Name: _____

VIP ID: _____

- Write your name and VIP ID in the space provided above.
- The test has three (3) pages, including this one.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books, notes or scratch paper may be used on this test.
- An approved calculator may be used on this test.

Problem 1 (10 + 15 pts)**.** Evaluate the following integrals.

(a) $\displaystyle\int_{1.1}^{1.8} \frac{t^2}{e^t \ln t}\, dt =$

(b) $\displaystyle\int_{10}^{118} \frac{4x^6}{(x^7+7)^{21}}\, dx =$

Problem 2 (25 pts)**.** Find the average value of the function $f(x) = 30\sqrt{16 - x^2}$ between $x = 0$ and $x = 4$.

Problem 3 (25 pts)**.** For a product, the demand curve is $p = 40e^{-0.008q}$ and the supply curve is $p = 2\sqrt{q} + 5$ for $0 \leq q \leq 500$, where q is quantity and p is price in dollars per unit. Find the consumer surplus at the equilibrium (round your answer to the nearest dollar).

Problem 4 (25 pts)**.** The marginal cost of drilling an oil well depends on the depth at which you are drilling; drilling becomes more expensive, per meter, as you dig deeper into the earth. The fixed costs are one million riyals, and if x is the depth in meters, the marginal costs are $MC(x) = 2000 + 16x$ riyals per meter. Find the total cost of drilling a 400 meter well.