Kuwait University | MATH 102 | November 19, 1998

Math. Dept. | Second Midterm | Duration 75 minutes

Answer the following questions. Calculators and mobile telephones are not allowed.

Evaluate the following integrals:

1. $\int x \sec^{-1} x \, dx$ (6 points)

2. $\int \frac{\sin^5 x}{\sec^2 x} dx$ (6 points)

3. $\int \frac{x^2}{\sqrt{25 - x^2}} dx$ (6 points)

4. $\int \frac{dx}{2 + \sin x + 2\cos x}$ (6 points)

5. $\int \frac{dx}{x(\sqrt{x} + \sqrt[6]{x})}$ (7 points)

Determine whether the integral converges or diverges, and if it converges, find its value.

6. $\int_0^2 \frac{dx}{\sqrt{2x - x^2}}$ (7 points)

Evaluate the following limits. (6 points each)

7. $\lim_{x \to 0+} x^{\tan x}$

8. $\lim_{x \to 1+} \left(\frac{1}{x-1} - \frac{1}{\tan(x-1)} \right)$