

NAME: \_\_\_\_\_

Math 181, Calculus II  
10:00 am

Hour Exam One  
October 9, 1998

Evaluate the following integrals. Show your work, noting what substitutions you make, what parts you use, and the number of any formula from the table.

1.  $\int x^2 \sin(x^3 - 1) dx.$

2.  $\int \frac{1}{x^2 - 2x + 3} dx.$

3. (a)  $\int \frac{x}{x^2 + 1} dx.$

(b) Calculate  $\int_0^\infty \frac{x}{x^2 + 1} dx$  or show this integral diverges.

4.  $\int x e^{x+1} dx.$

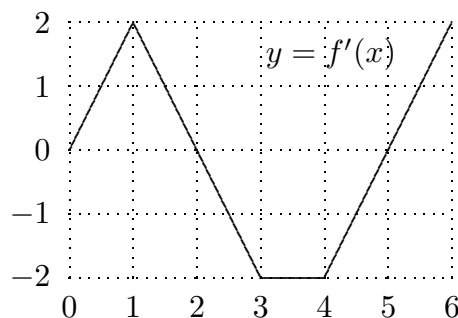
5. The following are some values of the velocity  $v(t)$  of a car stopping with nonconstant deceleration. The time  $t$  is measured in seconds and the velocity is measured in feet per second.

$t$	0	1	2	3	4	(sec)
$v(t)$	85	59	36	16	0	(feet/sec)

(a) Assuming  $v(t)$  is a decreasing function of time  $t$ , use a numerical method of integration to calculate a distance which is larger than the actual distance traveled by the car.

(b) Now, assuming  $v(t)$  is concave up (due to fading brakes) use another method to calculate a distance which is larger than the actual distance traveled by the car, but is smaller than the distance calculated in part (a).

6. The figure shows the graph of  $f'(x)$ .



It is given that  $f(0) = 1$ .

- (i) What is  $f(2)$ ?
- (ii) For what value of  $x$  in the range  $0 \leq x \leq 6$  is  $f(x)$  smallest?
- (iii) For what value of  $x$  in the range  $0 \leq x \leq 6$  is  $f(x) = 0$ ?

Explain how you get your result in each case.