min in the 4th quadrant **B1** for correct x intercepts $-\frac{1}{2}$ and 3. Must have a cubic curve **B1** for correct y intercept -3. Must have a cubic curve
3(c)	$k > 0$	**B1**	
	$k < -\frac{686}{27}$ or $k < -25.4$	**B1**	**FT** on *their* $-\frac{686}{27}$ or -25.4 from part (a)
4	$1 + 2e^{2x} + e^{4x}$	**B1**	For correct integrand
	$x + e^{2x} + \frac{e^{4x}}{4}$	**B2**	**B1** for 2 correct terms in integral
	$\left(2 + e^4 + \frac{e^8}{4}\right) - \left(1 + \frac{1}{4}\right)$	**M1**	For correct application of limits. Must be in the form $me^{4x} + ne^{2x} + x$
	$\frac{3}{4} + e^4 + \frac{e^8}{4}$	**A1**	

© Cambridge University Press & Assessment 2024