

Math 125D - Autumn 2001
First Mid-Term Exam
October 25, 2001

Name _____

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
Total	70	

- Complete all questions.
- You may not use electronic calculation devices during this examination.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

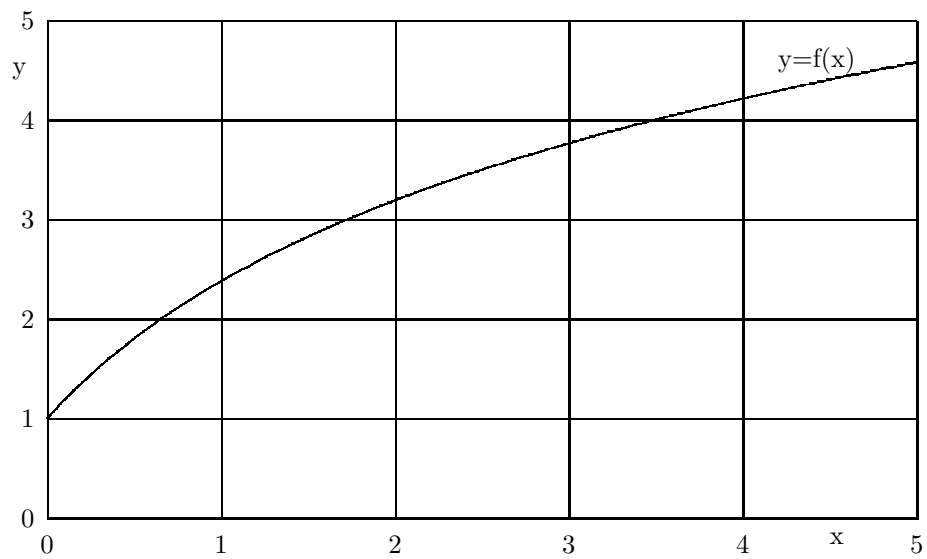
1. For each of the following, find f .

(a) (5 points) $f'(x) = x^2 + 3$, $f(0) = 1$.

(b) (5 points) $f''(x) = 1 + e^x$, $f'(0) = 1$, $f(0) = 2$.

2. (10 points) Using the graph of $y = f(x)$ shown, find two real numbers $A, B > 0$ such that

$$A < \int_0^5 f(x) dx < B$$



3. Evaluate the following integrals.

(a) (5 points)

$$\int_2^2 x^3 \cos x \, dx$$

(b) (5 points)

$$\int_0^5 \sqrt{25 - x^2} \, dx \quad (\text{Hint: interpret in terms of an area})$$

4. (10 points) Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function shown.

$$f(x) = \int_0^{x^2} \frac{1}{\cos t + \sin t} dt$$

5. Evaluate the indefinite integrals.

(a) (5 points)

$$\int x\sqrt{x} dx$$

(b) (5 points)

$$\int \frac{1 + \cos^2 x}{\cos^2 x} dx$$

6. Evaluate the integrals.

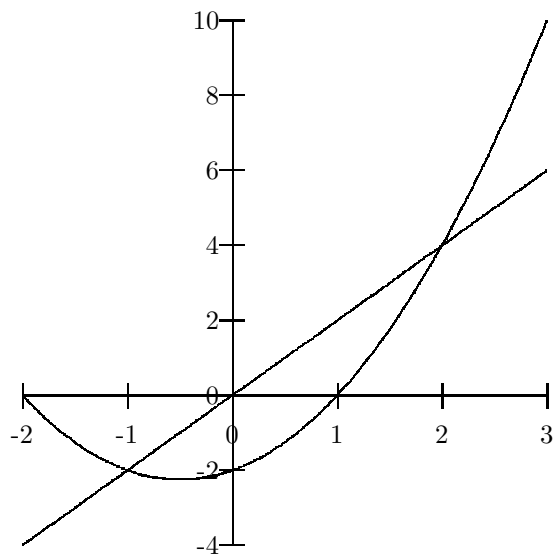
(a) (5 points)

$$\int x \cos x^2 dx$$

(b) (5 points)

$$\int x^2 \sqrt{x-1} dx$$

7. The two problems below concern the region bounded by the curves $y = 2x$ and $y = x^2 + x - 2$. The region is shown below.



- (a) (5 points) Set up but DO NOT EVALUATE an integral representing the area of the region.

- (b) (5 points) Set up but DO NOT EVALUATE an integral representing the volume of the solid of revolution created by revolving the region about the line $y = -3$.