

Name: _____

Math 231 W3, Spring Term 2009
Mock Exam #1
February 12, 2009

No books, notes, calculators, or other aids may be used. For full credit you must show all your work on each problem.

| Problem | Score | Points Possible |
|---------|-------|-----------------|
| 1 | | 20 |
| 2 | | 20 |
| 3 | | 20 |
| 4 | | 20 |
| 5 | | 20 |
| TOTAL | | 100 |

Problem 1: (20 points) Find the integral

$$\int \tan(2x) \sec^4(2x) dx.$$

Problem 2: (20 points)

- (a) Write out the general form of the partial fraction decomposition of the given function. (Note that you do *NOT* need to solve for the coefficients A, B, etc.)

$$\frac{1}{x^6 - x^2}$$

- (b) Find the integral

$$\int \frac{4x^3 - 2x^2 + 1}{x^4 + x^2} dx.$$

Problem 3: (20 points) Find the integrals:

(a) $\int x^2 \sin 3x \, dx.$

(b) $\int \arcsin x \, dx$

Problem 4: (20 points) Find the integral

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

Problem 5: (20 points) Determine if the improper integrals converge or diverge. If either converges, find what it converges to.

(a) $\int_2^{\infty} \frac{1}{\sqrt{x^{1/2} - 1}} dx$

(b) $\int_4^{13} \frac{2}{\sqrt{x - 4}} dx$