

6. Evaluate

$$\int_{-1}^1 (x^2 - 2x + 1) dx.$$

$$\int_{-1}^1 (x^2 - 2x + 1) dx$$

$$= \left. \frac{x^3}{3} - x^2 + x \right|_{-1}^1$$

$$= \left(\frac{1}{3} - 1 + 1 \right) - \left(-\frac{1}{3} - 1 - 1 \right)$$

$$= \frac{2}{3} + 2 = \frac{8}{3}$$

7. Evaluate

$$\int_0^{\pi/4} \sin(2x) dx.$$

$$\int_0^{\frac{\pi}{4}} \sin(2x) dx$$

$$= \int_0^{\frac{\pi}{4}} \sin(2x) \frac{1}{2} d(2x)$$

$$= \frac{1}{2} \int_0^{2 \cdot \frac{\pi}{4}} \sin u du = \frac{1}{2} \int_0^{\frac{\pi}{2}} \sin u du$$

$$= \frac{1}{2} (-\cos u) \Big|_0^{\frac{\pi}{2}} = \frac{1}{2} (0 + 1) = \frac{1}{2}$$