

King Saud university
The First Midterm Exam

Second semester, 1431H
Math 201

Time: 90 Minutes

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Question No.1

Determine whether $\{a_n\}$ converges or diverges:

(a) $\left\{\left(\frac{e^n + e^{-n}}{2}\right)^{\frac{1}{n}}\right\}$

(b) $\{e^{-n} \cos n\}$

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Question No.2

Find the interval of convergent of the power series

$$\sum_{n=1}^{\infty} (-1)^n \frac{\ln n}{e^n} (x - e)^n$$

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Question No.3

Find a power series representation for $f(x)$:

(a) $f(x) = \ln(x+1)^2$ (b) $f(x) = \frac{2x}{1-x^3}$

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Question No.4

Determine whether the series is absolutely convergent, conditionally convergent, or divergent

(1) $\sum_{n=1}^{\infty} (-1)^n \frac{n}{\ln n}$ (b) $\sum_{n=1}^{\infty} (-1)^n \frac{\sqrt{n}}{3n+1}$

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Good luck