Math 125, Section I, Winter 2011, Midterm I

January 27, 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 BOX your final answer.

Question	points
1	
2	
3	
4	
Total	

1. Evaluate the following integrals.

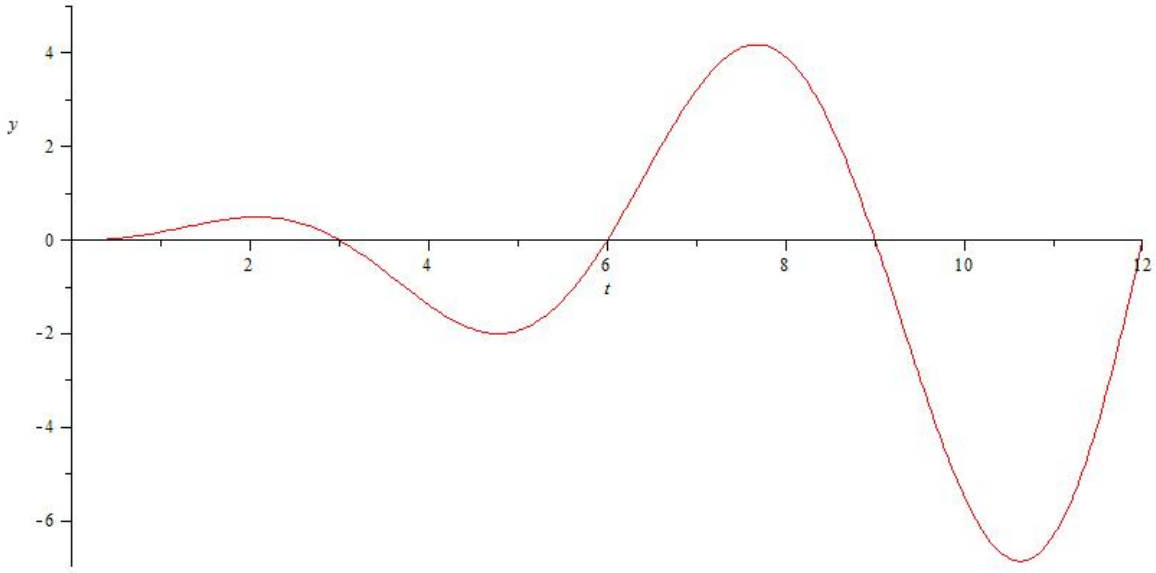
   (a) (5 points)

$$\int_0^3 t^3\sqrt{1+t^4}dt$$

   (b) (5 points)

$$\int \frac{x+3}{\sqrt{x+1}}dx$$

2. Define $g(x) = \int_0^x f(t)dt$ where f is the function whose graph is shown below.

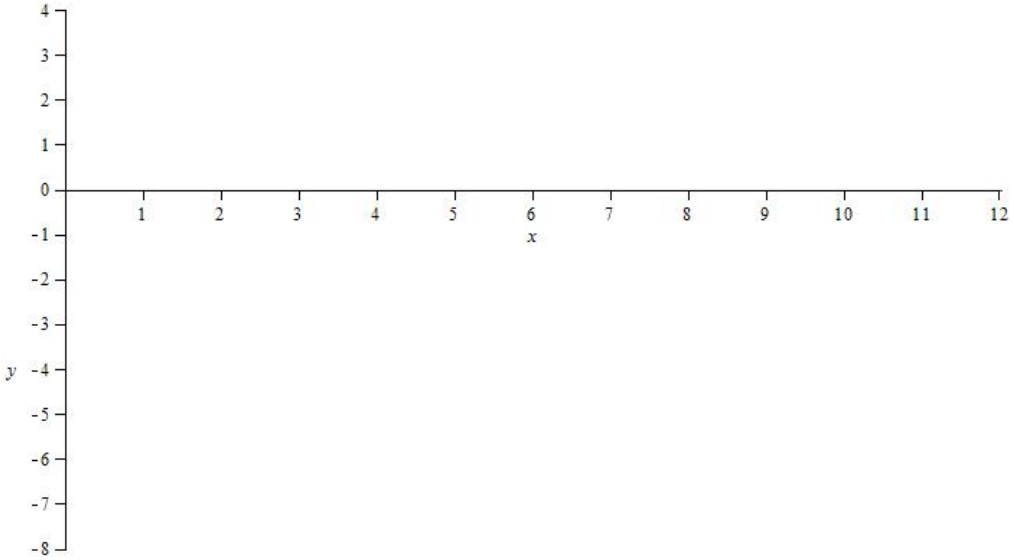


(a) At what values of x does g have a local maximum? (2 points)

(b) At what values of x does g have a local minimum? (2 points)

(c) On what intervals is g concave up? The endpoints can be approximate here. (3 points)

(d) Sketch a graph of $y = g(x)$. (3 points)



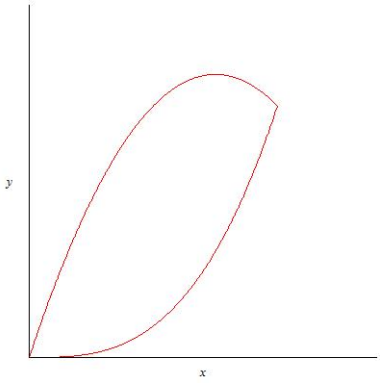
3. Let R be the region in the first quadrant bounded below by the x axis, bounded on the left by the parabola $y = -x^2 + 4x$ and bounded on the right by the line $y = -2x + 5$.

   (a) Sketch the region R. (2 points)

   (b) Estimate the area of the region with $n = 5$ and left points. (3 points)

   (c) Find the exact area of the region. What was you percentage error in your estimation above? (5 points)

4. Let R be the region bounded by the curves $y = x^3$ and $y = 3x - 2 * x^2$ in the first quadrant as shown below.



(a) Set up and integral to find the volume of the region obtained by rotating the region R about the y axis. Do not evaluate the integral. (5 points)

(b) Set up and integral to find the volume of the region obtained by rotating the region R about the line $y = 2$. Do not evaluate the integral. (5 points)