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2.E

Prueba de Matemáticas nº 4

Pregunta nº 1

a) ~~$\mathbb{R}$~~ $\mathbb{Z}$ $-4 ; 0 ; 4$

b) $-3 ; 2 ; 10$

c) $\mathbb{R} - \{-4 ; -3 ; 0 ; 2 ; 4 ; 10\}$

Pregunta nº 2

$$\lim_{x \to \frac{3\pi}{4}} \left(\frac{1 + \tan(x)}{\operatorname{sen}(x) + \cos(x)} \right) = \frac{0}{0} \text{ indet!!!}$$

$$\lim_{x \to \frac{3\pi}{4}} \frac{\frac{\cos(x) + \operatorname{sen}(x)}{\cos(x)}}{\frac{\operatorname{sen}(x) + \cos(x)}{\cos(x)}}$$

$$\lim_{x \to \frac{3\pi}{4}} \frac{1}{\cos(x)} = \frac{1}{\cos(135)} = -\sqrt{2} //$$

b) $\lim_{x \to 0} \left(\frac{4x + \operatorname{sen}(3x)}{x \sec(x)} \right)$ $\frac{0}{0}$ indet !!!

$$\lim_{x \to 0} \frac{\frac{4x}{x} + \frac{\operatorname{sen}(3x)}{x}}{x \cdot \frac{1}{\cos(x)}}$$

$$\lim_{x \to 0} \frac{4 \cdot \cancel{x} + \frac{3 \operatorname{sen}(3x)}{\cancel{3x}}}{\frac{1}{\cos(x)}}$$

1

$$\lim_{x \to 0} \frac{7}{\frac{1}{\cos(x)}} = 7 \cdot 1 //$$

c) $\lim_{x \to \infty} \left(\frac{x^2 - 9}{x(x^2+1)} \right) = \frac{\infty}{\infty}$ indet !!!

$$\lim_{x \to \infty} \frac{x^2 - 9}{x^3 + x}$$

$$\lim_{x \to \infty} \frac{\frac{x^2}{x^3} - \frac{9}{x^3}}{\frac{x^3}{x^3} + \frac{x}{x^3}} \quad \begin{matrix} 0 \\ 0 \end{matrix}$$

$$= \frac{0}{1} = 0 //$$

Pregunta n° 3

a) $y = \ln(x) - \sin(x) + \frac{e^x}{4} - \ln(4)$

$y' = \frac{1}{x} - \cos(x) + \frac{4e^x - 0}{16} - \frac{1}{4}$

$y' = \frac{1}{x} - \cos(x) + \frac{4e^x}{16} - \frac{1}{4}$.

b) $y = (x^4 + x)(\sqrt{x} + \cos(x))$

$y' = (4x^3 + 1)(\sqrt{x} + \cos(x)) + (x^4 + x)\left(\frac{1}{2\sqrt{x}} - \operatorname{sen}(x)\right)$

c) $y = \frac{\tan(x)}{e^x}$

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

Pregunta nº 4

a) $y = \sqrt{x^2 + \sqrt{\cos(x)^3}}$

$$y' = \frac{1}{2\sqrt{x^2 + \sqrt{\cos(x)^3}}} \cdot 2x \cdot \frac{1}{2\sqrt{\cos(x)^3}} \cdot 3x^2 \cdot -\operatorname{sen}(x)$$

b) $y = (x+1)^4 \cdot \operatorname{sen}^3(2 + \ln(x))$

$$y' = ((4x^3 + 1) \cdot \operatorname{sen}^3(2 + \ln(x)) + 3\cos^2(2 + \ln(x)) \cdot (0 + \frac{1}{x})$$

c) $y = \frac{e^{x^5}}{x^5 + x^3}$