

MAT123
Practice Exam 1

Use substitution to evaluate the following:

1. $\int \frac{x^2}{1+x^3} dx$

2. $\int_0^{\pi/6} \cos(3\omega)e^{\sin(3\omega)} d\omega$

Use integration by parts to evaluate the following:

3. $\int_1^2 x^2 \ln(x) dx$

4. $\int u^2 \cos(u) du$

5. $\int e^y \cdot \cos(y) dy$

Complete the square and use trigonometric substitution to evaluate

6. $\int \frac{dx}{\sqrt{7-9x^2-18x}}$

Use partial fractions to evaluate

7. $\int \frac{v^2 + 2v + 1}{v(v^2 + 1)} dv$

Evaluate the following *improper* integrals.

8. $\int_{-8}^{25} (x+7)^{-1/5} dx$

9. $\int_{-\infty}^{\infty} |x|e^{-x^2} dx$ (Hint: use the fact that $|x| = x$ when $x > 0$ and $|x| = -x$ when $x < 0$.)

10. Use the trapezoid, midpoint, and Simpson's rule, each with 4 subdivisions, to estimate

$$\int_{-3}^5 2^x dx.$$

TRAP(4) \approx

MID(4) \approx

SIMP(4) \approx