Calculus Practice: Techniques for Finding Antiderivatives 18a

Evaluate each indefinite integral.

1) $\int x \ln x^2 \, dx$

A) Use: $u = \ln x^2,\ dv = x\,dx$
$$\int x \ln x^2 \, dx = x \ln x - x + C$$

B) Use: $u = \ln x^2,\ dv = x\,dx$
$$\int x \ln x^2 \, dx = \frac{(\ln x)^3}{3} + C$$

C) Use: $u = \ln x^2,\ dv = x\,dx$
$$\int x \ln x^2 \, dx = \frac{x^2 \ln x^2 - x^2}{2} + C$$

D) Use: $u = \ln x^2,\ dv = x\,dx$
$$\int x \ln x^2 \, dx = \frac{2x^2 \ln x - x^2}{4} + C$$

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

A) Use: $u = x,\ dv = e^x\,dx$
$$\int xe^x \, dx = xe^x - e^x + C$$

B) Use: $u = x,\ dv = e^x\,dx$
$$\int xe^x \, dx = x \ln (x+1) - x + \ln (x+1) + C$$

C) Use: $u = x,\ dv = e^x\,dx$
$$\int xe^x \, dx = \frac{(x^2 - 1) \cdot e^{x^2}}{2} + C$$

D) Use: $u = x,\ dv = e^x\,dx$
$$\int xe^x \, dx = \frac{(\ln x)^3}{3} + C$$

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

A) Use: $u = x,\ dv = 2^x\,dx$
$$\int x \cdot 2^x \, dx = \frac{2x^{\frac{3}{2}} \ln 2x}{3} - \frac{4x^{\frac{3}{2}}}{9} + C$$

B) Use: $u = x,\ dv = 2^x\,dx$
$$\int x \cdot 2^x \, dx = \frac{(2x^2 - 1) \cdot e^{2x^2}}{8} + C$$

C) Use: $u = x,\ dv = 2^x\,dx$
$$\int x \cdot 2^x \, dx = x \log_2 x - \frac{x}{\ln 2} + C$$

D) Use: $u = x,\ dv = 2^x\,dx$
$$\int x \cdot 2^x \, dx = \frac{x \cdot 2^x}{\ln 2} - \frac{2^x}{(\ln 2)^2} + C$$

4) $\int x \cdot 2^{-x} \, dx$

A) Use: $u = x,\ dv = 2^{-x}\,dx$
$$\int x \cdot 2^{-x} \, dx = \frac{2x^{\frac{3}{2}} \ln 2x}{3} - \frac{4x^{\frac{3}{2}}}{9} + C$$

B) Use: $u = x,\ dv = 2^{-x}\,dx$
$$\int x \cdot 2^{-x} \, dx = \frac{e^x}{2x + 2} + C$$

C) Use: $u = x,\ dv = 2^{-x}\,dx$
$$\int x \cdot 2^{-x} \, dx = x \log_2 x - \frac{x}{\ln 2} + C$$

D) Use: $u = x,\ dv = 2^{-x}\,dx$
$$\int x \cdot 2^{-x} \, dx = -\frac{x}{2^x \ln 2} - \frac{1}{2^x \cdot (\ln 2)^2} + C$$

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

A) Use: $u = x,\ dv = \cos x\,dx$

$$\int x\cos x\,dx = x\cos^{-1} x - (1 - x^2)^{\frac{1}{2}} + C$$

B) Use: $u = x,\ dv = \cos x\,dx$

$$\int x\cos x\,dx = x\tan x + \ln \cos x + C$$

C) Use: $u = x,\ dv = \cos x\,dx$

$$\int x\cos x\,dx = x\sin x + \cos x + C$$

D) Use: $u = x,\ dv = \cos x\,dx$

$$\int x\cos x\,dx = -x\cot x + \ln \sin x + C$$

6) $\int \ln x\,dx$

A) Use: $u = \ln x,\ dv = dx$

$$\int \ln x\,dx = x\ln x - x + C$$

B) Use: $u = \ln x,\ dv = dx$

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

C) Use: $u = \ln x,\ dv = dx$

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

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7) $\int x^2 \ln x\,dx$

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

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

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

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

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D) Use: $u = x,\ dv = \sin x\,dx$

$$\int x\sin x\,dx = \frac{x^2\tan^{-1} x - x + \tan^{-1} x}{2} + C$$

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