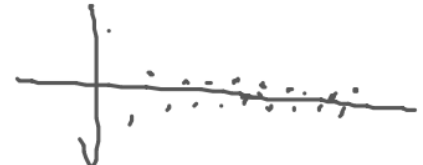


HW 10.1

25, 29

$$(25) a_n = \frac{(-1)^{n-1} n}{n^2 + 1}$$

$$\lim_{n \rightarrow \infty} \frac{(-1)^{n-1} n}{n^2 + 1}$$


$$\lim_{n \rightarrow \infty} \frac{-1 \cdot n}{n^2 + 1} = 0$$

$$\lim_{n \rightarrow \infty} \frac{n}{n^2 + 1} = 0$$

By SQUEEZE TH.

$$\lim_{n \rightarrow \infty} a_n = 0$$



(29)

$$a_n = \frac{(2n-1)!}{(2n+1)!} = \frac{\cancel{(2n-1)!}}{(2n+1)2n\cancel{(2n-1)!}}$$

$$\lim_{n \rightarrow \infty} \frac{1}{(2n+1)2n} = 0$$

$$\frac{5!}{7!} = \frac{\cancel{5!}}{7 \cdot 6 \cdot \cancel{5!}}$$

CONVERGES!

$$a_{100} = \frac{199!}{201!} = \frac{\cancel{199!}}{201 \cdot 200 \cdot \cancel{199!}} = \frac{1}{40,000}$$

$$(31) a_n = \frac{e^n + e^{-n}}{e^{2n} - 1} \cdot \frac{e^{-n}}{e^{-n}}$$

$$a_n = \frac{1 + e^{-2n}}{e^n - e^{-n}}$$

$$a_n = \frac{1 + \frac{1}{e^{2n}}}{e^n - \frac{1}{e^n}}$$

$$\lim_{n \rightarrow \infty} \frac{1 + \frac{1}{e^{2n}}}{e^n - \frac{1}{e^n}} = 0$$



$$\frac{x^2}{x^3} \cdot \frac{1}{x^2}$$

$$\frac{1}{x^2}$$

$$\downarrow$$

$$\lim_{x \rightarrow \infty} \frac{1}{x}$$

...

CONVERGES

(23)

$$a_n = \tan \frac{2n\pi}{1+8n}$$

$$\tan \lim_{n \rightarrow \infty} \frac{2n\pi}{1+8n}$$

$$\tan \frac{2\pi}{8}$$

$$\tan \frac{\pi}{4} = 1 \quad \text{CONVERGES!}$$

53

$$a_n = \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{(2n)^n}$$

$$= \frac{1}{2n} \cdot \frac{3}{2n} \cdot \frac{5}{2n} \cdots \frac{2n-1}{2n} = 0$$

$\lim_{n \rightarrow \infty} a_n = 0$  CONVERGES