Prueba resuelta: brandon almendares

Problema 1)

$x^5 - 6x^3 - 3x^2 - 3x$ raiz en $x = -1$

Brandon Almendares

① $5x^4 - 18x^2 - 16x - 3$ (1)

② $20x^3 - 36x - 16$

③ $60x - 36 = -60 - 36 = \boxed{-96}$

$\boxed{x = -1 \neq 0}$

② $x^5 - 6x^3 - 3x - 3x$ tome la misma expresión

$x(x+1)^3(x-3) = 0$

$\boxed{x = 0}$ $(x-3) = 0$

$(x+1)^3 = 0$ $\boxed{x = 3}$

$x + 1 = 0$

$\boxed{x = -1}$

Las raices restantes son $\boxed{x=0}$ y $\boxed{x=3}$

Brauna Almeida

3) $x^5 - 6x^3 - 8x^2 - 3x$

$x(x^4 - 6x^2 - 8x - 3)$

$x(x^4 + x^3 - x^3 - 6x^2 - 8x - 3)$

$x(x^4 + x^3 - x^3 - x^2 - 5x^2 - 8x - 3)$

$x(x^4 + x^3 - x^3 - x^2 - 5x^2 - 5x - 3x - 3)$

$x(x^3(x+1) - x^3 - x^2 - 5x^2 - 5x - 3x - 3)$

$x(x^3(x+1) - x^2(x+1) - 5x^2 - 5x - 3x - 3)$

$x(x^3(x+1) - x^3(x+1) - 5x(x+1) - 3x - 3)$

$x(x^3(\underline{x+1}) - x^3(\underline{x+1}) - 5x(\underline{x+1}) - 3(\underline{x+1}))$

$x(x+1)(x^3 - \underline{x}^2 - 5x - 3)$

$x(x+1)(x^3 + \underline{x^2 - 2x}^2 - \underline{5x} - 3)$

$x(x+1)(\underline{x^3 + x^2} - 2x^2 \underline{- 2x - 3x} - 3)$ Factorize pun x?

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

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

$x(x+1)(x^2(x+1) - 2x(x+1) - 3(x+1))$ Factorize(x+1)

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

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

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

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

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

$\to x(x+1)^3(x-3)$
Minima
expresión

Problema 2

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

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

$\lim_{n \to \infty} A_n = 0$ y converge

$\frac{2 \cdot \infty^2}{(3 \cdot \infty - 2)(3 \cdot \infty + 1)} = \frac{2}{(3-2)(3+1)} = \frac{2}{1+4} = \frac{2}{5} \neq 0$

Por lo tanto diverge

b) $\sum_{n=1}^{\infty} \frac{(n+4)!}{2^n n^2 (n+1)!}$ Binomio Alternante

$A_n = \frac{(n+4)!}{2^n n^2 (n+1)!}$

$L = 1$

$\frac{6}{6} = 1$

$A_{n+1} = \frac{(n+1+4)!}{2^{n+1}(n+1)^2(n+1+1)!}$

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

$= \frac{(n+5)\, n^2}{(n+2)(n+1)^2} = \frac{n^3 + 5n^2}{(n+1)(n+1)(n+2)} = \frac{n^3 + 5n^2}{n^3 + 4n^2 + 5n + 2}$

Linoal $3n^2 + 10n$

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

$$= \frac{(n+5)\cdot n^2}{(n+2)(n+1)^2} = \frac{n^3+5n^2}{(n+1)(n+1)(n+2)} = \frac{n^3+5n^2}{n^3+4n^2+5n+2}$$

$n^2+n+n+1$

$n^2+2n+1\,(n+2)$

$n^3+2n^2+n+2n^2+4n+2$

Limite tipo $\frac{\infty}{\infty}$ $\frac{3n^2+10n}{3n^2+8n+5}$

tipo $\frac{\infty}{\infty}$ $\frac{6n+10}{6n+8}$

tipo $\frac{\infty}{\infty}$

Problema 3

Dada la serie de potencias

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

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

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

$$\frac{A_{n+1}}{A_n} = \frac{(-1)^{\cancel{n}+1} (x-5)^{\cancel{n}+1}}{(2)^{\cancel{n}+1} (3n+3)} \cdot \frac{\cancel{2^n} (3n+2)}{\cancel{(-1)^n} \cancel{(x-5)^n}} =$$

$$\frac{A_{n+1}}{A_n} \frac{(-1)^1 (x-5) \cdot (3n+2)}{2 \ (3n+2)}$$

$$L = \frac{|x-5|}{2} < 1 \quad \text{CA}$$

Calculo L

$$L = \lim_{n\to\infty} \left|\frac{A_{n+1}}{A_n}\right| = \lim_{n\to\infty} = \left|\frac{(-1)(x-5)(3n+2)}{2 \ (3n+2)}\right|$$

$$= \lim_{n\to\infty} \frac{\overbrace{|-1|}^{=1} |x-5| \, |3n+2|}{|2| \ |3n+2|} \quad \frac{|x-5|}{2} \lim_{n\to\infty} \left|\frac{\cancel{3}n+2}{\cancel{3}n+2}\right|$$

$$L = \frac{|x-5|}{} \quad 1$$

$\frac{|x-5|}{2} < 1 \Rightarrow |x-5| < 2$

$-2 < x-5 < 2 \quad /+5$

$-2+5 < x < 2+5$

$3 < x < 7$

$x \in I\ (3,7)$

$\therefore$ si $x \in (3,7)$ allí la serie CA

2) determinar de convergencia intervalo

CA $\Rightarrow$ C

Luego si $x \in I\ (3,7)$ con CA $\Rightarrow$ $x \in I\ (3,7)$ C

3) el intervalo de divergencia es todo aquel numero que se encuentre fuera del intervalo $(3,7)$ ya que ahí es donde la serie C