Name: Richard

QUIZ 9 ♠

MATH 201
February 20, 2024

1. $\int xe^{5x}\,dx =$ $x\frac{e^{5x}}{5} - \int \frac{e^{5x}}{5}\,dx = \boxed{\frac{xe^{5x}}{5} - \frac{e^{5x}}{25} + C}$

$u = x \quad dv = e^{5x}dx$

$du = dx \quad v = \frac{e^{5x}}{5}$

Check: $\frac{d}{dx}\left[\frac{xe^{5x}}{5} - \frac{e^{5x}}{25} + C\right] =$

$\frac{1}{5}\left(1e^{5x} + x\,5e^{5x}\right) - \frac{1}{25}e^{5x}\cdot 5 + 0$

$= \frac{e^{5x}}{5} + xe^{5x} - \frac{e^{5x}}{5} = \underline{xe^{5x}}$ ✓

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QUIZ 9 ♢

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February 20, 2024

1. $\int x\cos(3x)\,dx =$ $x\frac{1}{3}\sin(3x) - \int \frac{1}{3}\sin(3x)\,dx$

$u = x \quad dv = \cos(3x)\,dx$

$du = dx \quad v = \frac{1}{3}\sin(3x)$

$= \boxed{\frac{x\sin(3x)}{3} + \frac{\cos(3x)}{9} + C}$

Check:

$\frac{d}{dx}\left[\frac{1}{3}x\sin(3x) + \frac{1}{9}\cos(3x) + C\right]$

$= \frac{1}{3}\left(1\cdot\sin(3x) + x\cos(3x)\cdot 3\right) - \frac{1}{9}\sin(3x)\cdot 3 + 0$

$= \frac{\sin(3x)}{3} + x\cos(3x) - \frac{\sin(3x)}{3} = \underline{x\cos(3x)}$ ✓

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QUIZ 9 ♣

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February 20, 2024

1. $\int x^2 \ln(x)\,dx =$ $\ln(x)\frac{x^3}{3} - \int \frac{x^3}{3}\frac{1}{x}\,dx$

$u = \ln(x) \quad dv = x^2\,dx$

$du = \frac{1}{x}\,dx \quad v = \frac{x^3}{3}$

$= \frac{\ln(x)\,x^3}{3} - \frac{1}{3}\int x^2\,dx$

$= \boxed{\frac{x^3\ln(x)}{3} - \frac{x^3}{9} + C}$

Check: $\frac{d}{dx}\left[\frac{x^3\ln(x)}{3} - \frac{x^3}{9} + C\right] =$ ✓

$\frac{1}{3}\left(3x^2\ln(x) + x^3\frac{1}{x}\right) - \frac{x^2}{3} + 0 = x^2\ln(x) - \frac{1}{3}x^2 + \frac{x^2}{3} = x^2\ln(x)$

Name: _____

QUIZ 9 ♡

MATH 201
February 20, 2024

1. $\int x\sec^2(x)\,dx =$ $x\tan(x) - \int \tan(x)\,dx$

$u = x \quad dv = \sec^2(x)\,dx$

$du = dx \quad v = \tan(x)$

$= \boxed{x\tan(x) - \ln|\sec(x)| + C}$

Check: $\frac{d}{dx}\left[x\tan(x) - \ln|\sec(x)| + C\right]$

$= 1\tan(x) + x\sec^2(x) - \frac{\sec(x)\tan(x)}{\sec(x)} + 0$

$= \tan(x) + x\sec^2(x) - \tan(x) = x\sec^2(x)$ ✓