Calculus Practice: Techniques for Finding Antiderivatives 19a

Evaluate each indefinite integral.

1) $\int \frac{(\ln x)^2}{x}\,dx$

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

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

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

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

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

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

D) Use: $u = \ln x,\ dv = \frac{\ln x}{x}\,dx$

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

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

A) Use: $u = \cos^{-1} x,\ dv = dx$

$\int \cos^{-1} x\,dx = x\tan x + \ln \cos x + C$

B) Use: $u = \cos^{-1} x,\ dv = dx$

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

C) Use: $u = \cos^{-1} x,\ dv = dx$

$\int \cos^{-1} x\,dx = -x\cot x + \ln \sin x + C$

D) Use: $u = \cos^{-1} x,\ dv = dx$

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4) $\int \tan^{-1} x\,dx$

A) Use: $u = \tan^{-1} x,\ dv = dx$

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B) Use: $u = \tan^{-1} x,\ dv = dx$

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

C) Use: $u = \tan^{-1} x,\ dv = dx$

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

D) Use: $u = \tan^{-1} x,\ dv = dx$

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

5) $\int x\tan^{-1} x\, dx$

A) Use: $u = \tan^{-1} x,\ dv = x\, dx$
$$\int x\tan^{-1} x\, dx = \frac{x^2\tan^{-1} x - x + \tan^{-1} x}{2} + C$$

B) Use: $u = \tan^{-1} x,\ dv = x\, dx$
$$\int x\tan^{-1} x\, dx = -x\cos x + \sin x + C$$

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

6) $\int x\sec^2 x\, dx$

A) Use: $u = x,\ dv = \sec^2 x\, dx$
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7) $\int x^3 e^{x^2}\, dx$

A) Use: $u = x^2,\ dv = xe^{x^2}\, dx$
$$\int x^3 e^{x^2}\, dx = x\log_2 x - \frac{x}{\ln 2} + C$$

B) Use: $u = x^2,\ dv = xe^{x^2}\, dx$
$$\int x^3 e^{x^2}\, dx = \frac{e^x}{x + 1} + C$$

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

8) $\int x\csc^2 x\, dx$

A) Use: $u = x,\ dv = \csc^2 x\, dx$
$$\int x\csc^2 x\, dx = \frac{x^2\tan^{-1} x - x + \tan^{-1} x}{2} + C$$

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Name________________________________

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