

Ex 1.3.10

$$\begin{aligned}
 \text{a) } \int_1^4 (x^2 - 2x + 3) dx &= \left. \frac{1}{3}x^3 - x^2 + 3x \right|_1^4 \\
 &= \left( \frac{1}{3} \cdot 64 - 16 + 12 \right) - \left( \frac{1}{3} - 1 + 3 \right) \\
 &= \frac{63}{3} - 6 = 21 - 6 = \underline{15}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } \int_{-1}^1 (2x^3 + 3x^2 + 2x - 1) dx &= \left. \frac{1}{2}x^4 + x^3 + x^2 - x \right|_{-1}^1 \\
 &= \left( \frac{1}{2} + 1 + 1 - 1 \right) - \left( \frac{1}{2} - 1 + 1 + 1 \right) = \underline{0}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } \int_{-1}^1 \sqrt[3]{x+1} dx &= \int_{-1}^1 (x+1)^{1/3} dx = \left. \frac{1}{\frac{4}{3}} (x+1)^{4/3} \right|_{-1}^1 \\
 &= \frac{3}{4} \left( 2^{4/3} - 0^{4/3} \right) = \frac{3}{4} \sqrt[3]{16} = \frac{3}{4} \cdot 2 \sqrt[3]{2} \\
 &= \underline{\frac{3}{2} \sqrt[3]{2}}
 \end{aligned}$$

$$\begin{aligned}
 \text{f) } \int_0^2 (1+2x)^3 dx &= \frac{1}{2} \int_0^2 (1+2x)^3 \cdot 2 dx = \frac{1}{2} \cdot \frac{1}{4} (1+2x)^4 \Big|_0^2 \\
 &\quad \begin{array}{l} u=1+2x \\ u'=2 \end{array} \\
 &= \frac{1}{8} 5^4 - \frac{1}{8} \cdot 1^4 = \frac{1}{8} (625 - 1) = \frac{624}{8} = \underline{78}
 \end{aligned}$$

$$\begin{aligned}
 \text{g) } \int_1^4 \frac{dx}{\sqrt{x}} &= \int_1^4 x^{-1/2} dx = \left. \frac{1}{\frac{1}{2}} x^{1/2} \right|_1^4 = 2\sqrt{x} \Big|_1^4 = 2 \cdot 2 - 2 \cdot 1 = \underline{2}
 \end{aligned}$$