

Math 222 Quiz 2

September 16, 2010

Your Name:

Your Section:

Instructions: Time is 20 minutes and the total score is 10 points. You can answer in attached papers if you like. There are extra problems on the back, whose points will be regarded as bonus.

1. Choose **ANY ONE** of the two below. (3 points)
 - Write out the formula for integral by parts and give an example for $\int f(x)g(x)dx \neq \int f(x)dx \cdot \int g(x)dx$.
 - Write out the general expression of partial fractions for $\frac{g(x)}{(x-a)^3(x-b)^2(x-c)}$, where $\deg(g) < 6$ and a, b, c are not equal to each other.
2. Find the integrals below. (7 points)
 - a). $\int_0^1 (y^2 - 2y + 1)e^y dy$ (4 pts)
 - b). $\int \frac{x^2+1}{(x-1)(x-2)(x-3)} dx$ (3 pts)

3. Extra problem.(Bonus)

1). Explain why there is a constant term C_1 on the right from (a) to (b). (1 pt)

$$\int e^x \cos x dx = e^x \sin x - \int e^x \sin x dx = e^x \sin x + e^x \cos x - \int e^x \cos x dx \quad (\text{a})$$

$$2 \int e^x \cos x dx = e^x \sin x + e^x \cos x + C_1 \quad (\text{b})$$

2). Find the integral. (3 pts)

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