Prueba II Álgebra II

I. $x^5 - 6x^3 - 8x^2 - 3x$ Raíz $x = -1$

1) multiplicidad 3

$p(-1) = (-1)^5 - 6(-1)^3 - 8(-1)^2 - 3(-1)$

$-1 + 6 - 8 + 3 = 0$ //

$p'(x) = 5x^4 - 18x^2 - 16x - 3$

$p'(-1) = 5(-1)^4 - 18(-1)^2 - 16(-1) - 3$

$5 - 18 + 16 - 3 = 0$ /

$p''(x) = 20x^3 - 36x - 16$

$p''(-1) = 20(-1)^3 - 36(-1) - 16$

$-20 + 36 - 16 = 0$ //

2) Raíces faltantes

$(x+1)^3 = x^3 + 3x^2 + 3x + 1$

$x^5 - 6x^3 - 8x^2 - 3x : x^3 + 3x^2 + 3x + 1 = x^2 - 3x$

$-1 \cdot \quad x^5 + 3x^4 + 3x^3 + x^2$

$-3x^4 - 9x^3 - 9x^2 - 3x$

$-1 \cdot \quad -3x^4 - 9x^3 - 9x^2 - 3x$

0

$x(x-3)$

Raíces $= 0$ y 3 //

3) Función factorizada

$x(x-3)(x+1)^3$ //

II

a) $\sum_{n=1}^{\infty} \frac{2n^2}{(9n-2)(3n+1)} \rightarrow \frac{2n^2}{9n^2-3n-2} = \lim_{n\to\infty} = \frac{2}{9} \neq 0$

diverge //

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b) $\sum_{n=1}^{\infty} \frac{(n+4)!}{2^n n^2 (n+1)!}$ $\qquad a_{n+1} = \frac{(n+5)!}{2^{n+1}(n+1)^2(n+2)!}$

$$\frac{(\cancel{n+5})!}{\cancel{2^{n+1}}(n+1)^2(\cancel{n+2})!} \cdot \frac{\cancel{2^n} n^2 (n+1)!}{(\cancel{n+4})!} = \frac{n^2(n+5)!}{2(n+1)(n+2)}$$

$\lim = \frac{1}{2} \neq 0$

diverge

①

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

$$C_n = \frac{(-1)^n}{2^n (3n+2)}$$

$$C_{n+1} = \frac{(-1)^{n+1}}{2^{n+1} (3n+5)}$$

$$\left| \frac{(\cancel{-1})^{n+1}}{\cancel{2^n}^{+1} (3n+5)} \cdot \frac{\cancel{2^n} (3n+2)}{(\cancel{-1})^n} \right|$$

$$\downarrow$$

$$\frac{(3n+2)}{2(3n+5)} = \lim_{n \to \infty} = \frac{1}{2}$$

$$R = 2$$

β intervalo de convergência absoluta

$(5-2, 5+2)$

$(3, 7)$ //

b) $\dfrac{(-1)^n\,(-2)^n}{2^n\,(3n+2)} = \dfrac{\cancel{2}^n}{\cancel{2}^n\,(3n+2)} = \dfrac{1}{(3n+2)}$ [illegible] //

c) $\dfrac{(-1)^n\,(\cancel{2})^n}{\cancel{2}^n\,(3n+2)} = \dfrac{(-1)^n}{3n+2}$ [illegible] //

$(3, 7]$ //