Math 125 D and H - Spring 2004
Mid-Term Exam Number One
April 22, 2004

Name: _____ Section: _____

1	20	
2	10	
3	8	
4	10	
5	10	
6	10	
7	10	
Total	78	

- Complete all questions.
- You may use a scientific calculator during this examination. Graphing calculators, and other calculating devices are not allowed.
- If you use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator when an algebraic method is available, you will not receive full credit.
- You may use one 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 each of the following indefinite integrals.

(a) $\displaystyle\int \frac{x^2}{x^3+5}\,dx$

(b) $\displaystyle\int (x^2+3)^2\,dx$

(c) $\displaystyle\int x^3\sqrt{x^2+4}\,dx$

(d) $\displaystyle\int \frac{1}{x\ln x}\,dx$

2. Alice falls from a plane at an altitude of 3000 meters. She falls in such a way that she is accelerating at a rate of

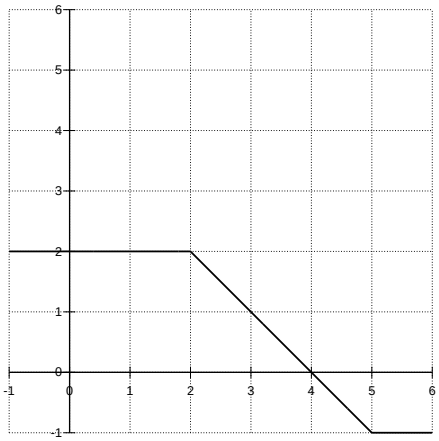
$$-9.8 + 0.3t \text{ m/s}^2$$

t seconds after the start of her fall. Assume her initial velocity is zero.

(a) What is her velocity after 6 seconds?

(b) How far off the ground will she be after falling for 6 seconds?

3. The graph of $f(x)$ is given below. Let $A(x) = \int_0^x f(t)\,dt$.



Evaluate each of the following:

(a) $A(2)$

(b) $A'(3)$

(c) $A(6)$

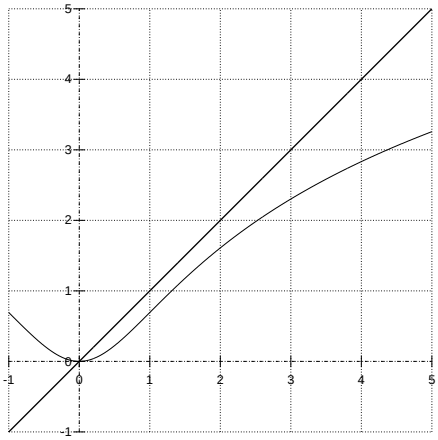
(d) $A(4) - A(3)$

4. Let R be the region in the first quadrant bounded by $y = 2 - x^2$, $y = x^2$, and the y-axis.

   (a) Find the volume of the solid of revolution created by revolving R about the y-axis.

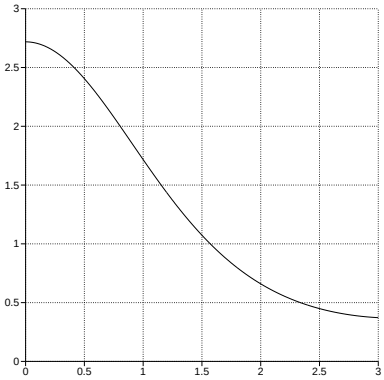
   (b) Find the volume of the solid of revolution created by revolving R about the x-axis.

5. Let R be the region bounded by $y = x$, $y = \ln(x^2 + 1)$, and $x = 3$. The curves are shown in the figure.



Determine the volume of the solid of revolution created by revolving R about the line $x = 5$.

6. Here is a graph of $y = e^{\cos x}$ on the interval $0 \leq x \leq 3$:



Use the midpoint rule with n=3 to approximate the value of the following integral:

$$\int_0^3 e^{\cos x}\, dx$$

7. Find the value of m so that the region bounded by $y = \sqrt{x}$ and $y = mx$ has an area of 4.