



UNIVERSIDAD AUTONOMA DEL ESTADO DE
MEXICO

PREPARATORIA REGIONAL DE TEJUPILCO A.C

CÁLCULO

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QUINTO SEMESTRE

EQUIPO 2

TEJUPILCO, MEXICO A 1 DE OCTUBRE DEL 2020

Calcular los siguientes límites:

1. $\lim_{x \rightarrow 0} \frac{9^2 - 5}{x}$

$$\frac{9^2 - 5x^2}{x}$$

X

X (-)

x → 0

x (+)

X = -.9

f = -62.2

f = 560

x = .1

X = -.99

f = -56.56

f = 5600

x = .01

X = -.999

f = -56.05

f = 56,000

x = .001

No existe límite debido a que no se acerca al mismo valor.

2. $\lim_{x \rightarrow -1} g(x)$: donde $g(x) = \begin{cases} 5 - 2x & \text{para } x < -1 \\ 2x & \text{para } x \geq -1 \end{cases}$

x → -1



X = -1.1

f = -2.2

f = 6.8

x = -.9

X = -1.01

f = -2.02

f = 6.98

x = -.99

X = -1.001

f = -2.002

f = 6.998

x = -.999

No hay límite, ya que no se acercan al mismo valor.

3. $\lim_{x \rightarrow 0} h(x)$: donde $h(x) = \begin{cases} x^2 & \text{para } x < 0 \\ 0.5x^2 & \text{para } x \geq 0 \end{cases}$

x → 0

x = -.1

f = -.01

f = .005

x = .1

x = -.01

f = -.0001

f = .00005

x = .01

x = -.001

f = -.000001

f = .0000005

x = .001

El límite es cero

$$4. \lim_{x \rightarrow 8} \frac{x^2 - 64}{x - 8} = \frac{0}{0}$$

$$\frac{(x - 8)(x + 8)}{x - 8} = x + 8 = (8) + 8 = 16$$

$$5. \lim_{x \rightarrow 3} \frac{9x - x^2}{3 - x} = \frac{0}{0}$$

$$\frac{(3 - x)(3 + x)}{(3 - x)} = 3 + x = (3) + (3) = 6$$

$$6. \lim_{x \rightarrow 1} \frac{3x^2 - 9x - 12}{3x + 3} = \frac{0}{0}$$

$$3x^2 - 9x - 12 = \frac{(3x - 12)}{3} \cdot \frac{(3x + 3)}{1} \cdot \frac{(x - 4)(3x + 3)}{3x + 3} = x - 4 = (-1) - 4 = -5$$

$$7. \lim_{x \leftarrow \frac{1}{2}} \frac{1 - x - 2x^2}{1 - 2x}$$

$$\begin{aligned} \frac{2x^2 + x - 1}{2x - 1} &= \frac{0}{0} = 2x^2 + x - 1 = \frac{(2x + 1)}{1} \cdot \frac{(2x - 1)}{1} = \frac{(2x + 1)(2x - 1)}{2x - 1} \\ &= (2x + 1) = (2(-\frac{1}{2}) + 1) = 0 \end{aligned}$$

$$8. \lim_{x \rightarrow -7} \frac{x^2 - 49}{x + 7} = \frac{0}{0}$$

$$\frac{(x - 7)(x + 7)}{x + 7} = x - 7 = (-7) - 7 = -14$$

$$9. \lim_{x \rightarrow -5} \frac{x^2 + 3x - 10}{x + 5} = \frac{0}{0}$$

$$\frac{(x + 5)(x - 2)}{x + 5} = (x - 2) = (-5) - 2 = -7$$

$$10. \lim_{x \rightarrow 3} \frac{x^2 + 3x - 18}{x - 3} = \frac{0}{0}$$

$$\frac{(x + 6)(x - 3)}{x - 3} = (x + 6) = 3 + 6 = 9$$

$$11. \lim_{x \rightarrow -3} \frac{x^2 + 3x}{x + 3}$$

$$\frac{x(x + 3)}{x + 3} = -3$$

$$12. \lim_{x \rightarrow -5} \frac{2x^2 + 7x - 15}{x + 5} = \frac{0}{0}$$

$$2x^2 + 7x - 30 = \frac{(2x + 10)(2x - 3)}{2} = \frac{(2x - 3)(x + 5)}{1} = \frac{(x + 5)(2x - 3)}{x + 5} = (2x - 3) = 2(-5) - 3 = -13$$

$$13. \lim_{x \rightarrow 2} \frac{3 - 4x + 1}{x^2 - 2x} = \frac{0}{0} = \lim_{x \rightarrow 2} \frac{3 - \sqrt{4x} + 1}{x^2, 2x} \frac{3 + \sqrt{4x} + 1}{3 + \sqrt{4x} + 1}$$

$$\lim_{x \rightarrow 2} \frac{3^2 - \sqrt{4x} + 1^2}{(x^2 - 2x)(3 + \sqrt{4x} + 1)}$$

$$\lim_{x \rightarrow 2} \frac{-4x(-2)}{x(x-2)(3 + \sqrt{4x} + 1)}$$

$$\lim_{x \rightarrow 2} \frac{9 - (4x + 1)}{(x(x-2))(3 + \sqrt{4x} + 1)}$$

$$\lim_{x \rightarrow 2} \frac{-4}{x(3 + \sqrt{4x} + 1)}$$

$$\lim_{x \rightarrow 2} \frac{9 - 4x = 1}{x(x-2)(3 + \sqrt{4x} + 1)}$$

$$\lim_{x \rightarrow 2} \frac{-4x + 8}{x(x-2)(3 + \sqrt{4x} + 1)}$$

$$\frac{-4}{2(3 + \sqrt{4(2)} + 1)}$$

$$\frac{-4}{2(3 + \sqrt{9})} = \frac{-4}{2(6)} = \frac{-4}{12} = -\frac{1}{3}$$

$$14. \lim_{x \rightarrow 0} \frac{x+4-2}{x} = \frac{0}{0} = \frac{\sqrt{x}+4-2}{x} \cdot \frac{\sqrt{x}+4+2}{\sqrt{x}+4+2}$$

$$\begin{aligned} \frac{\sqrt{x} + 4 - 2}{(x)(\sqrt{x} + 4 + 2)} &= \frac{x + 4 - 4}{(x)(\sqrt{x} + 4 + 2)} = \frac{x}{(x)(\sqrt{x} + 4 + 2)} = \frac{1}{\sqrt{x} + 4 + 2} \\ &= \frac{1}{\sqrt{0} + 4 + 2} = \frac{1}{\sqrt{4} + 2} = \frac{1}{4} \end{aligned}$$

$$15. \lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{7 \sin^2(x-2)} = \frac{4 - 8 + 4}{0} = 0$$

$$\frac{(x-2)}{7 \sin(x-2)} \cdot \frac{(x-2)}{\sin(x-2)} = \frac{(1)(1)}{7} = \frac{1}{7}$$

$$16. \lim_{x \rightarrow -3} \frac{(x+3)^2 \cos(x+3)}{x^2 + 6x + 9} \quad R = \cos(0) = 1 \quad \cos u = 1$$

$$R = (x+3)(x+3)$$

$$(x+3)(x+3)(1)$$

$$\underline{\hspace{2cm}} = (1) = 1$$

$$(x + 3)(x + 5)$$

$$17. \lim_{x \rightarrow 2} \frac{x-2}{(7x-14) \cos(x-2)} \quad R= \cos u= 1$$

$$R= \frac{x-2}{7(x-2) \cos(x-2)} = \frac{x-2}{7(x-2)(1)} = \frac{0}{7(1)} = \frac{1}{7}$$

$$\cos(2-2)$$

$$\cos= 1$$

$$18. \lim_{x \rightarrow \frac{1}{2}} \frac{4x^2 + 6x - 4}{\tan(2x-1)} \quad R= x \rightarrow \frac{1}{2}$$

$$R= \frac{4x^2 + 6x - 16}{(4x + 8)(2x - 2)} \rightarrow \frac{2}{2} \frac{2x - 2}{2x - 2}$$

$$(2x + 4)(2x - 1)$$

$$(2x + 4)(2x - 1)$$

$$\frac{(2x + 4)(2x - 1)}{(2x + 4)(2x - 1)} = 1$$

Tan $(2x - 1)$

$$(2x + 4) (1) = 2x + 4 = 2 \left(\frac{1}{2}\right) + 4 = 5$$

19. Lim $\frac{4x^3 - 2x^2 + 4x + 2}{2x^3 - 1}$ $x \rightarrow \infty$ $R = \frac{4}{2} = \frac{2}{1}$

20. Lim $\frac{2 - 3x^6}{4 - 6x^7}$ $x \rightarrow \infty$ $R = 0$

21. Lim $\frac{2x^5 + 5x^4 + 7x}{3x^2 + 6x - 1}$ $x \rightarrow \infty$ $R = \infty$

22. Lim $2x^4 + 2x^3 + 4$

$$x \rightarrow \infty \quad \frac{\quad}{8x^4 - 7x} \quad R = \frac{2}{8} = \frac{1}{4}$$

23. Lim

$$x \rightarrow \infty \quad \frac{2x - 6x^5}{7x^3 - 8x^5} \quad R = \frac{6}{8} = \frac{3}{4}$$

24. Lim

$$x \rightarrow \infty \quad \frac{6x - 1}{x + 10} \quad R = \frac{6}{1} = 6$$

25. Lim.

$$x \rightarrow \infty \quad \frac{5 - 5x}{x + 5} \quad R = 5$$

26. Lim.

$$(x + 2)(2x + 2)$$

$$x \rightarrow \infty \quad \frac{\text{-----}}{x^2 + 2} \quad R = 0$$

27. Lim.

$$x \rightarrow \infty \quad \frac{10x^2 + 12x - 13}{\text{-----}} \quad R = \frac{10}{20} = \frac{5}{10} = \frac{1}{2}$$
$$20x^2 + 2x + 10$$

28. Lim.

$$x \rightarrow \infty \quad \frac{90x^3 - 40x}{\text{-----}} \quad R = \frac{90}{30} = \frac{30}{10} = \frac{3}{1}$$
$$20 - 30x^3$$

29. Lim.

$$x \rightarrow \infty \quad \frac{4x + 12}{\text{-----}} \quad R = 0$$
$$\sqrt{x^2} - 10$$

30. Lim. $(\sqrt{9x^2 + 1} - 3x)$ $R= \infty$
 $x \rightarrow \infty$