

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

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

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

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**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).

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**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.