

Second Semester 2002/2003
Math 122
Test 2

Question 1

i) $\int \sin^3 2x \cos^2 2x \, dx$ [2 points]

ii) $\int \frac{4x^2 - 6x + 4}{(x^2 + 4)(x - 2)} \, dx$ [3 points]

iii) $\int_0^{\frac{\pi}{2}} \frac{1}{2 + \cos x} \, dx$ [4 points]

Question 2

Determine whether the improper integral converges or diverges. In each case of convergence, find the value of the integral.

i) $\int_0^2 \frac{x}{(x^2 - 1)} \, dx$ [4 points]

ii) $\int_0^{\infty} \frac{1}{e^x + e^{-x}} \, dx$ [4 points]

Question 3

Determine whether the series converges or diverges.

i) $\sum_{n=1}^{\infty} \frac{n+1}{n \cdot 2^n}$ [4 points]

ii) $\sum_{n=1}^{\infty} \frac{2n}{2n+1}$ [4 points]