"Convergent and Divergent Sequence"

* يعطى an

* $\lim_{n\to\infty} a_n$ ⇐ اذا كان الناتج رقم فال Con. Sequence

اما اذا كان الناتج ∞ or -∞ او عبارة عن رمزين

فال Sequence ⇐ Div

Example :- $a_n = \frac{1}{n}$

Sol

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{1}{n}$$

$$= \frac{1}{\infty} = 0 \quad \text{Conv.}$$

* Note

$\frac{\text{عدد}}{\infty} = 0$

$\frac{\text{عدد}}{0} = \infty$

$\frac{0}{\text{عدد}} = 0$

$\frac{\infty}{\text{عدد}} = \infty$

Example :- $a_n = \sqrt[n]{n^2}$

$$\lim_{n\to\infty} \sqrt[n]{n^2} = \lim_{n\to\infty} n^{\frac{2}{n}}$$

$$= \lim_{n\to\infty} n^{\frac{2}{\infty}=0} = (n)^0 = 1$$

① Conv.

Scanned by TapScanner

ample]

$a_n = 2 + (0.1)^n$

Sol]

$$\lim_{n\to\infty} 2 + (0.1)^n$$

$$= 2 + (0.1)^{\infty}$$

$$= 2 + 0 = 2 \quad \text{Conv.}$$

* Note

$$\lim_{n\to\infty} a^n$$

$a^{\infty} = \infty, \quad a > 1$

$a^{\infty} = 0, \quad -1 < a < 1$

$a^{\infty} = 1 \qquad a = 1$

$a^{\infty} = 1, -1 \qquad a = -1$

Example]

$a_n = 1 + (-1)^n$

Sol]

$$\lim_{n\to\infty} 1 + (-1)^n$$

$$= 1 + (-1)^{\infty} \begin{cases} 1+1 = 2 \\ 1-1 = 0 \end{cases} \quad \text{Div}$$

Example] $a_n = \dfrac{1}{(0.9)^n}$

$$\lim_{n\to\infty} \frac{1}{(0.9)^n} = \frac{1}{(0.9)^{\infty}} = \frac{1}{0} = \infty \quad \text{Div}$$

Scanned by TapScanner

ample] $a_n = \frac{n}{2} + 4$

Sol] $\lim_{n\to\infty} \frac{n}{2} + 4$

$\frac{\infty}{2} + 4 = \infty + 4 = \infty$ Div

Example] $a_n = \frac{3n^2 - 4n}{2n-1} = \frac{3n^2}{2n}$

$\lim_{n\to\infty} \frac{3n^2}{2n} = \infty$ Div

Note :-

في الدوال المتعددة الحدود

ناخذ

اكبر اس للبسط

اكبر اس للمقام

فاذا اس البسط > المقام = ∞

" " < المقام = 0

اما اذا اس البسط = المقام = رقم

Example]

$an = \frac{2n^5 - 4n^2}{3n^7 + n^2 - 10} = \frac{2n^5}{3n^7}$

$\lim_{n\to\infty} \frac{2n^5}{3n^7} = 0$ Conv.

Scanned by TapScanner

ample] $a_n = \frac{3n^2 - 5n}{5n^2 + 2n + 6}$

Sol

$$\lim_{n \to \infty} \frac{3n^2}{5n^2} = \frac{3}{5} \quad \text{Conv.}$$

Scanned by TapScanner