Department of Mathematics
Kuwait University
Math-102

Date: 19/07/2007
Duration : 90 minutes

Second Midterm

Calculators and mobile phones are not allowed. Please turn off your mobile and pager. **(Justify all your answers)**

1. ($3\frac{1}{2}$ points each) Evaluate, if possible, the following integrals

(a) $\int \frac{x^5}{(x^2-4)(x^2+4)}\,dx$

(b) $\int_{-1}^{1} \frac{1}{\sqrt{1-x^2}}\,dx$

(c) $\int \tan^2 x \sec^3 x\,dx$

(d) $\int \frac{1}{1+2\sec x}\,dx$

(e) $\int \frac{\sec x}{\sqrt{\sin(2x)}}\,dx$

(f) $\int \frac{x^2+6x+9}{\sqrt{7-6x-x^2}}\,dx$

2. (2 points each) Find, if it exists, the following limits

(a) $\lim_{x\to 0^+} \tan^{-1}[\sinh(x^{-1}) - e^{\frac{1}{x}}]$

(b) $\lim_{x\to\infty} [\coth(\frac{x}{2})]^x$