

Name: \_\_\_\_\_

Each problem is worth the indicated number of points; show all your work (excluding arithmetic) for full credit.

1. (10 pts) Find the average value of  $f(x) = \sqrt{x} - \frac{5}{x^2}$  on  $[4, 9]$

2. (10 pts) Find the area enclosed by the graphs of  $f(x) = x^5 - x$  and  $g(x) = 80x$ .

3. (15 pts) Suppose the supply and demand curves for tamarind are given (in \$/pod) by  $d(q) = 0.05 - \frac{\sqrt{q}}{100,000}$  and  $s(q) = 0.03 + \frac{\sqrt{q}}{100,000}$ , where  $q$  is the demand (in pods). Find the producer and consumer surplus for tamarind at the equilibrium price and quantity.

4. (10 pts) Evaluate the integral:

$$\int_0^5 x e^{(x^2)} dx$$

5. (15 pts) Evaluate the integral:

$$\int \sqrt[3]{x^{13} + x^9} dx$$