

$$f_n \xrightarrow{c-s} f$$

$$f_n(x) = \frac{1}{(1+x^2)^n} \quad : \text{القريب } \textcircled{3}$$

$$\text{حي } \lim_{n \rightarrow +\infty} f_n(x) = \begin{cases} 1 & ; x=0 \\ 0 & x \neq 0 \end{cases} \quad \textcircled{1}$$

$$f(x) = \begin{cases} 1, & x=0 \\ 0, & x \neq 0 \end{cases} \quad \text{على } \mathbb{R} \quad \textcircled{1}$$

$$g_n(x) = |f_n(x) - f(x)| = \frac{1}{(1+x^2)^n} \quad \text{نضع } \textcircled{2}$$

$$\text{ليحد } \Rightarrow |x| > a : \text{نضع } x \neq 0 \quad \text{من اجل}$$

$$|x| > a \Rightarrow x^2 > a^2 \Rightarrow 1+x^2 > 1+a^2$$

$$\Rightarrow (1+x^2)^n > (1+a^2)^n \Rightarrow \frac{1}{(1+x^2)^n} < \frac{1}{(1+a^2)^n} \quad \text{حي } \textcircled{1}$$

$$(1+a^2) > 1 \quad \text{حي } \textcircled{1}$$

$$\frac{1}{(1+a^2)^n} \rightarrow 0 \quad \text{حي } \textcircled{1}$$

$$f_n \Rightarrow 0 \quad \text{حي } \textcircled{1}$$

حي \mathbb{R} على انتظام f_n $\textcircled{3}$

$$\forall \epsilon > 0 : \lim_{x \rightarrow 0} f_n(x) = 1 \quad \text{حي } \textcircled{1}$$

$$= f_n(0)$$

حي $\textcircled{1}$