Continuidad:

(TEORÍA)

Una función f es continua en x_0 si:

1- $\exists f(x_0)$

2 - $\exists \lim_{x \to x_0} f(x)$

3 - $\lim_{x \to x_0} f(x) = f(x_0)$

Ej: • $f(x) = x^2$ en $x_0 = 1$: Continua

1- $f(1) = 1$

2 - $\lim_{x \to 1^-_+} x^2 = 1 \implies \lim_{x \to 1} x^2 = 1$

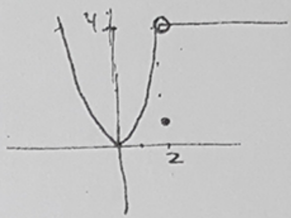
3 - $f(1) = 1 = \lim_{x \to 1} x^2$

• $f(x) = \begin{cases} x^2 & \text{si } x < 2 \\ 1 & \text{si } x = 2 \\ 4 & \text{si } x > 2 \end{cases}$ en $x_0 = 2$

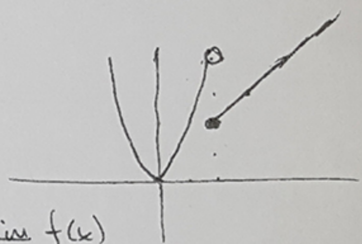
$f(2) = 1$ ✗

$\lim_{x \to 2} f(x) = 4$

Discontinua (evitable)



• $f(x) = \begin{cases} x^2 & \text{si } x < 2 \\ 4 & \text{si } x > 2 \end{cases}$ en $x_0 = 2$ $\nexists f(2)$ (disc. evitable)



• $f(x) = \begin{cases} x^2 & \text{si } x < 2 \\ x & \text{si } x \geq 2 \end{cases}$ en $x_0 = 2$

$f(2) = 2$

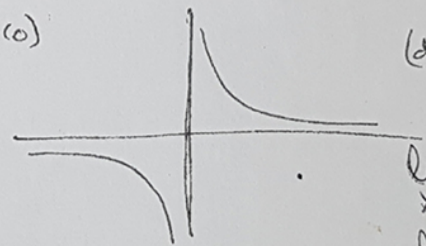
$\lim_{x \to 2^-} f(x) = \lim_{x \to 2} x^2 = 4$

$\neq$ $\nexists \lim_{x \to 2} f(x)$

$+$ $= \lim_{x \to 2} x = 2$

(disc. inevitable de salto 2)

• $f(x) = \frac{1}{x}$ en $x_0 = 0$ $\nexists f(0)$



(discont. inevitable de salto infinito).

$\lim_{x \to 0^-} \frac{1}{x} = -\infty$

$\lim_{x \to 0^+} \frac{1}{x} = +\infty$

— Tipos de discontinuidades:

a) discont. evitable : si $\nexists f(x_0)$ pero $\exists \lim_{x \to x_0} f(x)$ o $f(x_0) \neq \lim_{x \to x_0} f(x)$

b) " inevitable : $\nexists \lim_{x \to x_0} f(x)$

salto $= \left| \lim_{x \to x_0^+} f(x) - \lim_{x \to x_0^-} f(x) \right|$