Math 125 G - Winter 2008
Mid-Term Exam Number One
January 31, 2008

Name: _____   Section: _____

1	20	
2	10	
3	10	
4	10	
5	10	
6	15	
Total	75	

- Complete all questions.

- You may use a calculator, and you should have one, during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.

- You may use one double-sided, hand-written, 8.5 by 11 inch page of notes.

- Show all work for full credit.

- You have 80 minutes to complete the exam.

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1. Evaluate the following integrals.

(a) $\int (1+x)\left(x^2 - x\right) dx$

(b) $\int \dfrac{3x + \sqrt{x}}{x^2} dx$

(c) $\int_{-1}^{5} \left(3x + |2x - 4|\right) dx$
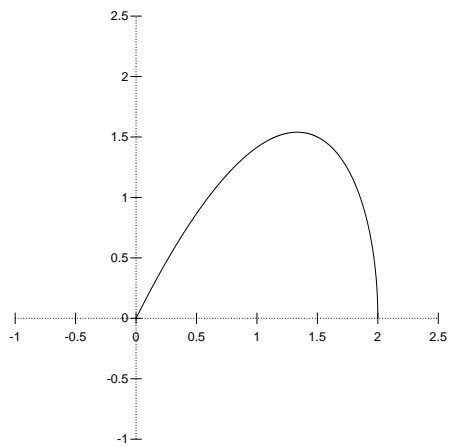
(d) $\int \dfrac{\cos(\ln x)}{x} dx$

2. Is $f(x) = x + \tan^{-1} x$ an antiderivative of $g(x) = \dfrac{x^2}{1 + x^2}$? Explain.

3. Let $f(x) = \displaystyle\int_{\sin x}^{x^2} \dfrac{1}{\ln t}\, dt$. Find $f'(x)$.

4. Evaluate the following limit:

$$\lim_{n\to\infty} \frac{1}{n^2} \sum_{i=1}^{n} (3i + 5)$$

5. Find the area of the region in the first quadrant bounded by $y = x\sqrt{2 - x}$ and $y = 0$.

6. Consider the region in the first quadrant bounded by $y = 1 - x^2$, $y = 0$ and $x = 0$.

(a) Find the volume of the solid of revolution created by revolving this region about the x-axis.

(b) Find the volume of the solid of revolution created by revolving this region about the y-axis.

(c) Find the vertical line $x = a$ about which the region should be revolved to get a solid of revolution with volume the same as what you found in part (a).