Lista Semana 9

1a) $f'(x) = 5.2x + (-2\text{sen}x) - \frac{2}{x} + 0 = \boxed{10x - 2\text{sen}x - \frac{2}{x}}$

b) $f'(x) = 3x^2 . \text{sen}x + x^3 . \cos x$

c) $f'(x) = e^x . tgx + e^x . \sec^2 x + \frac{1}{5}x^{\frac{3}{2}}$

d) $f'(x) = \dfrac{2x + 0 . (x+1) - (x^2 + 2 . 1)}{(x+1)^{2x}} \Rightarrow \dfrac{x^2 + 2x - 2}{(x+1)^2}$

e) $f'(x) = \dfrac{\cos x . e^x - \text{sen} . e^x}{(e^x)^2} \Rightarrow \dfrac{\cos x - \text{sen}x}{e^x}$

2) $f'(x) = \dfrac{2x . (x . \text{sen}x - (x^2+1) . (\text{sen} + x . \cos x)}{(x . \text{sen}x)^2}$

$$\dfrac{2.2x^3 \text{sen}x - x^3 \text{sen}x - x^3 \cos x - \text{sen}x - x\cos x}{(x . \text{sen}x)^2}$$

$$\dfrac{x^3 \text{sen}x + x^3 \cos x - \text{sen}x - x\cos x}{(x.\text{sen}x)^2}$$

3) $f'(x) = 3x^2 + \frac{1}{x}$; $f''(x) = 6x - 1.x^{-2}$; $f'''(x) = 6 - 1 . -2 . x^{-3} \Rightarrow 6 + 2x^{-3}$

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$3x^2 + x^{-1}$; $6x - \frac{1}{x^2}$ $6 + \frac{2}{x^3}$

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4a) $f'_{(1)} = 2x \cdot \ln x + x^2 \cdot \frac{1}{x}$

$f'_{(1)} = 2x \cdot \ln x + x$

b) $f'_{(e)} = 2e \cdot 1 + e$

$f'_{(e)} = 3e$

c) $f''_{(x)} = 2 \cdot \ln x + 2x \cdot \frac{1}{x} + 1$

$f''_{(1)} = 2\ln x + 2 + 1$

$f''_{(1)} = 2\ln x + 3$

5a) $f_{(1)} = \operatorname{sen} u \qquad \qquad 5x^2 = u$

$f_{(1)} = \cos u \cdot u'$

$f'_{(1)} = \cos x \cdot 5$

b) $f'_{(1)} = \cos u \qquad \qquad r^3 = u$

$f'_{(1)} = -\operatorname{sen} u \cdot u'$

$f'_{(1)} = -\operatorname{sen} r^3 \cdot 3r^2$

c) $f_{(1)} = \ln u \cdot u' \qquad x^2 + x + 5 = u$

$f'_{(1)} = \frac{1}{u} \cdot 2x + 2$

$f_{(1)} = \frac{1}{x^2 + x + 5} \cdot 2x + 2$

d) $f'_{(1)} = e^u \qquad \qquad \operatorname{sen} x = u$

$f'_{(1)} = e^u \cdot \cos x$

$f'_{(1)} = e^{\operatorname{sen} x} \cdot \cos x$

e) $f_{(1)} = tg^2 \qquad \qquad tg x = u$

$f_{(1)} = u^2 \cdot u'$

$f_{(1)} = \frac{4}{3} u^{\frac{1}{3}} \cdot \sec^2 x$

$f_{(1)} = \frac{4}{3} tg^{\frac{1}{3}} \cdot \sec^2 x$

6a) $(5 \cdot \operatorname{sen} x^2) + (5x \cdot (\operatorname{sen} x^2)') \qquad x^2 = u$

$f_{(1)} = 5 \cdot \operatorname{sen} x^2 + 5x \cdot (\cos x^2 \cdot 2x)$

b) $f_{(1)} = \dfrac{(5 \cdot \cos x^2 - 5x \cdot (-\operatorname{sen} x^2 \cdot 2x)}{(\cos x^2)^2} = \dfrac{5 \cdot \cos x^2 + 10x^2 \cdot \operatorname{sen} x^2}{\cos^2 x^2}$

c) $e^{\operatorname{sen} x^2} \cdot (\operatorname{sen} x^2)'$

$e^{\operatorname{sen} x^2} \cdot \cos x^2 \cdot 2x$

7a) $f(x) = (2x+1)^x$

$$Y = (2x+1)^x$$

$$\ln y = \ln (2x+1)^x$$

$$\ln y = x \ln(2x+1)$$

$$Y = e^{x \cdot \ln(2x+1)}$$

$$f'(x) = e^u \cdot u' \qquad u = x \cdot \ln(2x+1)$$

$$f'(x) = e^{x \cdot \ln(2x+1)} \cdot \left((1 \cdot \ln(2x+1)) + \left(x \cdot \frac{1}{2x+1} \right) \right)$$

$$f'(x) = e^{x \cdot \ln(2x+1)} \cdot \left(\ln(2x+1) + \frac{x}{2x+1} \right) = (2x+1)^x \cdot \left(\ln(2x+1) + \frac{x}{2x+1} \right)$$

b) $f(x) = x^{senx}$

$$Y = x^{senx}$$

$$\ln y = \ln x^{senx}$$

$$\ln y = senx \cdot \ln x$$

$$Y = e^{senx \cdot \ln x}$$

$$f'(x) = e^u \cdot u' \qquad u = senx \cdot \ln x$$

$$f'(x) = e^{senx \cdot \ln x} \cdot \left(cosx \cdot \ln x + senx \cdot \frac{1}{x} \right) = x^{senx} \cdot \left(cosx \cdot \ln x + senx \cdot \frac{1}{x} \right)$$

c) $f(x) = x^{sen3x}$

$$\ln y = \ln x^{sen3x}$$

$$Y = e^{sen3x \cdot \ln x}$$

$$f'(x) = e^u \cdot u' \qquad u = sen3x \cdot \ln x$$

$$f'(x) = e^{sen3x \cdot \ln x} \cdot \left((sen3x)' \cdot \ln x + sen3x \cdot \frac{1}{x} \right)$$

$$f'(x) = e^{sen3x \cdot \ln x} \cdot \left(3cos3x \cdot \ln x + \frac{sen3x}{x} \right) = x^{sen3x} \cdot \left(3 \cdot cos3x \cdot \ln x + \frac{sen3x}{x} \right)$$