

Name (20 pts): _____

Show all your work (excluding arithmetic) for full credit, and give the exact value of each answer unless an approximation is explicitly requested.

1. (20 pts) Evaluate the following indefinite integrals:

$$\int \sqrt{e^{(t^2)}} dv$$

$$\int \frac{x\sqrt{x-x}+\sqrt{x-1}}{\sqrt{x}} dx$$

$$\int (e^t + 3)^2 dt$$

$$\int \frac{5}{4x} dx$$

2. (20 pts) Find the average value of $f(x) = \sqrt[3]{x}$ on $[8, 64]$.

3. (20 pts) Find the area enclosed by the graphs of $f(x) = 4/x^2$ and $g(x) = 5 - x^2$.

4. (20 pts) Suppose the Siberian elk population is increasing at a rate given by $E(t) = 50e^{-0.001t}$, where t is the number of years since 1800. Find the elk population in 1950 if it was 35,000 in 1998.

5. (40 pts) Suppose the supply and demand curves for cabbage are given (in \$/bushel) by $s(q) = 0.02\sqrt{q}$ and $d(q) = 500 - 0.48\sqrt{q}$. Find the producers' and consumers' surplus at the market price and quantity.

6. Use a Riemann sum with n subintervals (for $n = 6, 60, 600,$ and 999) to approximate

$$\int_{-2}^4 x^2$$

Write out the value of $a, b, n, \Delta x,$ and x_0, \dots, x_{n-1} for $n = 6$ and use your calculator to compute the sums for the remaining values of n .

7. Find

$$\int \frac{1}{e^x \sqrt{e^{-x} + 1}} dx$$