

$$\Delta_n(x) = \sin^{2n}(x)$$

$$x_0 = \frac{\pi}{2}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \Delta_n(x) = \Delta_n\left(\frac{\pi}{2}\right)$$

$$\Delta(x) = \lim_{n \rightarrow \infty} \Delta_n(x)$$

$$\Delta\left(\frac{\pi}{2}\right) = 1 \neq \lim_{x \rightarrow \frac{\pi}{2}} \Delta(x) = 0$$

$$\lim_{n \rightarrow \infty} \Delta_n\left(\frac{\pi}{2}\right)$$

$$\lim_{n \rightarrow \infty} \lim_{x \rightarrow \frac{\pi}{2}} \Delta_n(x)$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \lim_{n \rightarrow \infty} \Delta_n(x)$$

$$x^n$$

$$\lim_{n \rightarrow \infty} x \rightarrow 1^-$$