

Math 2425 Midterm 2 Review Activity
26 October 2005

(1) Evaluate

$$\int e^{3x} \sqrt{1 - e^{2x}} dx$$

(2) Evaluate

$$\int \frac{dx}{x^4 + 4x^2 + 3}$$

(3) Evaluate

$$\int_1^3 \frac{1}{x-1} dx$$

(4) Show that $\{\frac{n}{e^n}\}$ converges by showing that it is increasing with an upper bound or decreasing with a lower bound.

(5) Compute, if possible,

$$(1 + \sqrt{2}) + 1 + (-1 + \sqrt{2}) + (3 - 2\sqrt{2}) + \dots$$

(6) Evaluate

$$\sum_{k=1}^{\infty} \ln\left(1 + \frac{1}{k}\right)$$

(7) Use the integral test to evaluate

$$\sum_{k=1}^{\infty} k3^{-k^2}$$

(8) Use a limit comparison test to evaluate the series

$$\sum_{k=1}^{\infty} \frac{\ln(k+1)}{(k+1)^3}$$

(9) Test the following series for convergence/divergence

$$\sum_{k=1}^{\infty} \frac{(3k)!}{2^k}$$