MATH 16020: Applied Calculus 2 Quiz 4 (Solutions) Fri., Feb. 3, 2023

Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided.

Name:_____

1. **[5 pts]** Compute $\int_0^{\pi} 10x\sin(x)\,dx$

Solution:

$$\int_0^{\pi} 10x\sin(x)\,dx \underset{du=10\,dx}{\overset{u=10x}{=\!=\!=}} \underset{u=-\cos(3x)}{\overset{dv=\sin(x)\,dx}{=\!=\!=}} -10x\cos(x)\big]_0^{\pi} - \int_0^{\pi} -10\cos(x)\,dx$$

$$= -10x\cos(x)\big]_0^{\pi} + 10\int_0^{\pi}\cos(x)\,dx$$

$$= -10x\cos(x)\big]_0^{\pi} + 10\cdot\sin(x)\big]_0^{\pi}$$

$$= -10\pi\cos(\pi) - (-10\cos(0)) + 10\sin(\pi) - 10\sin(\cdot 0)$$

$$= 10\pi$$

How I graded?

- **2 pt** for choice of u and dv
- **1 pt** for plugging everything into integration by parts formula
- **1 pt** for integration
- **1 pt** for final answer

2. **[5 pts]** Compute $\int x^{-4} \ln x \, dx$

Solution:

$$\int x^{-4} \ln x \, dx \underset{du = x^{-1}\,dx}{\overset{u = \ln x}{=\!=\!=}} \underset{u = -\frac{1}{3}x^{-3}}{\overset{dv = x^{-4}\,dx}{=\!=\!=}} -\frac{1}{3}x^{-3}\ln(x) - \int -\frac{1}{4}x^{-3}x^{-1}\,dx$$

$$= -\frac{1}{3}x^{-3}\ln(x) + \frac{1}{3}\int x^{-4}\,dx$$

$$= -\frac{1}{3}x^{-3}\ln(x) + \frac{1}{3}\cdot\frac{1}{-3}x^{-3} + C$$

$$= -\frac{1}{3x^3}\ln(x) - \frac{1}{9x^3} + C$$

How I graded?

- **2 pt** for choice of u and dv
- **1 pt** for plugging everything into integration by parts formula
- **1 pt** for integration
- **1 pt** for final answer