KUWAIT UNIVERSITY
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Calculus B

November 28, 96
2nd Midterm

Time allowed: 75 minutes

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(1) (5 points each) Evaluate the following integrals

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

b) $\int \frac{x}{(x^2+6x+10)^{3/2}}dx$,

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

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

e) $\int \sin^2 x \sin(4x)dx$.

(2) (5 points each) Determine whether the following improper integral converges or diverges, and if it converges, find its value:

a) $\int_1^\infty \frac{x^3}{1+x^8}dx$,

b) $\int_0^2 (\ln x)^2 dx$.

(3) (5 points) The curve C is given parametrically by

$$x(t) = t\sin t + \cos t, \quad y(t) = t\cos t - \sin t, \quad -\pi \le t \le 0.$$

Find the point where the tangent line to the curve C is vertical, and also find the length of C.

GOOD LUCK