

Quiz # 1 — 01/22/15

Answer all questions in a clear and concise manner. Answers that are without explanations or are poorly presented may not receive full credit.

1. Use calculus to compute the integral $\int (3x + 5) \sin(x) dx$.

Set $u = 3x + 5$ and $v' = \sin(x)$. Then $u' = 3$ and $v = -\cos(x)$. Using integration by parts,

$$\begin{aligned}\int (3x + 5) \sin(x) dx &= -(3x + 5) \cos(x) - \int -3 \cos(x) dx \\ &= -(3x + 5) \cos(x) + 3 \int \cos(x) dx \\ &= -(3x + 5) \cos(x) + 3 \sin(x) + C\end{aligned}$$

Award 1 point for correct values of u, v', u' , and v . Also 1 point for correct answer. If student omits $+C$, add it without penalty.

2. Use calculus to compute the integral $\int \ln(x) \frac{1}{x^2} dx$.

Set $u = \ln(x)$ and $v' = \frac{1}{x^2}$ so that $u' = \frac{1}{x}$ and $v = -\frac{1}{x}$. Using integration by parts,

$$\begin{aligned}\int \ln(x) \frac{1}{x^2} dx &= -\frac{\ln(x)}{x} - \int \frac{1}{x} \cdot \frac{-1}{x} dx \\ &= -\frac{\ln(x)}{x} + \int \frac{1}{x^2} dx \\ &= -\frac{\ln(x)}{x} - \frac{1}{x} + C \\ &= -\frac{1}{x} (\ln(x) + 1) + C\end{aligned}$$

Award 1 point for correct values of u, v', u' , and v . Also 1 point for correct answer. Again, if student omits $+C$, mark it without penalty.