Kuwait University Math 102 8th November, 1994
Department of Mathematics First Incomplete Examination Duration: 75 minutes

Answer all of the following questions.

Calculators and mobile phones are not allowed.

1. Find the area of the region bounded by the graphs of the functions:

$$y = x^2 + 4x,\ y = x.$$

5 points

2. The region R is bounded by the graphs of the curves $xy = 2$, $2y + 3x - 13 = 0$. Sketch the region R and find the volume of the solid generated by revolving the region R about the line $x = -1$.

6 points

3. Find the arc length of the graph of $y = 6 - 2\sqrt{x^3}$ from $(1, 4)$ to $(4, -10)$.

6 points

4. Let $f(x) = \sqrt{e^{x+1} + 4}$, $x \in (-\infty, \infty)$.
(a) Show that f is one-to-one.
(b) Find $f^{-1}(x)$ and state the domain and range of f^{-1}.

2+5 points

5. (a) Let $f(x) = 5e^x - 2e^{-x} - 2$, $(x \in (-\infty, \infty))$. Find the slope of the tangent line to the graph of f^{-1} at the point $(1, 0)$.
(b) Find y' if

$$y = \frac{\sqrt[5]{t^3 + 2x}(x^2 + 1)^6}{\sqrt[3]{1 - x^3}} + \ln|x^4 - e^x|.$$

4+4 points

6. Evaluate the following integrals

$$\text{(a)} \int (\tan x - 1)^2 dx \qquad \text{(b)} \int \frac{e^{2x} dx}{\sqrt{10 - e^{2x}}}.$$

4+4 points

HAVE A GOOD LUCK