

Name: _____

TA: _____

Math 222
First Exam

Prof. Beck
Fall 2004

1. Integrate

$$\int \frac{t^2 \cos(t^3 - 2)}{\sin^2(t^3 - 2)} dt$$

2. Integrate

$$\int \sin 4y \cos 5y \, dy$$

3. Use the method of completing the square, along with a trigonometric substitution if needed, to evaluate each integral.

$$\int \frac{3x}{\sqrt{x^2 + 2x + 5}} dx$$

4. Use integration by parts to evaluate

$$\int x^5 \sqrt{x^3 + 4} dx$$

5. Evaluate

$$\int \frac{\sin y \cos y}{9 + \cos^4 y} dy$$

6. Evaluate this improper integral or show that it diverges.

$$\int_0^{\infty} e^{-x} \cos x \, dx$$

7. Use the method of partial fraction decomposition to perform this integration.

$$\int \frac{3x^2 - 21x + 32}{x^3 - 8x^2 + 16x} dx$$

8. Indicate whether the given series converges or diverges. If it converges, find its sum. Hint: It may help you to write out the first few terms of the series.

$$\sum_{k=1}^{\infty} \frac{k!}{100^k}$$