Kuwait university

Math 102

December 15, 2005

Dept. of math & comp. Sci. Second Examination Duration: 90 minute.

Calculators, Mobile telephones and Pagers ARE NOT ALLOWED.

Answer all of the following questions.

1. Find the following limits (2 points each)

(a)
$$\lim_{x \to \infty} \left(\frac{x-3}{x+5}\right)^x$$

(b)
$$\lim_{x \to 1+} \left(\frac{1}{\ln x} + \frac{1}{1-x} \right)$$

2. Evaluate the following integrals. (3 points each)

(a)
$$\int e^{2x} \ln(1+e^x) dx$$

(b)
$$\int x^3(x^2-1)^{\frac{3}{2}} dx$$

(c)
$$\int \frac{2x-1}{x^2-2x+5} \ dx$$

(d)
$$\int \frac{2x^3-2x^2-3x-5}{(x+1)^2(x^2+2)} dx$$

(e)
$$\int \frac{1}{\sin x - \cos x - 1} dx$$

(f)
$$\int \frac{1}{\sqrt{x}\sqrt{1-\sqrt[3]{x}}} dx$$

3. Determine whether the improper integral $\int_0^{\frac{\pi}{2}} \frac{\cos^5 x}{\sqrt{\sin x}} dx$ is convergent or divergent and find its value if convergent. (3 points)

مام فافر

ملم قام