Math 125, Section E, Spring 2011, Midterm I

April 21, 2011

Name_____

TA/Section_____

Instructions.

- There are 4 questions. The exam is out of 40 points.
- You are allowed to use one page of notes written only on one side of the sheet in your own handwriting. **Hand in your notes with your exam paper.**
- You may use a calculator which does not graph and which is not programmable. Even if you have a calculator, give me exact answers. ($\frac{2\ln 3}{\pi}$ is exact, 0.7 is an approximation for the same number.)
- **Show your work**. If I cannot read or follow your work, I cannot grade it. You may not get full credit for a right answer if your answer is not justified by your work. If you continue at the back of a page, make a note for me. Please $\boxed{\text{BOX}}$ your final answer.

Question	points
1	
2	
3	
4	
Total	

1. Evaluate the following integrals.

(a) (4 points)

$$\int_0^{1/2} t \sec^2(t^2) \ \ dt$$

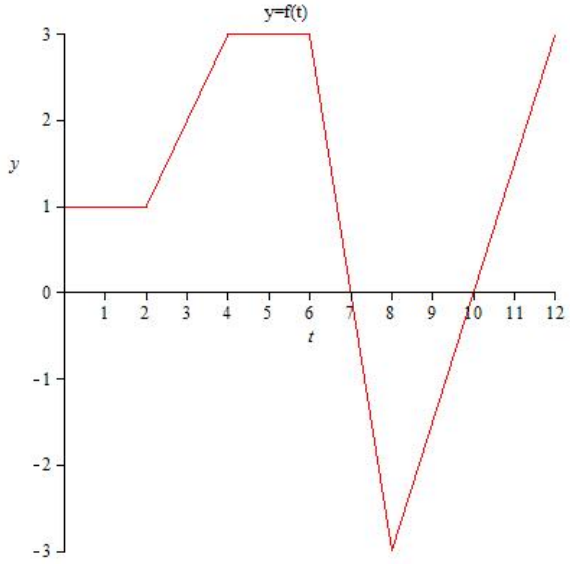
(b) (4 points)

$$\int (e^x + e^{-x})^2 \ \ dx$$

(c) (4 points)

$$\int_0^5 x\sqrt{x+4} \ \ dx$$

2. (10 points) Define $g(x) = \int_5^x f(t)dt$ where f is the function whose graph is shown below. All the critical points of the graph have integer coordinates.



(a) $g(6) =$

(b) $g(0) =$

(c) $g'(8) =$

(d) $g'(1) =$

(e) $g''(2) =$

(f) $g''(3) =$

(g) Let $h(x) = \int_x^{x^2} f(t)dt$. What is $h'(2)$?

(h) $\int_0^2 g(x)dx =$

3. An object is moving along the x-axis with acceleration at time $t \geq 0$ given by

$$a(t) = -\frac{60}{(t+3)^2} \text{ft/sec}^2.$$

The object has initial velocity $v(0) = 5$ ft/sec.

(a) (3 points) At what time does the object reverse direction?

(b) (5 points) What is the total distance travelled by the object from $t = 0$ to $t = 4$ seconds?

4. Let R be the region bounded above by the curve $y = -x^2 + 6$, on the right by $y = 5x$ and on the left by the y-axis.

   (a) (3 points) Sketch the region showing all relevant points of intersection.

   (b) (7 points) Find the volume of the solid obtained by rotating the region R about the line $y = 7$.