Ensayo Segunda prueba

Algebra II.

Urén Joseta RUT = 19.300.714-7.

Primer item

$$P(x) = x^5 - 6x^3 - 8x^2 - 3x$$

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

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

$= 5(1) - 18(1) + 16 - 3$

$= 5 - 18 - 16 - 3$

$= 0 //$

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

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

$= 20(-1) + 36 - 16$

$= -20 + 36 - 16$

$= 0 //$

$f'''(x) = 60x^2 - 36$

$f(1) = 60(-1)^2 - 36$

$= 60 - 36$

$= 24 //$

$(x+1)^3$

$x = -1 \Rightarrow x + 1 = 0$

② $\dfrac{x^5 - 6x^3 - 8x^2 - 3x}{x^3 + 3x^2 + 3x + 1} = P(x)$

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

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

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

$\underline{3x^4 + 9x^3 + 9x^2 + 3x}$

$= 0$

$P(x) = x^2 - 3x$

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

③ $f(x) = x^5 - 6x^3 - 8x^2 - 3x$

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

Segundo Item.

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

$$\lim_{n\to\infty} \frac{2n^2}{9n^2-3n-2} = \frac{2}{9} \lim_{n\to\infty} 1 \cdot \frac{n^2}{n^2-\frac{1}{3}n-\frac{2}{9}} = \frac{2}{9}\cdot 1 = \frac{2}{9} = L$$

$\therefore$ **Diverge**

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

$$\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| = \frac{(n+5)!}{2^{n+1}(n+1)^2(n+2)!} \cdot \frac{2^n \cdot n^2 (n+1)!}{(n+4)!}$$

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

$$\lim_{n\to\infty} \left| \frac{n^2(n+5)(n+1)}{2(n+1)^2(n+2)(n+4)} \right| = \frac{1}{2} \lim_{n\to\infty} \left| \frac{n^2(n+5)(n+1)}{(n+1)^2(n+2)(n+4)} \right| = L = \frac{1}{2}\cdot 1 = \frac{1}{2} < 1$$

$\therefore$ **Converge**

tercer Item

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

$$L = \lim_{n\to\infty} \left| \frac{C_{n+1}}{C_n} \right| = \frac{(-1)^{n+1}(x-5)^{n+1}}{2^{n+1}(3n+5)} \cdot \frac{2^n(3n+2)}{(-1)^n(x-5)^n} =$$

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

$$L = \frac{|x+5|}{2} < 1 \qquad |x+5| < 2 \Rightarrow -2 < x+5 < 2$$

$$3 < x < 7$$

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

Caso 1 $\boxed{x=3}$

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

$$\sum_{1}^{\infty} \frac{1}{3n+2} = a_n \Rightarrow b_n \frac{1}{3n} \Rightarrow \sum_{1}^{\infty} \frac{1}{3n} \Rightarrow \frac{1}{3}\sum_{1}^{\infty} \frac{1}{n} \Rightarrow p=1$$

$\therefore$ Diverge

Caso 2 $\boxed{x=7}$

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

leibnitz

1) verificar que $a_n > 0$

$$\frac{1}{3n+2} > 0$$

2) verificar que $f'(n) < 0$

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

$$= \frac{-3}{(3n+2)^2} < 0$$

3) Verificar $\lim_{n\to\infty} a_n = 0$

$$\lim_{n\to\infty} \frac{1}{(3n+2)} = 0$$

$\therefore$ por libnitz CA = C