

Name: \_\_\_\_\_

**MA2 Final Exam Review Sheet**

The final exam will be on **Tuesday, June 6, 2006**. All problems must be answered using calculus techniques. For full credit, final answers must be *exact* (not rounded), *in simplest form*, and include appropriate *units* unless otherwise indicated; denominators should be *rationalized* and answers should be written with *positive exponents only*. Put a box around your final answer. Graphing calculators, though not required, are recommended for this exam, however the following calculators may *not* be used: TI-89, TI-92, or any calculator with symbolic manipulation abilities.

The following are the topics that may be covered on the final exam:

- Properties of Derivatives and Properties of Integrals
- Product Rule, Quotient Rule, Chain Rule, Power Rule
- Finding the slope of a tangent/normal line and writing the equation of a tangent/normal line at a given point.
- Higher-order derivatives (e.g. second derivative, third derivative)
- Differentiating and integrating polynomial functions, rational functions, trig functions,  $e^u$  and  $\ln u$ .
- Using  $u$ -substitution to evaluate an integral.
- Relationship among the position, velocity, and acceleration functions.
- Computing definite integrals using the Fundamental Theorem of Calculus.
- The area under a curve or between two curves.

The following problems are *representative* of those that will appear on the final exam. However, you must study your notes, previous exams, examples done in class, as well as homework problems to be fully prepared for the exam. You may find it helpful to access the solutions posted on the website, if you have not already done so. The actual exam questions may differ significantly in their presentation, but the *concepts* involved will be limited to the above list.

1. Find  $f'(x)$  if  $f(x) = \frac{2x+1}{x-1}$ .

2. Find  $g'(x)$  if  $g(x) = \cos^3(4x)$ .

3. Evaluate:  $\int_0^4 \sqrt[3]{x} dx$ .

4. Evaluate:  $\int_1^3 \frac{e^{3/x}}{x^2} dx$ .

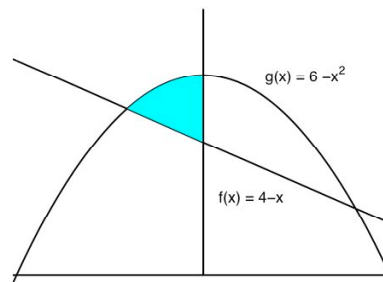
5. Evaluate:  $\int \frac{\sec x \tan x}{\sec x - 1} dx$ .

6. Find  $h'(x)$  if  $h(x) = x^2(x-2)^4$ .

7. Find the points on the graph of  $f(x) = \frac{1}{3}x^3 + x^2 - x - 1$  at which the slope is (a) 1, (b) 2, and (c) 0.

8. Represent the shaded area as an integral, but do not evaluate it.

$$f(x) = 4 - x$$
$$g(x) = 6 - x^2$$



9. Find the area of the region between the graphs of  $f(x) = 3x^3 - x^2 - 10x$  and  $g(x) = -x^2 + 2x$ .

10. Sketch the region bounded by the graphs of the equations and determine its area.

$$y = \frac{1}{x^2}, \quad y = 4, \quad \text{and} \quad x = 5$$