

Exam

$$1. \int_{-2}^2 x^2 dx = \frac{x^3}{3} \Big|_{-2}^2 = \frac{(2)^3}{3} - \frac{(-2)^3}{3}$$

$$= \frac{8}{3} - \frac{-8}{3} = \frac{8}{3} + \frac{8}{3} = \frac{16}{3}$$

$$2. \int_{-3}^3 \left(\frac{2x^3}{3} + 3x \right) dx$$

$$= \left(\frac{2x^4}{4} + \frac{3x^2}{2} \right) \Big|_{-3}^3$$

$$= \left[\frac{2(3)^4}{4} + \frac{3(3)^2}{2} \right]$$

$$= \left[\frac{2(81)}{4} + \frac{27}{2} \right] - \left[\frac{2(-3)^4}{4} + \frac{3(-3)^2}{2} \right]$$

$$= \left[\frac{162}{4} + \frac{27}{2} \right] - \left[\frac{162}{4} + \frac{27}{2} \right]$$

$$= \frac{162}{4} + \frac{27}{2} - \frac{162}{4} - \frac{27}{2} = 0$$

$$3. \int_{-3}^3 \left(\frac{x^5}{5} - \frac{x^4}{4} + \frac{x^2}{2} \right) dx$$

$$= \left(\frac{x^6}{6} - \frac{x^5}{5} + \frac{x^3}{3} \right) \Big|_{-3}^3 = \left[\frac{(3)^6}{6} - \frac{(3)^5}{5} + \frac{(3)^3}{3} \right] - \left[\frac{(-3)^6}{6} - \frac{(-3)^5}{5} + \frac{(-3)^3}{3} \right]$$

$$= \left[\frac{729}{6} - \frac{243}{5} + 9 \right] - \left[\frac{729}{6} - \frac{-243}{5} - 9 \right]$$

$$= \left[\frac{729}{6} + 9 \right] - \left[\frac{729}{6} - \frac{243}{5} - 9 \right]$$

$$= \frac{729}{6} + 9 - \frac{729}{6} + \frac{243}{5} + 9$$

$$= 0$$

$$5. \int_0^{12} G(x) dx$$

$$= \int_0^{12} (x^2 + 9x) dx$$

$$= \left(\frac{x^3}{3} + \frac{9x^2}{2} \right) \Big|_0^{12}$$

$$= \left(\frac{12^3}{3} + \frac{9(12)^2}{2} \right) - \left(\frac{0^3}{3} + \frac{9(0)^2}{2} \right)$$

$$= 768 + 96 = 864$$

$$\int_0^{12} G(x) dx = 864$$

$$6. \int_{-1}^6 -\frac{x^2}{4} + x + 3 dx$$

$$= \int_{-1}^6 \left[9 - \left(\frac{x}{2}\right)^2 \cdot (6-x) \right] dx = \int_{-1}^6 \left[3 - \frac{x^2}{4} + x \right] dx$$

$$= \left[3x - \frac{x^3}{12} + \frac{x^2}{2} \right] \Big|_{-1}^6 = \frac{61}{3}$$

