Kuwait University

Math. Dept

Math. 102 Second Exam.

May 14, 1995

Duration: 75 minutes

Answer all of the following questions.

Calculators and mobile phones are not allowed

1. (a) Find the derivative of (4 Points)

$$y = \ln \left[\log_{10} \left(\sin^{-1} x \right) \right] + x^{\cos^{-1} x}.$$

(a) Evaluate (3 Points)

$$\tan^{-1}\left(\tan\frac{7\pi}{6}\right) + \sin\left[\cos^{-1}\left(-\frac{1}{2}\right)\right].$$

2. Evaluate the following integrals: (5 Points each)

(a)
$$\int \tanh(\ln x) dx$$

(b)
$$\int x \frac{\cos x}{\sin^3 x} dx$$

$$(c) \int \frac{x+3x^3}{x^4-1} dx$$

(d)
$$\int \frac{\sin 2x}{2 + \cos x} dx$$

(e)
$$\int \frac{1}{x\sqrt{x^2-2x}}dx$$

3. Evaluate the following limits: (4 Points each

(a)
$$\lim_{x\to 0} \frac{xe^{3x}-x}{1-\cos 2x}$$

(b)
$$\lim_{x\to\infty} (3x + e^x)^{2/x}$$