MATH 1120 **Test 3** **Fall 2000**

Name : _____

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1. Find the following indefinite integrals:

   (a) $\int(3x^2+1)dx$

   (b) $\int(4e^x+\frac{2}{x})dx$

   (c) $\int(\sqrt{x}-x^{-3})dx$

   (d) $\int x^3e^{x^4}dx$

   (e) $\int x^2(x^3+2)^9dx$

   (f) $\int\frac{(\ln x)^2}{x}dx$

2. Find the following definite integrals:

   (a) $\int_0^3 (4x^3 + 6x + 5)dx$

   (b) $\int_1^2 \frac{1}{x+1} dx$

   (c) $\int_0^4 xe^{x^2+1} dx$

3. Find the area of the region bounded by the graphs of the functions $f(x) = 8 - x^2$ and $g(x) = x$ and the vertical lines $x = 0$ and $x = 2$.

4. Find the average value of the function $\sqrt{3x + 1}$ over the interval $[0, 5]$.

5. The velocity of a car (in ft/sec) t seconds after starting from rest is given by the function $f(t) = 4t$, $0 \leq t \leq 20$. At $t = 0$, the car is at the origin. Find the car's position at any time t on the interval $[0, 20]$.

6. Suppose that an investment is expected to generate an income stream at the rate of $R(t) = 300,000$ dollars per year for the next 10 years. Find the present and future values of the income stream during the next 10 years if the interest rate is 9% per year compounded continuously.