* Analytical Solution -

$$\Rightarrow I = \int_{-2}^{4} (1 - x - 4x^3 + 2x^5)\, dx$$

$$= \left| x \right|_{2}^{4} - \left| \frac{x^2}{2} \right|_{-2}^{4} - 4 \left| \frac{x^4}{4} \right|_{-2}^{4} + 2 \left| \frac{x^6}{6} \right|_{-2}^{4}$$

$$= [4 - (-2)] - \frac{1}{2}[(4^2) - (2)^2] - \frac{4}{4}[(4)^4 - (-2)^4] + \frac{2}{6}[(4)^6 - (-2)^6]$$

$$\therefore \boxed{I = 110^4}$$