

EXAM 3
Math 106
August 31, 2006

Name _____

You must show all your work. Partial credit will be given.

1. The acceleration of a race car during the first 35 seconds of a road test is modeled by the equation $a(t) = .024t^2 - 1.72t + 22.58$ ft/sec² where t is the number of seconds since the test began.

(a) Estimate $\int_3^{10} a(t) dt$ using $n = 10$. (5 pts)

(b) Estimate $\int_3^{10} a(t) dt$ using $n = 50$. (5 pts)

(c) Estimate $\int_3^{10} a(t) dt$ using $n = 200$. (5 pts)

(d) Using these three estimates make your best guess as to the actual value of $\int_3^{10} a(t) dt$
(5 pts)

2. An apartment complex has an exercise room and sauna, and tenants will be charged a yearly fee for the use of these facilities. A survey of tenants results in these demand/price data.

Quantity demanded	Price(dollars)
5	250
15	170
25	100
35	50
45	20
55	5

- (a) Find a quadratic formula for this data (this is a price function). (5 pts)
- (b) Use part a) to find the revenue function. (5 pts)
- (c) What quantity demanded will maximize the revenue. (10 pts)
3. Find all relative maximums and minimums of the equation $y = 0.4x^3 - 8.8x^2 + 41.1x + 121.1$. (15 pts)

4. Find each of the following integrals

(a) $\int 6x^2 - 3x + x^{-1} dx$ (5 pts)

(b) $\int 10^x - 6e^{2x} dx$ (5 pts)

(c) $\int 39.2e^{3.9x} ds$ (5 pts)

(d) $\int_{-1}^2 -1.3x^3 + .93x^2 + .49 dx$ (5 pts)

5. A corporation's revenue flow rate can be modeled by $r(x) = 9.9x^2 - 40.7x + 58.5$ million dollars per year x years after the end of 1987. Evaluate $\int_0^5 r(x) dx$ and interpret your answer. (10 pts)

6. Calculate the area between the graphs of $f(x) = x^2 - 4x + 10$ and $g(x) = 2x^2 - 12x + 14$ from $a = 1$ to $b = 7$. (10 pts)

7. Assume the following graph is of some function $f(x)$. Also assume the the areas labeled A and B are of exactly the same size. What does $\int_{-0.25}^{1.5} f(x) dx$ equal? (Hint: no calculation is needed.) (5 pts)

