

Math 2315 - Calculus II
Quiz #3 - 2010.02.09
Solutions

1. Compute the following Integral:

$$\int x^2 e^{2x} dx$$

We apply tabular integration:

| | |
|-------|---------------------|
| x^2 | e^{2x} |
| $2x$ | $\frac{1}{2}e^{2x}$ |
| 2 | $\frac{1}{4}e^{2x}$ |
| 0 | $\frac{1}{8}e^{2x}$ |

$$\int x^2 e^{2x} = \frac{1}{2} x^2 e^{2x} - \frac{1}{2} x e^{2x} + \frac{1}{4} e^{2x} + C$$

2. Compute the following integral:

$$\int \cos^3(x) \sin^5(x) dx$$

This is a trig substitution problem where either $u = \cos(x)$ or $u = \sin(x)$ will work. We will use the latter,

$$\begin{aligned} \int \cos^3(x) \sin^5(x) dx &= \int \cos^2(x) \sin^5(x) \cos(x) dx \\ &= \int (1 - \sin^2(x)) \sin^5(x) \cos(x) dx \\ &= \int (1 - u^2) u^5 du \\ &= \frac{1}{6} u^6 - \frac{1}{8} u^8 + D \\ &= \frac{1}{6} \sin^6(x) - \frac{1}{8} \sin^8(x) + D \end{aligned}$$