1. Calcule a derivada de

$$a(x)=\frac{e^{tg(x^2+1)}\cdot sec(e^{x^2}+x)}{\sqrt[3]{x^2+3x}-\cos(x)}$$

$$b(x)=\underbrace{e^{tg(x^2+1)}}_{d(x)}\cdot\underbrace{sec(e^{x^2}+x)}_{f(x)}$$

$$c(x)=\sqrt[3]{x^2+3x}-\cos x$$

$$a'(x)=\left(\frac{b(x)}{c(x)}\right)'=\frac{b'(x)\cdot c(x)-b(x)\,c'(x)}{c^2(x)}$$

$$b'(x)=d'(x)\cdot f(x)+d(x)\cdot f'(x)$$

2.

$d(x) = e^{tg(x^2+1)}$

$g(x) = e^x$

$h(x) = tg(x^2+1)$

$d(x) = g(h(x))$

$d'(x) = g'(h(x)).h'(x)$

$g'(x) = e^x$

$i(x) = tg\,x \qquad i'(x) = sec^2 x$

$j(x) = x^2+1 \qquad j'(x) = 2x$

$h(x) = (i \circ j)(x)$

$h'(x) = i'(j(x)).j'(x)$

$h'(x) = sec^2(j(x)).2x$

$\boxed{h'(x) = sec^2(x^2+1).\ 2x}$

$d'(x) = e^{h(x)}.h'(x)$

$\boxed{d'(x) = e^{tg(x^2+1)}.\ sec^2(x^2+1).\ 2x}$

3) $f(x) = \sec(e^{x^2} + x)$

$k(x) = \sec x$

$l(x) = e^{x^2} + x$

$f(x) = k(l(x))$

$f'(x) = k'(l(x)) . l'(x)$

$k'(x) = \sec x . tg\, x$

$l'(x) = (e^{x^2})' + 1$

$m(x) = e^x \quad , \quad m'(x) = e^x$

$n(x) = x^2 \quad , \quad n'(x) = 2x$

$e^{x^2} = m(n(x))$

$(e^{x^2})' = m'(n(x)) . n'(x)$

$= e^{n(x)} . 2x = e^{x^2} . 2x$

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$$f'(x) = \sec(l(x)) \cdot tg(l(x)) \cdot [e^{x^2} \cdot 2x + 1]$$

$$= \sec(e^{x^2}+x) \cdot tg(e^{x^2}+x) \cdot [e^{x^2} \cdot 2x + 1]$$

assim já podemos calcular $b'(x)$.

$$c'(x) = \left(\sqrt[3]{x^2+3}\right)' - (\cos x)'$$

$$o(x) = \sqrt[3]{x}$$

$$p(x) = x^2+3$$

$$o'(x) = (x^{\frac{1}{3}})' = \frac{1}{3} x^{-\frac{2}{3}} = \frac{1}{3\sqrt[3]{x^2}}$$

$$p'(x) = 2x$$

5) $\sqrt[3]{x^2+3} = \vartheta(p(x))$

$$\left(\sqrt[3]{x^2+3}\right)' = \vartheta'(p(x)) \cdot p'(x) = \frac{1}{3}\frac{1}{\sqrt[3]{p^2(x)}} \cdot 2x$$

$$= \frac{1}{3}\frac{1}{\sqrt[3]{(x^2+3)^2}} \cdot 2x$$

$$c'(x) = \frac{2}{3}\frac{x}{\sqrt[3]{(x^2+3)^2}} + \ln x$$

$$a'(x) = \frac{b'(x) \cdot c(x) - b(x) \cdot c'(x)}{c^2(x)}$$, onde

$$b'(x) = e^{tg(x^2+1)} \cdot sec^2(x^2+1) \cdot 2x \cdot sec(e^{x^2}+x)$$
$$+ e^{tg(x^2+1)} \cdot sec(e^{x^2}+x) \cdot tg(e^{x^2}+x) \cdot [e^{x^2} \cdot 2x +$$

$$c'(x) = \left(\frac{2}{3} \cdot \frac{x}{\sqrt[3]{(x^2+3)^2}} + sen\, x\right)$$

$$b(x) = e^{tg(x^2+1)} \cdot sec(e^{x^2}+x)$$

$$c(x) = \sqrt[3]{x^2+3x} - cos\, x$$

$$'(x) = \frac{b'(x) \cdot c(x) - b(x) \cdot c'(x)}{c^2(x)}, \text{ onde}$$

$$) = e^{tg(x^2+1)} \cdot sec^2(x^2+1) \cdot 2x \cdot sec(e^{x^2}+x)$$

$$+ e^{tg(x^2+1)} \cdot sec(e^{x^2}+x) \cdot tg(e^{x^2}+x) \cdot [e^{x^2} \cdot 2x + 1]$$

$$(x) = \left(\frac{2}{3} \cdot \frac{1}{\sqrt[3]{(x^2+3)^2}} + sen\, x \right)$$

$$(x) = e^{tg(x^2+1)} \cdot sec(e^{x^2}+x)$$

$$(x) = \sqrt[3]{x^2+3x} - cos\, x$$