

(Q2)

(a)

$$\begin{aligned}\int \frac{t^4 + 2t + 1}{\sqrt[3]{t}} dt &= \int (t^4 + 2t + 1)t^{-\frac{1}{3}} dt \\ &= \int t^{\frac{11}{3}} dt + 2 \int t^{\frac{2}{3}} dt + \int t^{\frac{1}{3}} dt \\ &= \frac{3}{14} t^{\frac{14}{3}} + \frac{6}{5} t^{\frac{5}{3}} + \frac{3}{2} t^{\frac{2}{3}}\end{aligned}$$

(b)

$$\begin{aligned}\int (x+1)x^{135} dx &= \int x^{136} dx + \int x^{135} dx \\ &= \frac{1}{137} x^{137} + \frac{1}{136} x^{136}\end{aligned}$$

(c) Let $u = 2\pi x$ Then $du = 2\pi dx$. Then we have

$$\int_0^1 \sin(u) du = \int_0^{2\pi} \sin(2\pi x) \frac{1}{2\pi} dx = \left. \frac{-\cos(2\pi x)}{2\pi} \right|_0^{2\pi} = 0$$

(d)

$$\int_{-1}^1 (e^t + t^3) dt = \left(e^t + \frac{1}{4} t^4 \right) \Big|_{-1}^1 = e - \frac{1}{e}$$