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Problema 1

$x^5 - 6 \cdot x^3 - 8x^2 - 3 \cdot x$

Este polinomio tiene una raíz en $x = -1$

$x = -1$

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

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

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

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

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

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

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

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

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

$20(-1)^3 - 36(-1) - 16$

$20(-1) + 36 - 16$

$-20 + 36 - 16 = 0$

$(x+1)^3$

$(x+1)(x+1)(x+1$

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

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

$x^3 + 2x^2 + x^2 + x + 2x + 1$

$x^3 + 3x^2 + 3x + 1$

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Problema 2

determine la convergencia o divergencia

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

a) diverge.

B) $\sum_{1}^{\infty} \frac{(n+4)}{2^{n}n^2(n+1)} = \frac{(n+4)\ n!}{2^n n^2 (n+1)\, n!} \rightarrow a_n = \frac{n+4}{2^n n^2 (n+1)}$

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

$\frac{a_{n+1}}{a_n} = \frac{n+5}{2^{n+1}(n+1)^2(n+2)} \cdot \frac{2^n n^2 (n+1)}{n+4} = \frac{n^2(n+5)}{2(n+1)(n+2)(n+4)} \quad \frac{n^3+5n^2}{2n^3+14n^2+28n+16}$

$\lim_{n\to\infty} \frac{n^3+5n^2}{2n^3+14n^2+28n+16} = \lim_{n\to\infty} \frac{n^3}{2n^3} = \frac{1}{2}$

si $L < 1$ converge

debido al criterio de la razón.

Item III

dada la serie de potencias $\sum_{n=1}^{\infty} \frac{(-1)^{n}(x-5)^n}{2^n(3n+2)}$

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