



Mi Universidad

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TEMA: Problemario

SEMESTRE: 6to

MATEMÁTICAS APLICADA

PLATAFORMA

$$1. \lim_{x \rightarrow \infty} \frac{3x^2+1}{x^2+5} = \frac{\infty}{\infty} \quad \frac{6x}{2x} = \frac{\infty}{\infty} \quad \frac{6}{2} = \frac{3}{1} = 3$$

$$2. \lim_{x \rightarrow 0} \frac{\sin x}{x} = \frac{\sin(0)}{0} = \frac{0}{0} = 1$$

$$3. \lim_{x \rightarrow \infty} \frac{5x+2}{x^2+1} = \frac{\frac{5x}{x^2} + \frac{2}{x^2}}{\frac{x^2}{x^2} + \frac{1}{x^2}} = \frac{\frac{5}{x} + \frac{2}{x^2}}{1 + \frac{1}{x^2}} = \frac{0+0}{1+0} = \frac{0}{1} = 0$$

$$4. \lim_{x \rightarrow 3} \frac{x^2-9}{x-3} = \frac{3^2-9}{3-3} = \frac{0}{0} \quad \frac{(x+3)(x-3)}{x-3} = 3+3=6$$

$$5. \lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^2} = \frac{e^0 - 0 - 1}{0} = \frac{0}{0} \quad \frac{e^x}{2} = \frac{1}{2}$$

$$6. \lim_{x \rightarrow \infty} \frac{4x^3-x}{2x^3+5} = \frac{12x^2-1}{6x^2} = \frac{24x}{12x} = \frac{24}{12} = \frac{12}{6} = \frac{6}{3} = \frac{2}{1} = 2 = \frac{\infty}{\infty}$$

$$7. \lim_{x \rightarrow 2} \frac{x^2-4}{x-2} = \frac{2^2-4}{2-2} = \frac{0}{0}$$

$$8. \lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} \quad \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

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

$$\sin^2 x + \cos^2 x = 1 \Rightarrow \sin^2 x = 1 - \cos^2 x = (1 - \cos x)(1 + \cos x)$$

$$1 \cdot 1 \cdot \frac{1}{1 + \cos x} = 1 \cdot 1 \cdot \frac{1}{1 + 1} = 1 \cdot 1 \cdot \frac{1}{2} = \frac{1}{2}$$

$$9. \lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$$

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

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

$$10. \lim_{x \rightarrow \infty} \frac{x^2 + x}{x^2} \cdot \frac{2x + 1}{2x} = \frac{2}{2} = 1$$

