

Solutions

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

2.1

- $u = x$ (algebraic), $dv = \cos x \, dx$

2.2

- $du = dx$, $v = \sin x$; $\int x \cos x \, dx = x \sin x - \int \sin x \, dx = x \sin x + \cos x + C$

2.3

- $u = x$, $dv = e^{2x} \, dx \Rightarrow v = \frac{1}{2}e^{2x}$; $\frac{1}{2}xe^{2x} - \int \frac{1}{2}e^{2x} \, dx = \frac{1}{2}xe^{2x} - \frac{1}{4}e^{2x} + C$

3.1 B

- x is algebraic (A), $\sin x$ is trig (T); A comes before T, so $u = x$

3.2

- $u = \ln x$, $dv = dx$, $v = x$; $x \ln x - \int x \cdot \frac{1}{x} \, dx = x \ln x - x + C$

3.3

- $u = x$, $dv = e^x \, dx$; $[xe^x]_0^1 - \int_0^1 e^x \, dx = (e - 0) - [e^x]_0^1 = e - (e - 1) = 1$