

SNS COLLEGE OF ENGINEERING Kurumbapalayam (Po), Coimbatore – 641 107 AN AUTONOMOUS INSTITUTION Accredited by NAAC – UGC with 'A' Grade



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$$\begin{aligned}
\delta''(z) &= \frac{-1}{(1+z)^2} & \delta''(0) &= -1 \\
\delta'''(z) &= \frac{1}{(1+z)^3} & \delta'''(0) &= 2 \\
\delta'''(z) &= \frac{-b}{(1+z)^4} & \delta'''(0) &= -6
\end{aligned}$$

Taylor's sories about x = 0

$$\begin{aligned} f(x) &= \int (0) + \int \frac{f'(0)}{1!} x + \frac{f''(0)}{2!} x^{2} + \frac{f''(0)}{3!} x^{3} + \cdots \\ &= 0 + \frac{1}{1!} x + \frac{(-1)}{2} x^{2} + \frac{2}{6} x^{3} + \frac{(-6)}{24} x^{4} + \cdots \\ &= x - \frac{x^{2}}{2} + \frac{x^{3}}{3} - \frac{x^{4}}{4} + \cdots \end{aligned}$$

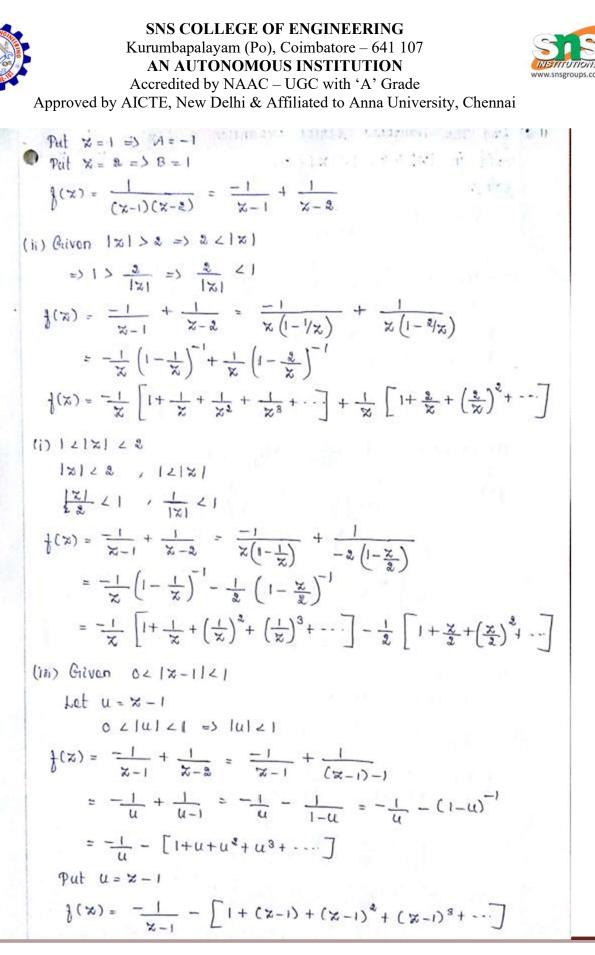
Laurenti sories :

Let CI, Ca be two concentric circles 1x-al=R, and 1x-al=Ra where Ra LRI.

het J(x) be analytic on CI & C2 and in the annulas

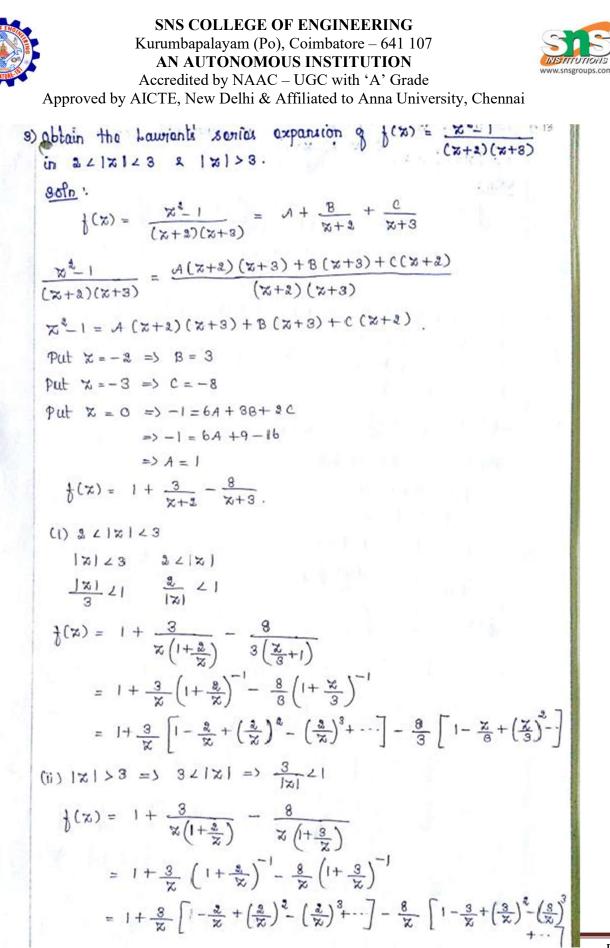
Problems :

1) Find the Laurenti' series expansion $q = f(x) = \frac{1}{(x-1)(x-2)}$ valid in the region (i) $| \leq |x| \leq 2$ (ii) |x| > 2 and $0 \leq |x-1| \leq 1$. Soft . Given, $f(x) = \frac{1}{(x-1)(x-2)}$ $\frac{1}{(x-1)(x-2)} = \frac{A}{x-1} + \frac{B}{x-2} = \frac{A(x-2) + B(x-1)}{(x-1)(x-2)}$ 1 = A(x-2) + B(x-1)



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a) find the Lowant's sentier expansion
$$\frac{1}{2} \frac{1}{5} (x) = \frac{1}{(x+1)(x+z)}$$

valid in $|x| > 9$, $1 < |x| < 9$.
 $\frac{9 \text{ find}}{5}$
Griven, $\frac{1}{2} (x) = \frac{1}{(x+1)(x+3)}$
 $\frac{1}{(x+1)(x+3)} = \frac{A}{|x|} + \frac{B}{|x|+3} = \frac{A(|x|+3) + B(|x|+1)}{(|x|+1)(|x|+3)}$
 $1 = A(|x|+3) + B(|x|+1)$.
Put $|x| = 3 \Rightarrow B = -1/2$.
Put $|x| = -1 \Rightarrow A = 1/3$.
 $(1) |x| > 3 \Rightarrow |> \frac{3}{|x||} \Rightarrow \frac{3}{|x||} = 1$
 $\frac{1}{2} \frac{1}{(x+1)(x+3)} = \frac{1}{2} \frac{1}{(x+1)} - \frac{1}{2} \frac{1}{|x|+3|}$.
 $(1) |x| > 3 \Rightarrow |> \frac{3}{|x||} = 3 \frac{3}{|x||} = 1$
 $\frac{1}{2x} \left[1 + \frac{1}{x} + (\frac{1}{x})^3 - (\frac{1}{3x})^4 + \cdots \right]$
 $\frac{1}{2x} \left[1 + \frac{3}{2x} + (\frac{1}{x})^{-1} - \frac{1}{3x} (\frac{1}{x})^3 + \cdots \right]$
 $\frac{1}{2x} \left[1 + \frac{3}{2x} + (\frac{1}{x})^{-1} - \frac{1}{3x} (\frac{1}{x})^3 + \cdots \right]$
 $(1) ||x| > 3 = \frac{1}{2} \frac{1}{|x|} - 1$
 $\frac{1}{2x} \left[1 - \frac{3}{2x} + (\frac{3}{2x})^5 - (\frac{3}{2x})^4 + \cdots \right]$
 $\frac{1}{2x} \left[1 + \frac{3}{2x} - (\frac{1}{2} + \frac{3}{2})^4 + \cdots \right]$
 $\frac{1}{2x} \left[1 + \frac{3}{2} + (\frac{1}{2})^5 - (\frac{1}{3})^4 + \cdots \right]$
 $\frac{1}{2x} \left[(\frac{1}{x} + \frac{1}{x}) - \frac{1}{3(x+3)} + \frac{1}{3(x+3)} +$



Page 13

