

King Fahd University of Petroleum & Minerals
Department of Mathematics and Statistics
Semester I, 2008/2009 (081) Math 132 – Second Major Exam January 3, 2009

Name: _____ I.D. # _____ Section # _____ Sr. # _____

Q1. Evaluate $\int \frac{3x}{\sqrt{x^2+2}} dx$. (2 points)

Q2. Evaluate $\int \frac{e^{-x}}{1+e^{-x}} dx$. (2 points)

Q3. Evaluate $\int x 2^x dx$.

(2 points)

Q4. If $F(x) = \int_1^x \frac{\ln(2+t^2)}{1+t^2} dt$, find $F'(0)$.

(2 points)

Q5. If $\int_{-1}^0 f(x) dx = 4$, and $\int_{-1}^{-2} f(x) dx = -3$, find $\int_{-2}^0 f(x) dx$. (2 points)

Q6. Find the area of the region bounded by the curves $y = x^3$ and $y = x$. (3 points)

Q7. The marginal cost function is $\frac{dC}{dq} = 3q^2 + q$. Find the total cost function if fixed costs are 7. (2 points)

Q8. If the revenue function is $r = 42q - 4q^2$ and the average-cost function is $\bar{c} = 10 + \frac{90}{q}$, find the profit-maximizing q . (3 points)

Q9. Consider the function $f(x) = (x - 1)^3(x - 3)$.

(4.5 points)

a) Find all critical numbers.

b) Find the interval(s) on which the function increases.

c) Find the interval(s) on which the function decreases.

d) Find the relative extrema of the function.

e) Find the absolute extrema of the function.

f) Find the inflection points and where the function is concave up or down

g) Sketch the function.

