| Question | | | Answer | Marks | AO | Guidance | |
|---|---|---|---|---|---|---|---|
| **6** | | | $\frac{dy}{dx} = 2x + k + 4x^{-2}$ | **M1** | **1.1a** | Attempt to differentiate | Power decreases by 1 for at least 2 terms |
| | | | $2(-2) + k + 4(-2)^{-2} = 0$ | **M1** | **3.1a** | Substitute $x = -2$, equate to 0 and attempt to solve | |
| | | | $k = 3$ | **A1** | **1.1** | | |
| | | | $\frac{d^2y}{dx^2} = 2 - 8x^{-3}$ | | | | |
| | | | $2 - 8x^{-3} = 0$ | **M1** | **3.1a** | Equate second derivative to 0 and attempt to solve | |
| | | | $x = 4^{\frac{1}{3}}$ | **A1** | **1.1** | | |
| | | | for $x < 4^{\frac{1}{3}} \Rightarrow \frac{d^2y}{dx^2} < 0$<br>for $x > 4^{\frac{1}{3}} \Rightarrow \frac{d^2y}{dx^2} > 0$ | **E1** | **2.1** | Consider convex/concave either side of $x = 4^{\frac{1}{3}}$ and conclude | |
| | | | When $x = 4^{\frac{1}{3}}, \frac{dy}{dx} \neq 0$ hence not a stationary point | **E1** | **2.1** | Consider gradient at $x = 4^{\frac{1}{3}}$, or justify that $x = -2$ is the only stationary point | |
| | | | | **[7]** | | | |