Calculus Practice: Techniques for Finding Antiderivatives 20b

Evaluate each indefinite integral.

1) $\int x^2 e^{-x}\,dx$

2) $\int x^2 \cdot 2^x\,dx$

3) $\int x^2 \sin x \, dx$

4) $\int x^2 e^x \, dx$

5) $\int x^2 \cos x \, dx$

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Evaluate each indefinite integral.

1) $\int x^2 e^{-x}\,dx$

Use: $u = x^2,\ dv = e^{-x}\,dx$

$$\int x^2 e^{-x}\,dx = \frac{-x^2 - 2x - 2}{e^x} + C$$

2) $\int x^2 \cdot 2^x\,dx$

Use: $u = x^2,\ dv = 2^x\,dx$

$$\int x^2 \cdot 2^x\,dx = \frac{2^x\left(x^2 \cdot (\ln 2)^2 - 2x \ln 2 + 2\right)}{(\ln 2)^3} + C$$

3) $\int x^2 \sin x \, dx$

Use: $u = x^2$, $dv = \sin x \, dx$

$\int x^2 \sin x \, dx = -x^2 \cos x + 2x \sin x + 2\cos x + C$

4) $\int x^2 e^x \, dx$

Use: $u = x^2$, $dv = e^x \, dx$

$\int x^2 e^x \, dx = x^2 e^x - 2xe^x + 2e^x + C$

5) $\int x^2 \cos x \, dx$

Use: $u = x^2$, $dv = \cos x \, dx$

$\int x^2 \cos x \, dx = x^2 \sin x + 2x \cos x - 2\sin x + C$