

Universidad Mariano Gálvez de Guatemala

Ingeniería en Sistemas de Información y Ciencias de la Computación

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Calculo #1

Tema: Tareas de calculo

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SECCION "A"

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TAREA SEMANA 2 - 2.3 Ejercicios

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

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

R// 4

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

$$\frac{(5^2) - 5(5) + 6}{5 - 5} = \frac{25 - 25 + 6}{0} = \frac{6}{0} = \infty$$

R// ∞

3. $\lim_{t \rightarrow -3} \frac{t^2 - 9}{2t^2 + 7t + 3} = \frac{(-3)^2 - 9}{2(-3)^2 + 7(-3) + 3} = \frac{9 - 9}{2(9) + (-21) + 3} = \frac{0}{18 - 21 + 3} = \frac{0}{0}$

$$t^2 - 9 = (t-3)(t+3) = 2t^2 + 7t + 3 = 2t^2 + 6t + t + 3 = 2t(t+3) + 1(t+3) =$$

$$(2t+1)(t+3) = \frac{(t-3)(t+3)}{(2t+1)(t+3)} = \frac{t-3}{2t+1} = \frac{-3-3}{2(-3)+1} = \frac{-6}{-5} = \frac{6}{5}$$

R// $\frac{6}{5}$

4. $\lim_{x \rightarrow -2} \frac{x+2}{x^3+8} =$

$$\frac{-2+2}{(-2)^3+8} = \frac{0}{0} = 0$$

R// 0

5. $\lim_{x \rightarrow 4} \frac{x^2 - 4x}{x^2 - 3x - 4} =$

$$\frac{4^2 - 4(4)}{4^2 - 3(4) - 4} = \frac{16 - 16}{16 - 12 - 4} = \frac{0}{0}$$

$$x^2 - 4x = x(x-4)$$

$$x^2 - 3x - 4 = (x-4)(x+1)$$

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

R// $\frac{4}{5}$

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TAREA DE LA SEMANA 3 - COD 2.5 ; Encuentra el límite.

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

$$\lim_{x \rightarrow 1} \frac{\frac{2}{x} - \frac{x}{x}}{\frac{x}{x} - \frac{1}{x}} = \frac{0-1}{1-1} = \frac{-1}{0} = \text{H} \parallel +\infty$$

2. $\lim_{x \rightarrow \infty} \frac{x^3 + 5x}{2x^3 - x^2 + 4} =$

$$\lim_{x \rightarrow \infty} \frac{x^3(1 + \frac{5}{x^2})}{x^3(2 - \frac{1}{x} + \frac{4}{x^3})} = \frac{1+0}{2-0-0} = \frac{1}{2} \text{ H} \parallel \frac{1}{2}$$

3. $\lim_{x \rightarrow 3} \frac{x+2}{x+3} =$

$$\lim_{x \rightarrow 3} \frac{\frac{x}{x} + \frac{2}{x}}{\frac{x}{x} + \frac{3}{x}} = \frac{1+0}{1+0} = \frac{1}{1} = 1 \text{ H} \parallel 1$$

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

$$\lim_{x \rightarrow 2} \frac{\frac{x^2}{x} - \frac{2x}{x}}{\frac{x^2}{x} - \frac{4x}{x} + \frac{4}{x}} = \frac{x-2}{x-4+4} = \frac{-2}{0} = \text{H} \parallel \infty$$

5. $\lim_{x \rightarrow \infty} \frac{3x+5}{x-4} = \frac{\frac{3x}{x} + \frac{5}{x}}{\frac{x}{x} - \frac{4}{x}} = \frac{3+0}{1-0} = \frac{3}{1} = 3 \text{ H} \parallel 3$

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TAREA SEMANA 4 - Derivadas

1. $f(x) = 786.5 = 0$

$\text{R// } 0$

2. $f(x) = x^3 - 4x + 6 = -x$

$x(3) = 4x + 0$

$3x^2 - 4x + 0$

$3x^2 - 4$

$\text{R// } f(x) = 3x^2 - 4$

3. $f(t) = \frac{1}{4}(t^4 + 8) =$

$f(t) = \frac{1}{4}(4t^3 + 0) = t^3$ $\text{R// } f(x) = t^3$

4. $y = 3e^x + \frac{4}{\sqrt[3]{x}} =$

$y' = \frac{(3e^x)(x^{1/3}) - (3e^x + 4)(\frac{1}{3}x^{-2/3})}{(x^{1/3})^2}$

$(x^{1/3})^2 = x^{2/3}$ $\text{R// } y' = \frac{3e^x \cdot x^{1/3} - \frac{1}{3}(3e^x + 4)x^{-2/3}}{x^{2/3}}$

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

$f(x) = \frac{d}{dx}(x^2) - \frac{d}{dx}(3x) + \frac{d}{dx}\left(\frac{1}{x^2}\right)$

$f(x) = 2x - 3 + 0$

$\text{R// } f'(x) = 2x - 3$

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Tarea Semana 5

1. $f(x) = (x^3 + 2x)e^x =$

$$f'(x) = (3x^2 + 2)e^x + (x^3 + 2x)e^x$$

$$f'(x) = e^x[(3x^2 + 2) + (x^3 + 2x)]$$

$$f'(x) = e^x(x^3 + 3x^2 + 2x + 2)$$

$\Rightarrow f'(x) = e^x(x^3 + 3x^2 + 2x + 2)$

2. $y = \frac{e^x}{x^2} =$

$$y' = \frac{e^x \cdot x^2 - e^x \cdot 2x}{x^4} = \frac{e^x(x-2)}{x^4}$$

$$y' = \frac{e^x(x-2)}{x^3} \quad \Rightarrow y' = \frac{e^x(x-2)}{x^3}$$

3. $y = \frac{e^x}{1+x} =$

$$y' = \frac{e^x(1+x) - e^x(1)}{(1+x)^2} = \frac{e^x[(1+x) - 1]}{(1+x)^2}$$

$$y' = \frac{e^x x}{(1+x)^2}$$

$$y' = \frac{x e^x}{(1+x)^2}$$

$\Rightarrow y' = \frac{x e^x}{(1+x)^2}$

4. $g(x) = \frac{3x-7}{2x+1} =$

$$g'(x) = \frac{(3)(2x+1) - (3x-7)(2)}{(2x+1)^2} = g'(x) = \frac{6x+3-(6x-2)}{(2x+1)^2}$$

$$g'(x) = \frac{6x+3-6x+2}{(2x+1)^2} = g'(x) = \frac{5}{(2x+1)^2}$$

$\Rightarrow g'(x) = \frac{5}{(2x+1)^2}$

5. $f(t) = \frac{2t}{4+t^2} =$

$$f'(t) = \frac{(2)(4+t^2) - (2t)(2t)}{(4+t^2)^2}$$

$$f'(t) = \frac{8 - 4t^2}{(4+t^2)^2} = f'(t) = \frac{8-4t^2}{(4+t^2)^2} = f'(t) = \frac{2(4-t^2)}{(4+t^2)^2}$$

$\Rightarrow f'(t) = \frac{2(4-t^2)}{(4+t^2)^2}$