

Math 125, Sections F and G, Autumn 2012, Midterm I

October 18, 2012

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) (3 points) $\int_1^4 \frac{9x^3 + \sqrt{x}}{x} dt$

(b) (4 points) $\int_1^e \frac{\ln x}{x} dx$

(c) (3 points) $\int \frac{x^2 + 2x + 3}{x - 1} dx$

2. Let

$$f(x) = \int_1^{x^2+1} e^{\sin t} dt$$

Answer the following questions about $f(x)$.

(a) (1 point) $f(0) =$

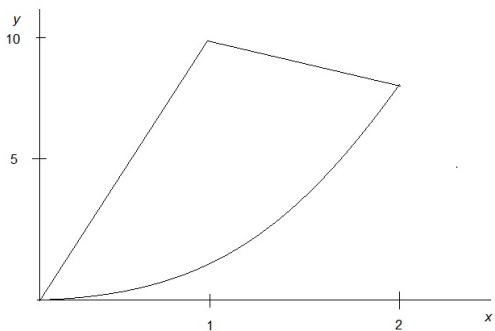
(b) (2 points) $f'(x) =$

(c) (2 points) Is $f(-2) > f(1)$?

(d) (1 point) Is f increasing or decreasing at $x = 2$?

(e) (4 points) Approximate $f(1)$ with $n = 4$ and using right points. Round your answer to three decimal points.

3. The following questions are about the region whose graph is given below. The intersection points are at $(1, 10)$, $(2, 8)$ and $(0, 0)$. The curve has the equation $y = x^3$.



- (a) (4 points) Set up integral(s) ending in dx to find the area.
- (b) (4 points) Set up integral(s) ending in dy to find the area.
- (c) (2 points) Evaluate your answer in part (a) or (b) to find the area.

4. The following questions are about the region between the line $y = x + 4$ and the parabola $x = y^2 - 16$.

(a) (2 points) Sketch the region labeling all intersection points.

(b) (2 points) Set up an integral to find the area of the region. Do not integrate.

(c) (3 points) Set up an integral to find the volume generated by rotating the region about the y -axis. Do not integrate.

(d) (3 points) Set up an integral to find the volume generated by rotating the region about the horizontal line $y = -6$. Do not integrate.