

PROBLEMA 1.

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

$$x = -1 \mid \rightarrow (x+1)$$

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

$$P(-1) = -1 + 6 - 8 + 3$$

$$P(-1) = 0$$

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

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

$$P'(-1) = 0$$

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

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

$$P''(-1) = 0$$

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

$$P'''(-1) = 60 - 36$$

$$P'''(-1) = 24$$

①

②

③

④ X

Multiplicidad 3.

$$(x+1)^3$$

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

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

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

Los dos raíces faltantes
son $x=0$ y $x=3$.

c) $\frac{x(x-3)(x+1)^3}{(x+1)^3} = x(x-3)$

$$\begin{array}{r} x^5 - 6x^3 - 8x^2 - 3x : x^3 + 3x^2 + 3x + 1 \\ \underline{-x^5 - 3x^4 - 3x^3 - x^2} \quad (x^2 - 3x) \\ -3x^4 - 9x^3 - 9x^2 - 3x \end{array}$$

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

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

0

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

PROBLEMA 2.

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

$$a_n = \frac{2n^2}{(3n-2)(3n+1)} = \frac{2n^2}{9n^2-3n-2}$$

$$\lim_{n \rightarrow \infty} \frac{2n^2}{9n^2-3n-2} = \frac{2}{9} \neq 0$$

LA SERIE (a) DIVERGE.

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

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

$$= \frac{(n+5)n^2}{2 \cdot (n+1)^2 (n+2)} = \frac{1}{2} < 1 \quad \left. \vphantom{\frac{(n+5)n^2}{2 \cdot (n+1)^2 (n+2)}} \right\} \text{LA SERIE (b) CONVERGE.}$$

PROBLEMA 3.

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

$$(x-a) = (x-5)^2$$

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

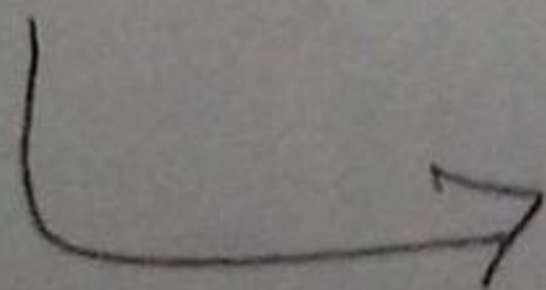
$$a) R = \frac{1}{\left(\frac{1}{2}\right)} \rightarrow \boxed{R=2}$$

$$(a-R), (a+R)$$

$$(5-2), (5+2)$$

$$(3, 7) \rightarrow$$

CONVERGENCIA
ABSOLUTA.



CONTINUACIÓN PROBLEMA 3.

$$\boxed{X=3}$$

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

Comparación $\sum \frac{1}{n}$ por

$$\boxed{X=7}$$

$$\sum \frac{(-1)^n (7-5)^n}{2^n (3n+2)} = \frac{(-1)^n (\cancel{2})^n}{\cancel{2}^n (3n+2)} = \frac{(-1)^n}{(3n+2)} \rightarrow \text{converge por comparación } \sum \frac{(-1)^n}{n}$$

$[3, 7] \rightarrow$ la serie converge en este intervalo y diverge fuera de este.

$$\lim_{n \rightarrow \infty} \frac{1}{2} = 0 \text{ Convergente}$$

$$\lim_{n \rightarrow \infty} \frac{(-1)^n}{n} = 0 \text{ Convergente}$$