

**Question 5**

Recognize a product derivative and evaluate:

$$\int e^x(x+1) dx.$$

**Question 5 – Solution**

**Step 1:** Look for a product whose derivative matches the integrand. Try  $xe^x$ .

**Step 2:** Differentiate with the product rule.

$$\begin{aligned}\frac{d}{dx}(xe^x) &= \frac{d}{dx}(x)e^x + x\frac{d}{dx}(e^x) \\ &= e^x + xe^x \\ &= e^x(x+1).\end{aligned}$$

**Step 3:** Reverse the derivative.

$$\int e^x(x+1) dx = xe^x + C.$$

$xe^x + C$