Prova 3 de Calculo II

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1.

$$\sum_{k=0}^{\infty} u_k = \sum_{k=0}^{\infty} \frac{4^{k+1} b^{2k-1}}{9^{k-1}}$$

(a) $u_1 = 16b$

(b) $q = \frac{4b^2}{9}$

(c) $|b| < \frac{3}{2}$

(d) $b = \frac{1}{2}$ **ERREI:** ou $b = -\frac{9}{2}$

2. (a)

$$\sum_{k=2}^{\infty} \frac{1}{5^k \ln k} x^k$$

i. $R = 5$

ii. $I = [-5, 5]$

(b)

$$\sum_{k=0}^{\infty} c_k (x+4)^k, \qquad R = 3$$

i. $I = (-7, -1)$

ii. $x = 4 \notin I \cup \{-7, -1\} \rightarrow diverge$

iii. $x = -5 \in I \rightarrow converge$

iv. $x = 0 \notin I \cup \{-7, -1\} \rightarrow diverge$

v. $\sum_{k=0}^{\infty} c_k \quad converge, -3 \in I$

vi. $\sum_{k=0}^{\infty} 3^{k+1} c_k$ *inconclusiva*, -1 é extremo

3.

$$f(x) = \sum_{k=0}^{\infty} (-1)^k a_k (x-4)^{5k+1}, \qquad \forall x$$

(a) $f(4) = 0$

(b) $f(3) = \sum_{k=0}^{\infty} -a_k$

(c) $\sum_{k=0}^{\infty} (-1)^k a_k = f(5)$

(d) $f^{(56)}(4) = -(56!) a_{11}$

(e) $f'(x) = \sum_{k=0}^{\infty} (-1)^k a_k (5k+1)(x-4)^{5k}, \qquad \forall x$

(f) $(x-4)^3 f''(x) = \sum_{k=1}^{\infty} (-1)^k a_k (5k+1) 5k (x-4)^{5k+2}, \qquad \forall x$

4.

$$\sum_{k=0}^{\infty} \frac{(-1)^k}{(3k+1)2^k} x^{4k+3}$$

(a) $p_{15}(x) = \sum_{k=0}^{3} \frac{(-1)^k}{(3k+1)2^k} x^{4k+3}$

(b) $\int_0^1 f(x)dx = \sum_{k=0}^{\infty} \frac{(-1)^k}{(3k+1)2^k(4k+4)}$

(c) $S_3 = \sum_{k=0}^{3} \frac{(-1)^k}{(3k+1)2^k(4k+4)}$