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a) Discontinua Reparable

$\{-4, 0, 4\}$

b) Discontinua irreparable

$\{-3, 2, 10\}$

c) Continua

$\mathbb{R} - \{-4, -3, 0, 2, 4, 10\}$

② a) $\lim_{x \to 3\pi/4} \left(\frac{1+tg(x)}{sen(x)+cos(x)} \right) = \frac{0}{0}$ indet $= \lim_{x \to 3\pi/4} \left(\frac{1 + \frac{sen(x)}{cos(x)}}{sen(x)+cos(x)} \right)$

$= \lim_{x \to 3\pi/4} \frac{\frac{cos(x)+sen(x)}{cos(x)}}{sen(x)+cos(x)} = \lim_{x \to 3\pi/4} \frac{\cancel{(sen(x)+cos(x))}}{cos(x)} \cdot \frac{1}{\cancel{(sen(x)+cos(x))}}$

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

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b) $\lim_{x \to 0} \left(\frac{4x + sen(3x)}{x \cdot sec(x)} \right) = \frac{0}{0}$ indet. $= \lim_{x \to 0} \frac{4x + sen(3x)}{x \cdot \frac{1}{cos(x)}} \cdot \lim_{x \to 0} \frac{4x + sen(3x)}{\frac{x}{cos(x)}} \begin{matrix} :x \\ :x \end{matrix}$

$\lim_{x \to 0} \frac{4 + 3\frac{sen(3x)}{3x}}{\frac{\cancel{x}}{\cancel{x} cos(x)}} = \frac{4+3}{\frac{1}{cos(x)}} = \frac{4+3}{1} = 7$

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c) $\lim_{x \to \infty} \left(\frac{x^2 - 9}{x(x^2+1)} \right) = \frac{\infty}{\infty}$ indet $= \lim_{x \to \infty} \left(\frac{x^2 - 9 \; :x^3}{x^3 + x \; :x^3} \right)$

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

Scanned with CamScanner

③ a) $y = \ln(x) - \sin(x) + \frac{e^x}{4} - \ln(4)$

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

$= \frac{1}{x} - \cos(x) + \left(\frac{e^x \cdot \cancel{4} - e^x \cdot \overset{0}{\cancel{0}}}{\cancel{16}\,4}\right) - 0$

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

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

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

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

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

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

$y' = \frac{(\sec^2(x) \cdot 1) \cdot e^x - (tg(x) \cdot e^x)}{(e^x)^2}$

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

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

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

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

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

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

$$y' = \frac{((e^{x^5}) \cdot (5x^4) \cdot (x^5 + x^3)) - ((e^{x^5}) \cdot (5x^4 + 3x^2))}{(x^5 + x^3)^2}$$