



**Universidad del sureste**

**Campus Comitán**

**Licenciatura en Medicina Humana**

**Nombre de la actividad: Poniendo límites**

**Materia: Biomatemáticas**

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**Grupo: "B"**

**Grado: Segundo semestre**

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Morales Irecta**

Comitán de Domínguez Chiapas a 19 de febrero del 2022

**Mafalda**

L M I T E  
l i m i t e



Uso de herramientas de las matemáticas para el análisis

LIMITE

$$\lim_{x \rightarrow a} f(x) = L$$

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

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

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

$$(2.5)^2 = 6.25$$

$$x \rightarrow 2.5$$

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

$$(1.5)^2 = 2.25$$

$$x \rightarrow 1.5$$

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

$$(3)^2 = 9$$

$$x \rightarrow 3$$

$$a^2 + b^2 = a$$

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

$$(1^2 - 1) = 1 - 1 = 0$$

$$a^2 - b^2 = (a - b)(a + b)$$

$$\lim_{x \rightarrow 1} \frac{(x-1) \cdot (x+1)}{x-1} = \lim_{x \rightarrow 1} (x) + \lim_{x \rightarrow 1} (1)$$

$$1 + 1 = 2 //$$

11. 02. 2022



# EJERCICIOS

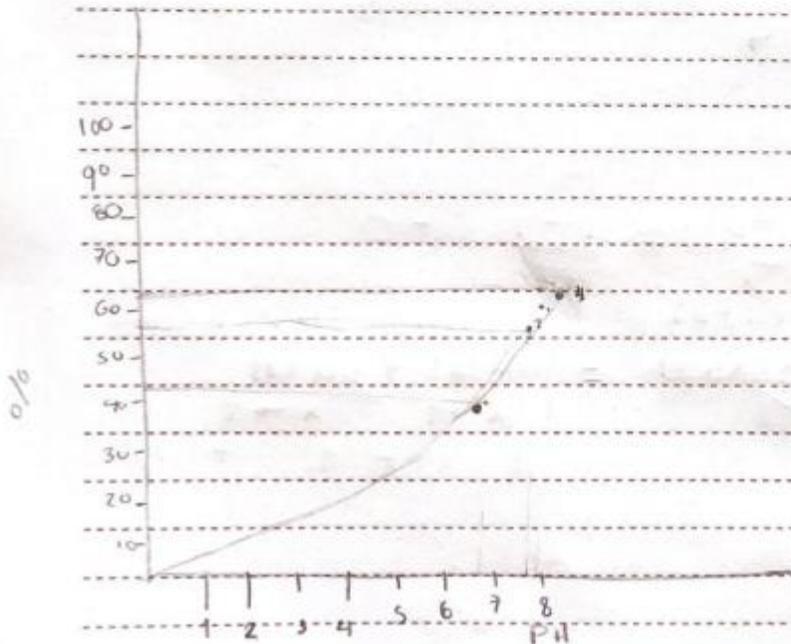
Mafal

$$\lim_{x \rightarrow \text{pH } 6.6} x^2 = 43.56$$

$$\lim_{x \rightarrow \text{pH } 7.6} x^2 = 57.76$$

$$\lim_{x \rightarrow \text{pH } 7.8} x^2 = 60.84$$

$$\lim_{x \rightarrow \text{pH } 8} x^2 = 64$$



11-02-2021



Lim (7.6)<sup>3</sup> = 438.936 = 439

(7.8)<sup>3</sup> = 474.552 = 475

(8)<sup>3</sup> = 4,096

MCM • MCD

439	2
219.5	

4096	2
2048	2
1024	2
512	2
256	2
128	2
64	2
32	2
16	2
8	2
4	2
2	2 = 24
1	

474	2
237	3
79	

4096 - 10

x<sup>7</sup> → 4096 pH

8 → 100%  
2 → 25

Cuando alguien tiene un pH de 8 satura al 25%

Mafalda

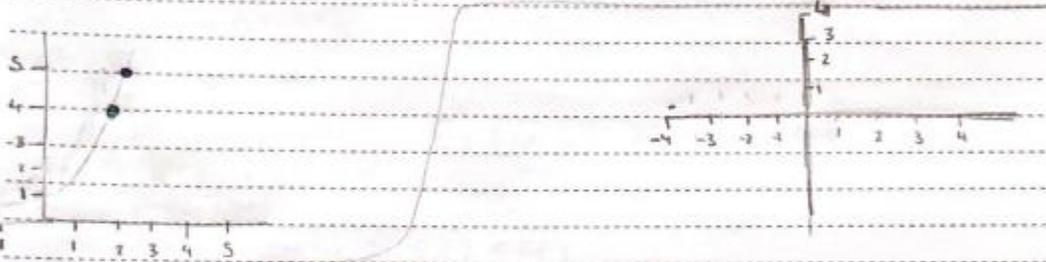
## TAREA



$$\bullet \lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x - 2} \quad \lim_{x \rightarrow 2} \frac{x^2 + 3x - 2x - 6}{x - 2}$$

$$\lim_{x \rightarrow 2} \frac{x \times (x+3) - 2x - 6}{x - 2} = \frac{x(x+3) - 2(x+3)}{x - 2}$$

$$= \frac{(x+3)(x-2)}{x-2} \quad \lim_{x \rightarrow 2} (x+3) = \lim_{x \rightarrow 2} 2+3 = 5 //$$

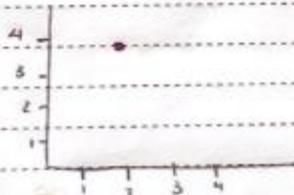


$$\bullet \lim_{x \rightarrow -4} \frac{x^2 + 5x + 4}{x^2 + 3x - 4}$$

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

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

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



$$\lim_{x \rightarrow a} c = c \quad \lim_{x \rightarrow 2} 5 = 5$$

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

$$\lim_{x \rightarrow a} x^n = a^n \quad \lim_{x \rightarrow a} x = a$$

$$\lim_{x \rightarrow a} k \cdot f(x) = k \cdot \lim_{x \rightarrow a} f(x) = k \cdot L$$

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

$$\lim_{x \rightarrow 3} 9x^2 = 9(3)$$

$$\lim_{x \rightarrow 8} 6x^2 = 6(8)^2 = 64 \cdot 8 = 384 //$$

k=80

Mafalda

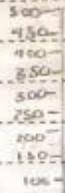
disat O<sub>2</sub> H<sub>2</sub>?



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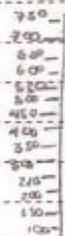
→ pH 6

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



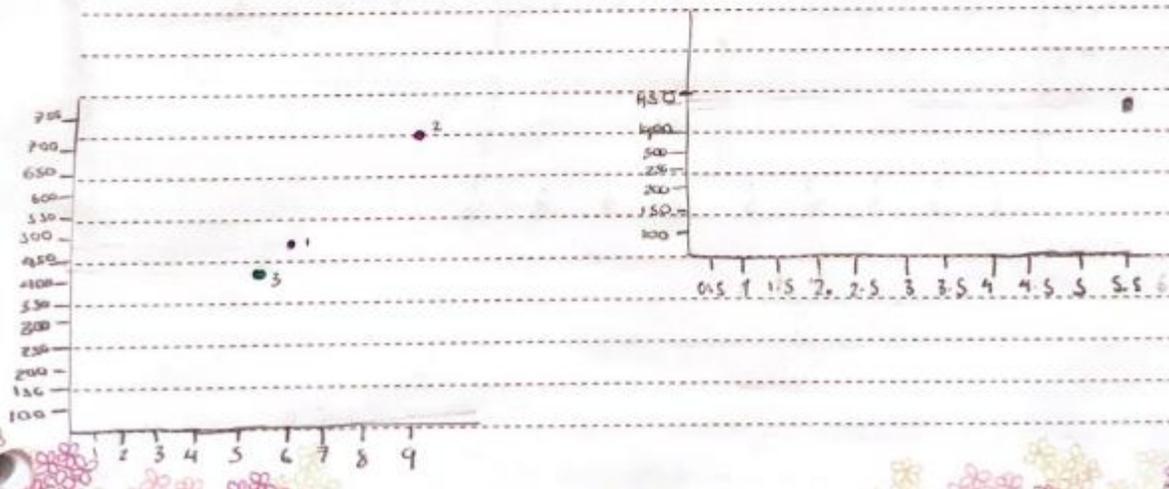
→ pH 9

$$\lim_{x \rightarrow 9} 80(x) = 80 \lim_{x \rightarrow 9} x = 80(9) = 720$$



→ pH 5.5

$$\lim_{x \rightarrow 5.5} 80(x) = 80 \lim_{x \rightarrow 5.5} x = 80(5.5) = 440$$





$$\lim_{x \rightarrow 6} 6(x)$$

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

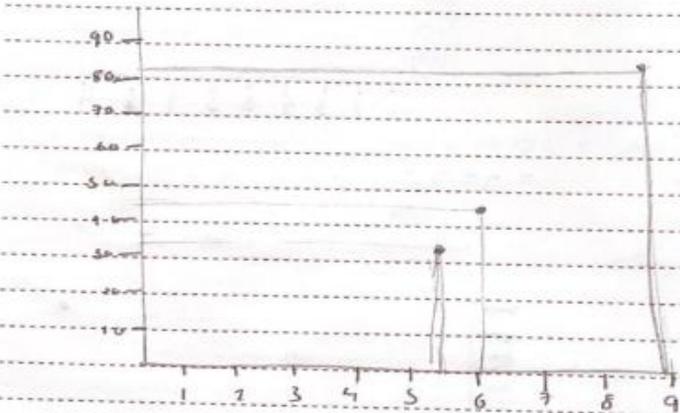
$x = 6$

$$\lim_{x \rightarrow 9} 9(x)$$

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

$$\lim_{x \rightarrow 5.5} 5.5(x)$$

$$\lim_{x \rightarrow 5.5} 5.5(x) = 5.5 \lim_{x \rightarrow 5.5} (x) \quad (5.5)(5.5) = 30.25$$



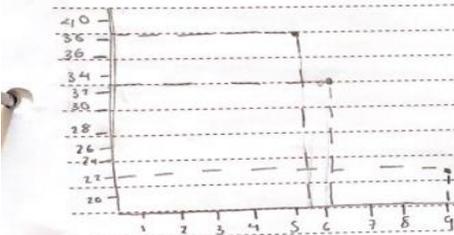
### Mafalda

6 → 100%    4 → 100%  
 2 → 33%    2 → 22%  
 5.5 → 100%    2 → 36%



### Pere

4	80	2	7	20	2	4	40	2
240	2	360	2	220	2			
170	2	180	2	110	2			
60	2	40	2	55	5			
30	2	20	2	11	11			
15	3	15	3	1				
5	5	5	5					
1		1						



Mafalda

$$\lim 3 \cdot 6 + 8 = 19$$

$$\frac{12}{16} = \frac{6}{8} = \frac{3}{4} = 0.75$$

$$\begin{array}{r} 1 \\ 16 \overline{) 172} \\ \underline{16} \phantom{0} \\ 12 \phantom{0} \\ \underline{12} \phantom{0} \\ 0 \phantom{0} \end{array}$$

18.02.2022



$$\lim_{x \rightarrow a} f(x) \pm g(x) = \lim_{x \rightarrow a} f(x) \pm \lim_{x \rightarrow a} g(x) = L \pm m$$

$$\lim_{x \rightarrow 2} 4x + 3x = \lim_{x \rightarrow 2} 3(2) + \lim_{x \rightarrow 2} 4(2) = 6 + 8 = 14$$

$$\lim_{x \rightarrow a} f(x) \cdot g(x) = \lim_{x \rightarrow a} f(x) \cdot \lim_{x \rightarrow a} g(x) = L \cdot m$$

$$\lim_{x \rightarrow 2} (4x)(3x) = 4 \lim_{x \rightarrow 2} 2 \cdot 3 \lim_{x \rightarrow 2} 2$$

$$= 4 \cdot 2 = 8 \cdot 3 \cdot 2 = 48$$

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

$$12 \cdot 24 = 288$$

$$\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{\lim_{x \rightarrow a} f(x)}{\lim_{x \rightarrow a} g(x)} = \frac{L}{M}, M \neq 0$$

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

$$\lim_{x \rightarrow 5} \frac{3x - 12}{4x - 19} = \frac{\lim_{x \rightarrow 5} (3)(5) - 12}{(4)(5) - 19} = \frac{15 - 12}{20 - 19} = \frac{3}{1} = 3$$



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

$$\lim_{x \rightarrow 3} 2x^3 = ((2)(3))^3 = (6)^3 = 216$$

$$\lim_{x \rightarrow 3} 2x^3 = \left( \lim_{x \rightarrow 3} 2(3) \right)^3 = \left( \lim 2(3) \right)^3 = (6)^3 = 216.$$

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

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

8	2
4	2
2	2
1	



# L I M I T E S

> cuando  $x$  se acerca a  $c$  por la derecha

lim

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

①  $f(x)$

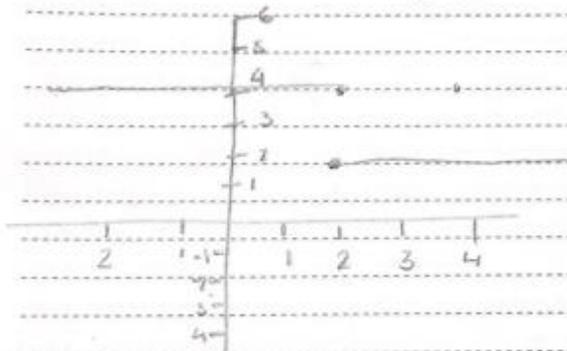
$f(2) = 4$

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

②  $f(x)$

$f(2) = 4$

③  $6 - (2)(2) = 6 - 4 = 2$



calcular

calcular  $f(x)$   $x \rightarrow 1$  mayor que

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

$f(x) = 1 + 1 = 2$

$f(x) = 2(1) = 2$

