FECHA: / /

I

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

b) $\{-3, 2, 70\}$

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

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II (a) $\lim_{x \to \frac{3\pi}{4}} \left[\frac{1 + \tan(x)}{\sin(x) + \cos(x)} \right] = \frac{0}{0}$ indeterminado

$\lim_{x \to \frac{3\pi}{4}} \left[\frac{1 + \frac{\sin(x)}{\cos(x)}}{\sin(x) + \cos(x)} \right]$ $\lim_{x \to \frac{3\pi}{4}} \frac{\frac{\cos(x) + \sin(x)}{\cos(x)}}{\sin(x) + \cos(x)}$

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

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

$\lim_{x \to 0} \frac{\left(\frac{4x}{3x} + \frac{\sin(3x)}{3x} \right)}{x \cdot \sec(x) \cdot \frac{1}{3x}}$ $\lim_{x \to 0} \left(\frac{\frac{4}{3} + \frac{1}{1}}{\frac{x}{\cos(x) \cdot 3x}} \right)$

$\frac{\frac{7}{3}}{\frac{3\cos x}{1}} = \frac{7}{3} \cdot \frac{3 \cdot 1}{1} = 7$

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

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

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III

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

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

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

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

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

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

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

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

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

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

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

$$((x+1)^4)' \cdot \sin^3(2+\ln(x)) + (x+1)^4 \cdot (\sin^3(2+\ln(x))$$

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

$$\cos 2+\ln(x)) \cdot (0+\frac{1}{x})$$

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

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