



CourseTitle: Calculus II

Number of Questions: 4

Time: 2 hour

Using Calculator (Yes)

Question 1:

Answer the following questions:

a) Solve for y : $\ln(y - 1) = x + \ln y$.

b) Evaluate $\lim_{x \rightarrow 0^+} \left(\frac{1}{x}\right)^x$.

c) Test the series $\sum_{n=1}^{\infty} \frac{2}{(2n+1)(2n-1)}$ for convergence.

d) Write the following $12.252525252525\dots$ as a fraction.**Question 2:**

Find the derivative of the following functions

a) $\sin^{-1}\left(\frac{1}{y}\right) = (\sin x)^x$

b) $y = x \cos^{-1} \sqrt{x^2 + 1}$

c) Find $\frac{dy}{dx}$ if $y = 2^{\sin^{-1} x}$

d) Find $\frac{dy}{dx}$ if $y = \log_3(x^2 + 1) + \csc^{-1}(x + 2)$.



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Final Exam
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Question 3:

Evaluate the following integrals

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

b) $\int e^x \cos x dx$

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

d) $\int x \ln(x + e) dx$

Question 4:

Test for convergence

a) $\sum_{n=2}^{\infty} \frac{\ln n}{n^3 + 4n + 1}$

b) $\sum_{n=1}^{\infty} \frac{n^2 - 3n + 6}{5n^5 - 3n^3 + n}$

c) $\sum_{n=1}^{\infty} \left(n \sin \frac{\pi}{n}\right)^n$

d) $\int_1^{\infty} \frac{2x + 1}{\sqrt{x^5 - 1}} dx$