

Solutions

Each answer shows the steps, then the **result**.

2.1

- $u = x^3 + 5; du = 3x^2 dx$

2.2

- $u = x^2, du = 2x dx; \int e^u du = e^{x^2} + C$

2.3

- $u = 4x, dx = \frac{1}{4}du; -\frac{1}{4}\cos(4x) + C$

3.1 C

- $u = x^2$ gives $du = 2x dx$, matching the x in the integrand

3.2

- $u = x^2 + x, du = (2x + 1) dx; \int u^5 du = \frac{u^6}{6} = \frac{(x^2 + x)^6}{6} + C$

3.3

- $u = x^3 + 1, du = 3x^2 dx$; limits $x = 0 \rightarrow u = 1, x = 1 \rightarrow u = 2$; $\int_1^2 \sqrt{u} du = \left[\frac{2}{3}u^{3/2}\right]_1^2 = \frac{2}{3}(2\sqrt{2} - 1) \approx 1.22$