Pop Quiz 4

2206xxxx72
ALDEN LUTHFI

1 a) $\sum_{n=1}^{\infty} \frac{(2x+4)^n}{3^n(2n+1)}$

Ratio test

$\lim_{n\to\infty} \frac{3^{n+1}(2n)}{(2x+4)^{n+1}} \cdot \frac{(2x+4)^n}{3^n(2n-1)} = \lim_{n\to\infty} \frac{3.2n}{(2x+4)(2n-1)}$

$\lim_{n\to\infty} \frac{6n}{(2x+4)(2n-1)} = \frac{3}{4+2x} < 1$

↳ $4+2x > 3$

$x > -\frac{1}{2}$

↳ $4+2x \neq 0$

$x \neq -2$

↳ $3(4+2x) < 4+2x$

$x < -2$

$\{x < -2 \wedge x > -\frac{1}{2}\}$

2.a. Ratio test

$\lim_{n\to\infty} \frac{a_{n+1}}{a_n} \to \lim_{n\to\infty} \frac{(x+2)^{n+1}(n+1)!\ln(n+1)}{(x+2)^n\, n!\ln(n)} = \lim_{n\to\infty} \frac{(x+2)(n+1)\ln(n+1)}{\ln(n)}$

akan selalu divergen

kecuali $(x+2) = 0$

Maka $x = \{-2\}$

set konvergen

(3.a.) absolute konvergen $|U_n| = \frac{x^n}{n^2 2^n}$

Ratio test

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

$|x| < 2 \rightarrow -2 < x < 2$

Saat $x = 2$ dan $x = -2$

a_n konvergen (p series) Jadi set konvergensinya $-2 \leq x \leq 2$

(4.b.) $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} \dots$

$f(x) = 1 - 2x + \frac{4x^2}{2!} + \frac{8x^3}{3!} \rightarrow e^{2x}$

Jadi $1 - 2x + \frac{4x^2}{2!} - \frac{8x^3}{3!} \dots = e^{-2x}$

(5.a.) $\frac{x}{(1-2x^3)^3} = x\left(1 + (-3).2x^3 + \frac{(-3)(-4)}{2!}.(2x^3)^2 + \frac{(-2)(-3)(-4)}{3!}(2x^3)^3 \dots\right)$

$= x - (-3)2x^4 + \frac{(-3)(-4)}{2!}(2x^3)^2 x - \frac{(-2)(-3)(-4)}{3!}(2x^3)^3 x \dots$

binomial series