

Name (20 pts): _____

1. Evaluate the following indefinite integrals:

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

$$\int 5 dt$$

$$\int e^x dx$$

$$\int \frac{1}{q} dq$$

2. Suppose a contractor builds houses at a rate given by $H(t) = 100 + 10 \ln(t + 1)$ houses/year, where t is the number of years since 1990. If the contractor has built a total of 750 houses by 1995, how many houses have been built by 2000?

3. Suppose the speed of a bowling ball t seconds after it is thrown is given by $v(t) = 10e^{-t}$.

(a) Approximate $\int_0^3 v(t)dt$ using left-hand and right-hand sums with at least 5 subintervals.

(b) What is the physical interpretation of your answer from part 3a?

4. Using the FTC, find the area of the region enclosed by the graphs of $f(x) = x^2 - 4$ and $g(x) = -x^2 + 8x - 4$.

5. Evaluate $\int_2^4 \left[\frac{d}{dt} \sin(\ln(\sqrt{t})) \right] dt$.

6. (Bonus 40 pts) Evaluate $\int_1^2 \frac{\cos(\frac{\pi}{3}x)}{\sin(\frac{\pi}{3}x)} dx$ using FTC.