Prueba 4

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Pregunta 1

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

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

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

Pregunta 2

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

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

$$= \frac{1}{\cos(x)}$$

$$= \frac{1}{\cos(3\pi/4)}$$

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

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

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

b) $\lim_{x \to 0} \left(\frac{4x + \operatorname{Sin}(3x)}{x \cdot \sec(x)} \right) = \frac{0}{0}$ ndet

$$\lim_{x \to 0} = \frac{4x}{x \cdot \sec(x)} + \frac{3 \cdot \operatorname{Sin}(3x) : 3x}{x \cdot \sec(x) : x}$$

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

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

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

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

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

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

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

Pregunta 3

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

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

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

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

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

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

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

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

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

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

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

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