

Prueba 4

MATEMÁTICAS

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2º ECO

272.

Pregunta 1

a) Discontinua Removable: $\{-4, 0, 4\}$

b) Discontinua Irremovable: $\{-3, 2, 10\}$

c) continua: $\mathbb{R} - \{-4, -3, 0, 2, 4, 10\}$

Pregunta 2

$$a) \lim_{x \rightarrow \frac{3\pi}{4}} \left(\frac{1 + \tan(x)}{\sin(x) + \cos(x)} \right) = \frac{1 + (-1)}{\frac{\sqrt{2}}{2}} = \frac{0}{0} \text{ indeterminado}$$

$$\lim_{x \rightarrow \frac{3\pi}{4}} \frac{1 + \frac{\sin(x)}{\cos(x)}}{\sin(x) + \cos(x)} = \lim_{x \rightarrow \frac{3\pi}{4}} \frac{\cancel{\cos(x)} + \sin(x)}{\cancel{\cos(x)} + \cos(x)} = \lim_{x \rightarrow \frac{3\pi}{4}} \frac{\sin(x)}{\cos(x)} = \frac{1}{\cos(x)}$$

$$\lim_{x \rightarrow \frac{3\pi}{4}} = -\sqrt{2}$$

$$= \frac{-2}{\sqrt{2}} = -\sqrt{2}$$

$$\frac{-2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$$

$$b) \lim_{x \rightarrow 0} \left(\frac{4x + \sin(3x)}{x \cdot \sec(x)} \right) = \frac{0}{0} \text{ indet}$$

$$\frac{\lim}{x \rightarrow 0} = \frac{4x}{x \cdot \sec(x)} + \frac{3 \cdot \sin(3x) : 3x}{x \cdot \sec(x) : x}$$

$$\lim_{x \rightarrow 0} = 4 \cos(x) + 3 \cos(x)$$

$$\lim_{x \rightarrow 0} = 4 + 3$$

$$\lim_{x \rightarrow 0} = 7 //$$

$$c) \lim_{x \rightarrow \infty} \left(\frac{x^2 - 9}{x(x^2 + 1)} \right) = \frac{0}{0} \text{ indet}$$

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

$$\lim_{x \rightarrow \infty} \rightarrow \frac{\frac{1}{x} - \frac{9}{x^3}}{1 + \frac{1}{x^2}} = \frac{0}{1} = 0 //$$

$$\lim_{x \rightarrow \infty} = 0$$

Pregunta 3

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

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

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

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

$$y' = \left[(4x^3 + 1) \cdot (\sqrt{x} + \cos(x)) \right] + \left[(x^4 + x) \cdot \left(\frac{1}{2\sqrt{x}} - \sin(x) \right) \right]$$

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

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

Pregunta 4

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

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

$$b) y = (x+1)^4 \cdot \sin^3(2 + \ln(x))$$

$$y' = \left(4(x+1)^3 \cdot 1 \cdot \sin^3(2 + \ln(x)) \right) + \left((x+1)^4 \cdot 3(\sin(2 + \ln(x)))^2 \cdot \cos(2 + \ln(x)) \cdot \frac{1}{x} \right)$$

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

$$\frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{g(x)^2}$$

$$\frac{\left((e^{x^5} \cdot 5x^4) \cdot (x^5 + x^3) \right) - \left((e^{x^5}) \cdot (5x^4 + 3x^2) \right)}{(x^5 + x^3)^2}$$