

$$(29) \quad f(x) = \frac{1}{3-x}$$

$$\frac{1}{3\left(1 - \frac{x}{3}\right)}$$

$$r = x/3$$

$$\frac{1}{3} \sum_{n=0}^{\infty} \left(\frac{x}{3}\right)^n = \sum_{n=0}^{\infty} \frac{x^n}{3^{n+1}}$$

(25)
$$\sum_{n=1}^{\infty} \frac{x^n}{n - 4 \ln n}$$

Ratio Test

$$\frac{\frac{x^{n+1}}{n+1 - 4 \ln(n+1)}}{\frac{x^n}{n - 4 \ln n}}$$

$$\frac{x^{n+1} \cdot (n - 4 \ln n)}{x^n (n+1 - 4 \ln(n+1))}$$

$$\frac{n - 4 \ln n}{n+1 - 4 \ln(n+1)} \rightarrow$$

$$\frac{1 - \frac{4}{n}}{1 - \frac{4}{n+1}} \rightarrow 1$$

check endpoints

$|x| < 1 \quad [-1, 1)$

$$\frac{(-1)^1}{1 - 4 \ln 1} + \frac{(-1)^2}{2 - 4 \ln 2} + \frac{(-1)^3}{3 - 4 \ln 3} - \dots$$

C. by Leibniz

$$\frac{1}{1 - 4 \ln 1} + \frac{1}{2 - 4 \ln 2} + \frac{1}{3 - 4 \ln 3} + \dots$$

$$\frac{1}{n - 4 \ln n} > \frac{1}{n}$$

diverges
Comparison
to $\frac{1}{n}$