

Key

No notes or calculators. Show all work.

Find the antiderivatives.

1. (4 points) $\int 4xe^x dx$

$$u = 4x$$

$$du = 4 dx$$

$$dv = e^x dx$$

$$v = e^x$$

$$= 4xe^x - 4 \int e^x dx$$

$$= \boxed{4xe^x - 4e^x + C}$$

2. (6 points) $\int x^3 \ln(x) dx$

$$u = \ln(x)$$

$$du = \frac{1}{x} dx$$

$$dv = x^3 dx$$

$$v = \frac{1}{4} x^4$$

$$= \frac{1}{4} \ln(x) \cdot x^4 - \frac{1}{4} \int \frac{x^4}{x} dx$$

$$= \frac{1}{4} x^4 \ln(x) - \frac{1}{4} \int x^3 dx$$

$$= \boxed{\frac{1}{4} x^4 \ln(x) - \frac{1}{16} x^4 + C}$$