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#121260

MATH 1360 - 80
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Assignment 5.1

Ejercicios de Práctica:

Demuestre si las siguientes series son convergentes o divergentes

1. $1 + \frac{1}{8} + \frac{1}{27} + \frac{1}{64} + \frac{1}{125} + \cdots \ldots \ldots \ldots \ldots \ldots \ldots$

2. $\frac{1}{5} + \frac{1}{8} + \frac{1}{11} + \frac{1}{14} + \frac{1}{17} + \cdots \ldots \ldots \ldots \ldots$

3. $\sum_{n=1}^{\infty} \frac{1}{(2n+1)^3}$

4. $\sum_{n=1}^{\infty} \frac{n}{n^4+1}$

5. $\sum_{n=1}^{\infty} ne^{-n}$

1)

$n = 2^3 = 8$

$n = 3^3 = 27$

$n = 4^3 = 64$

$\sum_{n=1}^{\infty} = 1/n^3$

$P = 3 > 1$ Convergente

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

$5+3=8$

$3+2=5$

$3 \cdot \overset{n}{2} + 2$
$6+2=8$

$3 \cdot 3 + 2 =$
$9 + 2 = 11$

$3 \cdot 4 + 2 =$
$12 + 2 = 14$

$a_n = \frac{1}{3n+2}$ y $b_n = 1/n$

$\lim_{n\to\infty} \left(\frac{a_n}{b_n}\right) = \lim_{n\to\infty} \frac{n}{3n+2}$ a_n

$= \lim_{n\to\infty} \frac{1}{3 + \frac{2}{n}}$

$= 1/3$

$P = 1$

Divergente.

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

$n^3 < (2n+1)^3$

$\frac{1}{(2n+1)^3} < 1/n^3$

Converge

4) $\sum_{n=1}^{\infty} \frac{n}{n^4+1}$

$n^4 < n^4 + 1$

$\frac{n}{n^4+1} < \frac{n}{n^4} = 1/n^3$

Por el criterio de comparación converge

5) $\sum_{n=1}^{\infty} ne^{-n} = \sum_{n=1}^{\infty} f(n) \leq \sum_{n=1}^{\infty} \int_{n}^{n+1} f(x)\,dx$

$= \int_{1}^{\infty} xe^{-x}\,dx = 2/e$

$n=1 > 3/6$

Converge