



Universidad del sureste
Campus Comitán
Licenciatura en Medicina Humana

Tema: Poniendo límites

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Grupo "B"

Grado: Segundo semestre
Materia: Biomatemáticas

PASIÓN POR EDUCAR

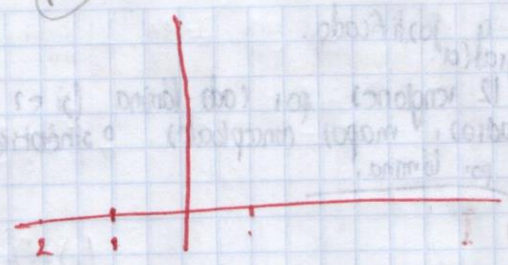
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Comitán de Domínguez Chiapas a 20 de febrero de 2022

2020 III SP

11-1
1-1

$$\lim_{x \rightarrow 2} x^2 = (2)^2 = 4$$



Exercs.

1) $\lim_{x \rightarrow 2.5} x^2$

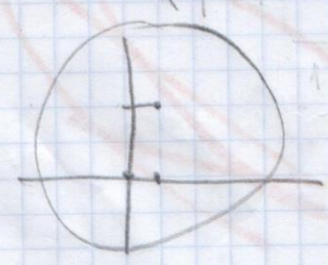
$$\frac{x^2 + 2x + 1}{x + 3}$$

2) $\lim_{x \rightarrow 1.5} x^2$

3) $\lim_{x \rightarrow 3} x^2$

1) $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$

$$\frac{x^2 - 1}{x - 1} = \frac{(x-1)(x+1)}{x-1}$$



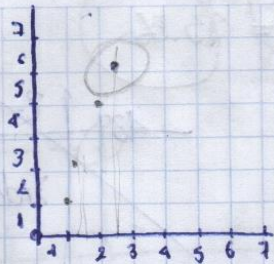
$x \rightarrow 1$ $\frac{1+1}{1-1}$ 2)

$\frac{x}{x-1}$ $\frac{1}{1-1}$ $\frac{1}{0}$

$$\textcircled{1} \lim_{x \rightarrow 2.5} x^2$$

$$\textcircled{6.25}$$

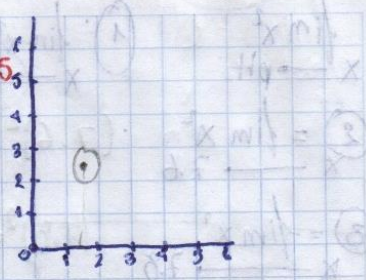
$$(2.5)^2 = 6.25$$



$$\textcircled{2} \lim_{x \rightarrow 1.5} x^2$$

$$\textcircled{2.25}$$

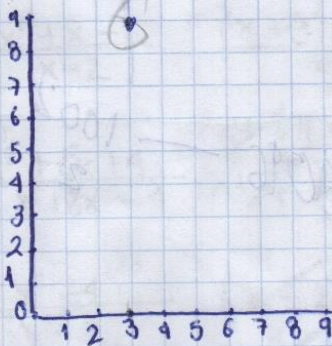
$$(1.5)^2 = 2.25$$



$$\textcircled{3} \lim_{x \rightarrow 3} x^2$$

$$\textcircled{9}$$

$$(3)^2 = 9$$

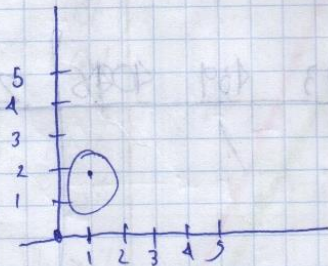


$$\textcircled{4} \lim$$



$$\textcircled{4} \lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} = \frac{(x-1)(x+1)}{x-1}$$

$$x+1 = 1+1 = \textcircled{2}$$



2 3 5 7 11

Ejercicios.

$\lim_{x \rightarrow 4} x^2$

(1) $\lim_{x \rightarrow 6.6} x^2 = (6.6)^2 = 43.56$

(2) $\lim_{x \rightarrow 7.6} x^2$

$(7.6)^2 = 57.76$

(3) $\lim_{x \rightarrow 7.8} x^2$

$(7.8)^2 = 60.84$

(4) $\lim_{x \rightarrow 8} x^2$

$(8)^2 = 64$

(2) $\lim_{x \rightarrow 7.6} x^3$

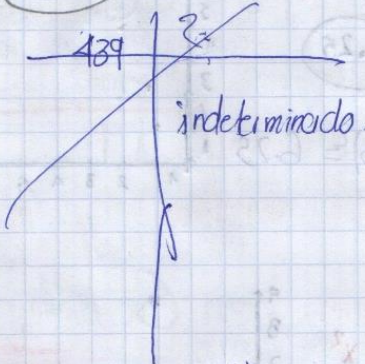
$= 438.976$

(3) $\lim_{x \rightarrow 7.8} x^3$

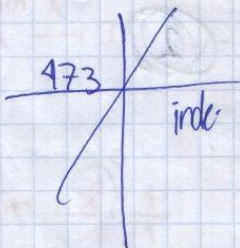
$= 474.552$

(4) $\lim_{x \rightarrow 8} x^3$

$= 512$



$4096 \rightarrow \frac{100\%}{2}$

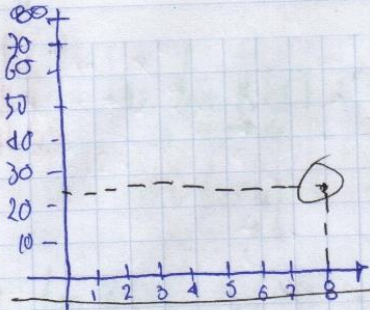


4096	2
2048	2
1,024	2
512	2
256	2
128	2
64	2
32	2
16	2
8	2
4	2
2	2

4096



44



$$\frac{x+4}{x+1} \quad \text{at } 0_2 \quad \frac{8-100\%}{2} = \frac{8}{2} = 4$$

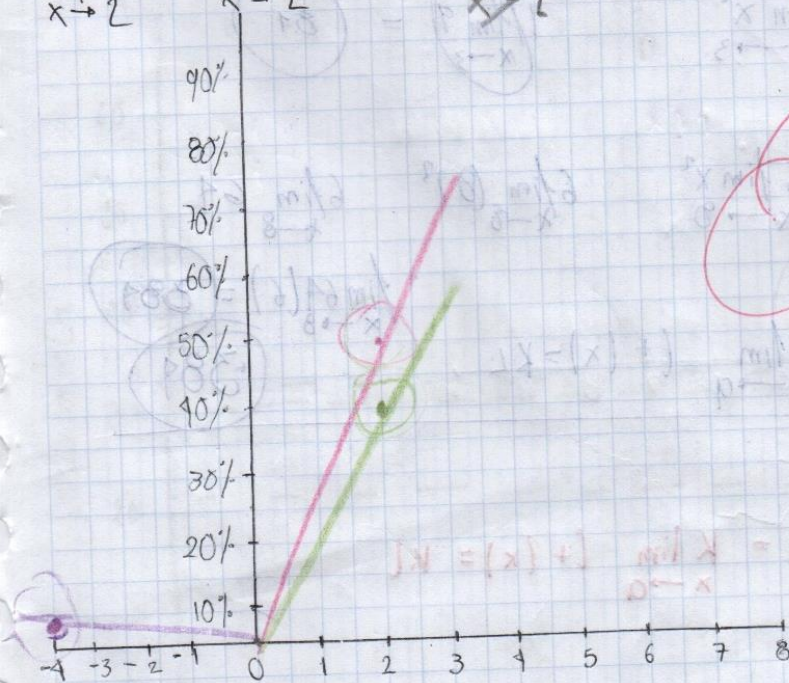
$$\frac{x^2+4x}{x+2} \quad \frac{8-100\%}{2} = 25\%$$

Propiedades de los límites. (?) ¿Qué es?

1. $\lim_{x \rightarrow 2} \frac{x^2+x-6}{x-2} = \frac{(x+3)(x-2)}{x-2} = x+3 = 2+3 = 5$

2. $\lim_{x \rightarrow -4} \frac{x^2+5x+4}{x^2+3x-4} = \frac{(x+4)(x+1)}{(x+4)(x-1)} = \frac{x+1}{x-1} = \frac{-4+1}{-4-1} = \frac{-3}{-5} = 0.6$

3. $\lim_{x \rightarrow 2} \frac{x^2-4}{x-2} = \frac{(x-2)(x+2)}{x-2} = x+2 = 2+2 = 4$



Propiedades básicas de los límites.

$$\lim_{x \rightarrow a} C = C = \lim_{x \rightarrow 2} 5 = 5$$

$$\lim_{x \rightarrow a} x = a \quad \lim_{x \rightarrow 2} x = 2$$

$$\lim_{x \rightarrow a} x^n = a^n = \lim_{x \rightarrow 2} x^2 = (2)^2 = 4$$

$$\lim_{x \rightarrow a} \sqrt[n]{x} = \sqrt[n]{a} \quad \lim_{x \rightarrow 4} \sqrt{x}$$

Ejemplo.

$$\lim_{x \rightarrow 2} 2x = 2 \lim_{x \rightarrow 2} x = 2(2) = 4$$

$$\lim_{x \rightarrow 3} 9x^2 \xrightarrow{f(x)} 9 \lim_{x \rightarrow 3} x^2 \quad 9 \left(\lim_{x \rightarrow 3} 3 \right)^2 = 81$$

Ejercicio

$$\lim_{x \rightarrow 8} 6x^2 = 6 \lim_{x \rightarrow 8} x^2 = 6 \left(\lim_{x \rightarrow 8} 8 \right)^2 = 6 \lim_{x \rightarrow 8} 64$$

$$\lim_{x \rightarrow 8} 64(6) = 384$$

$$\lim_{x \rightarrow a} k[f(x)] = k \lim_{x \rightarrow a} f(x) \quad (f(x) = L) \Rightarrow kL$$

$$= 384$$

Propiedades

$$\lim_{x \rightarrow a} k[f(x)] = k \lim_{x \rightarrow a} f(x) = kL$$

1. pH como constante y como x. (primera parte).
2. Presión de oxígeno de 80 mmHg. (segunda parte).

X=K

pH 6
pH 9
pH 55

K = $i \cdot 2 \cdot 10^2 \cdot Hb$?

$$1. \lim_{x \rightarrow a} K(x) = K \lim_{x \rightarrow a} (x) =$$

$$80 \lim_{x \rightarrow 6} (x) = 480 \rightarrow 33\%$$

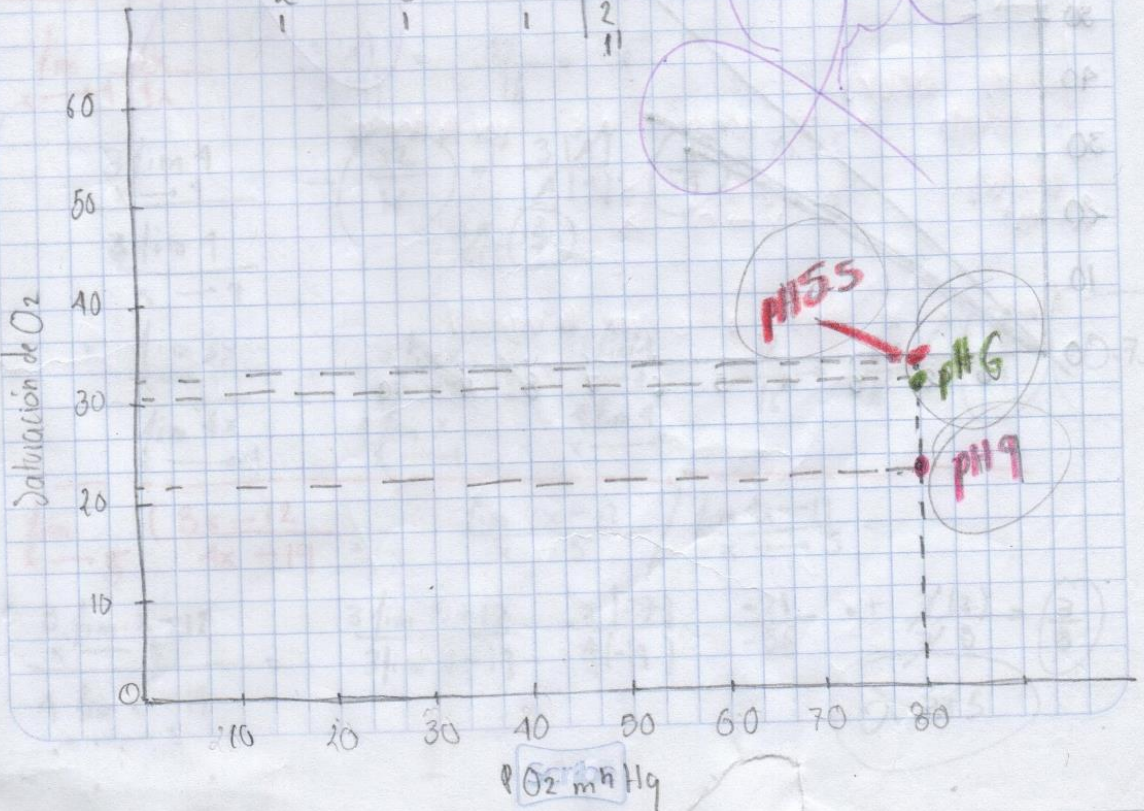
$$2. \lim_{x \rightarrow a} K(x) = K \lim_{x \rightarrow a} (x) = 80 \lim_{x \rightarrow 9} (x) = 720 \rightarrow 42\%$$

$$3. \lim_{x \rightarrow a} K(x) = K \lim_{x \rightarrow a} (x) = 80 \lim_{x \rightarrow 5.5} (x) = 440 \rightarrow 36\%$$

conexión =

480	720	440	2
240	360	220	2
120	180	110	2
60	90	55	5
12	18	11	2
6	9	11	3
2	3	11	3
1	1	1	2
			11

15840 100%
720



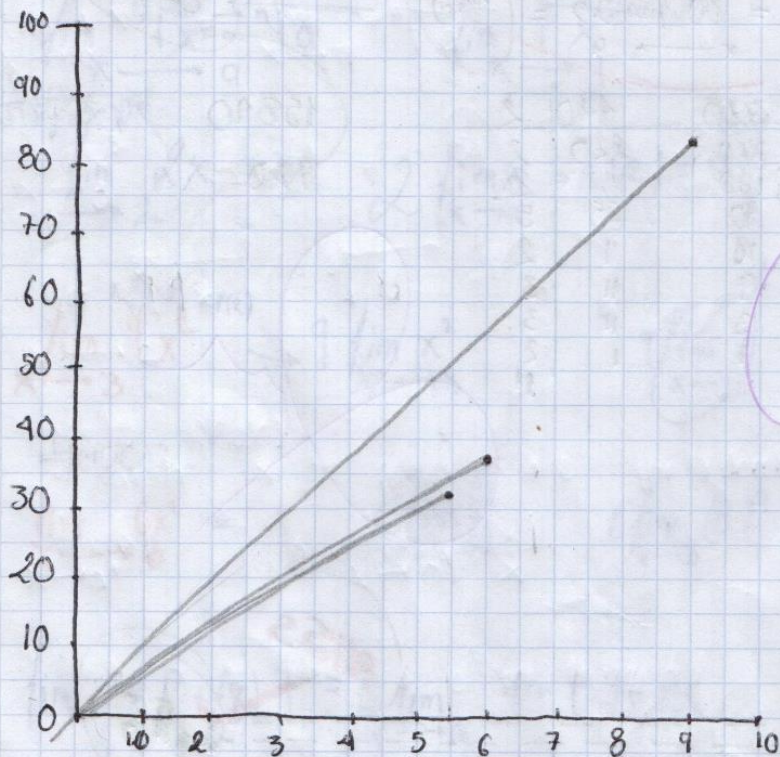
Exercício 1

5. Sal O₂ H₂?

$$1. \lim_{x \rightarrow 6} 6x = 6 \lim_{x \rightarrow 6} x = \lim_{x \rightarrow 6} 6(6) = 36$$

$$2. \lim_{x \rightarrow 9} 9x = 9 \lim_{x \rightarrow 9} x = \lim_{x \rightarrow 9} 9(9) = 81$$

$$3. \lim_{x \rightarrow 5.5} 0.5x = 0.5 \lim_{x \rightarrow 5.5} x = \lim_{x \rightarrow 5.5} 0.5(5.5) = 2.75$$



$$\frac{15-12}{20-19}$$

$$\frac{3 \cdot 3}{1} = 3$$

18 de febrero.

$$\lim_{x \rightarrow 2} 3x + 4$$

$$\lim_{x \rightarrow 2} (Ax)(Bx) \quad \left(4 \lim_{x \rightarrow 2} 2 \cdot 3 \lim_{x \rightarrow 2} 2 \right) \quad \text{distribuir los límites por separado}$$

$$2 \lim_{x \rightarrow 2} x \cdot 3 \lim_{x \rightarrow 2} x \quad (8) \cdot (6) = 48$$

$$2 \lim_{x \rightarrow 2} 2 \cdot 3 \lim_{x \rightarrow 2} 2 = 8 \cdot 6 = 48$$

$$\lim_{x \rightarrow 4} 3x \cdot 6x = \lim_{x \rightarrow 4} 3x \cdot \lim_{x \rightarrow 4} 6x = \frac{3 \lim_{x \rightarrow 4} x}{1} \cdot \frac{6 \lim_{x \rightarrow 4} x}{1}$$

$$3(4) \cdot 6(4)$$

$$12 \cdot 24$$

$$\frac{3 \lim_{x \rightarrow 4} 4}{1} \cdot \frac{6 \lim_{x \rightarrow 4} 4}{1}$$

$$12 \cdot 24 = 288$$

$$\lim_{x \rightarrow 4} \frac{3x}{4x}$$

$$\frac{3(4)}{4(4)} = \frac{12}{16} = \frac{3}{4}$$

$$\frac{3 \lim_{x \rightarrow 4} 4}{4 \lim_{x \rightarrow 4} 4}$$

$$\rightarrow \frac{12}{16} = \frac{3(4)}{4(4)} = \frac{3}{4} = 0.75$$

$$\frac{\lim_{x \rightarrow 4} 3x}{\lim_{x \rightarrow 4} 4x} = \frac{3 \lim_{x \rightarrow 4} x}{4 \lim_{x \rightarrow 4} x} = \frac{3 \lim_{x \rightarrow 4} 4}{4 \lim_{x \rightarrow 4} 4} = \frac{12}{16} = \frac{3 \cdot 4}{4 \cdot 4} = \frac{3}{4} = 0.75$$

$$\lim_{x \rightarrow 5} \frac{3x-12}{4x-19} = \frac{\lim_{x \rightarrow 5} 3x-12}{\lim_{x \rightarrow 5} 4x-19} =$$

$$\frac{3 \lim_{x \rightarrow 5} x - 12}{4 \lim_{x \rightarrow 5} x - 19} = \frac{3 \lim_{x \rightarrow 5} 5 - 12}{4 \lim_{x \rightarrow 5} 5 - 19} = \frac{3(5) - 12}{4(5) - 19} = \frac{-3}{1} = -3$$

0.375

$$\lim_{x \rightarrow 5} \frac{3x - 12}{4x - 19}$$

$$3. \lim_{x \rightarrow 5} x = \lim_{x \rightarrow 5} 12 =$$

$$4. \lim_{x \rightarrow 5} x = \lim_{x \rightarrow 5} 19$$

$$\lim [f(x)]^n = \left[\lim_{x \rightarrow a} f(x) \right]^n$$

$$\lim_{x \rightarrow a} \sqrt[n]{x} = \lim_{x \rightarrow a} \sqrt[n]{a}$$

$$\lim_{x \rightarrow 3} 2x^3 = 2(27) = 54$$

$$2(3)^3 = 2(27) = 54$$

$$\lim_{x \rightarrow 2} \sqrt[3]{4x} = \sqrt[3]{8} = 2$$

límites laterales

• Cuando x se acerca a c por la derecha

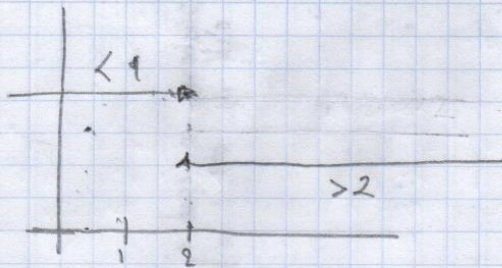
$$\lim_{x \rightarrow a^+} f(x) \quad \text{ó} \quad \lim_{x \rightarrow 0^+} \frac{|x|}{x}$$

Cuando x se acerca a c por la izquierda

Calcular $\lim_{x \rightarrow 2} f(x)$

$$f(x) = \begin{cases} x^2 & \text{si } x < 2 \\ 4 & \text{si } x = 2 \\ 6 - 2x & \text{si } x > 2 \end{cases}$$

4
4
2



Calcular $\lim_{x \rightarrow 1} f(x)$

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

1 + 1 = 2

2

