Revisão

Cap. 3:

$$\frac{d}{dx}(c) = 0, \quad c \text{ constante real}$$

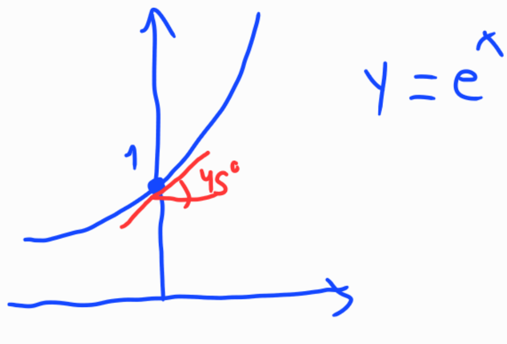
$$\frac{d}{dx}(x^n) = n x^{n-1}, \quad n \in \mathbb{R}$$

$$\frac{d}{dx}[c f(x)] = c \frac{d}{dx} f(x)$$

$$\frac{d}{dx}[f(x) + g(x)] = \frac{d}{dx} f(x) + \frac{d}{dx} g(x)$$

$$\frac{d}{dx}[f(x) - g(x)] = \frac{d}{dx} f(x) - \frac{d}{dx} g(x)$$

$$\lim_{h \to 0} \frac{e^h - 1}{h} = 1$$



$$\frac{d}{dx}(e^x) = e^x$$

$$\frac{d}{dx}[f(x) g(x)] = f(x) \cdot \frac{d}{dx}[g(x)] + g(x) \cdot \frac{d}{dx}[f(x)]$$

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x) \cdot \frac{d}{dx}[f(x)] - f(x) \cdot \frac{d}{dx}[g(x)]}{[g(x)]^2}$$

$$\lim_{\theta \to 0} \frac{\operatorname{sen} \theta}{\theta} = 1 = \lim_{\theta \to 0} \frac{\operatorname{tg} \theta}{\theta}$$

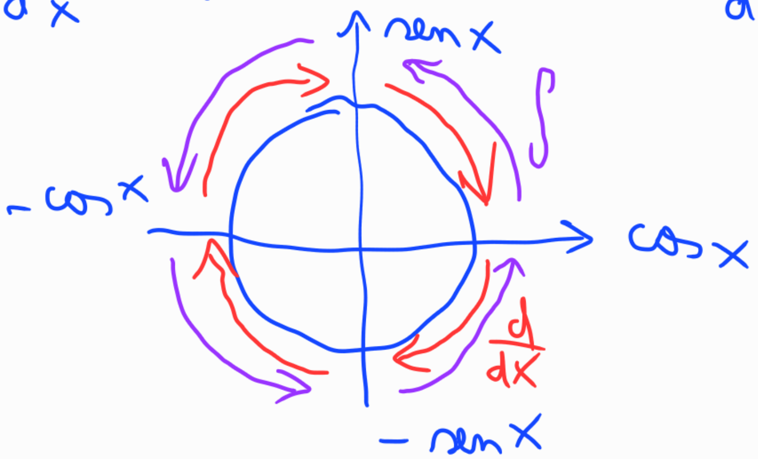
Quando $\theta < \frac{\pi}{18}$, $\operatorname{sen} \theta \cong \operatorname{tg} \theta \cong \theta$

$$\lim_{\theta \to 0} \frac{\cos \theta - 1}{\theta} = \lim_{\theta \to 0} \frac{-\operatorname{sen} \theta}{1} = 0.$$

$$\frac{d}{dx}(\operatorname{sen} x) = \cos x \qquad \frac{d}{dx}(\operatorname{cossec} x) = -\operatorname{cossec} x \cdot \operatorname{cotg} x$$

$$\frac{d}{dx}(\cos x) = -\operatorname{sen} x \qquad \frac{d}{dx}(\sec x) = \sec x \cdot \operatorname{tg} x$$

$$\frac{d}{dx}(\operatorname{tg} x) = \sec^2 x \qquad \frac{d}{dx}(\operatorname{cotg} x) = -\operatorname{cossec}^2 x$$



$$\frac{dy}{dx} = \frac{dy}{du_1} \cdot \frac{du_1}{du_2} \cdot \frac{du_2}{du_3} \cdots\cdots \frac{du_n}{dx}$$

$$\frac{d}{dx}\left[g(x)\right]^n = n\left[g(x)\right]^{n-1} \cdot g'(x)$$

$u = g(x)$ $\qquad \frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx} = n u^{n-1} \cdot g'(x)$

$y = u^n$

$$\frac{d}{dx}(a^x) = a^x \ln a$$

$$\frac{d}{dx}(\text{arc sen } x) =$$

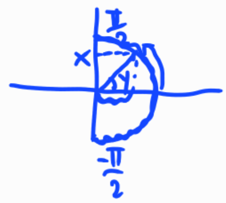
$$x = g(y)$$

$$f(x,y) = g(x,y)$$

$$y = \text{arc sen } x \Rightarrow x = \text{sen } y$$

$$\frac{d}{dx}(x) = \frac{d}{dx}(\text{sen } y) \Rightarrow 1 = \cos y \cdot \frac{dy}{dx} \Rightarrow \frac{dy}{dx} = \frac{1}{\cos y} =$$

$$= \frac{1}{\sqrt{1-x^2}}.$$



$x = \text{sen } y$

$\text{sen}^2 y + \cos^2 y = 1$

$x^2 + \cos^2 y = 1$

$\cos^2 y = 1 - x^2 \Rightarrow \cos y = \sqrt{1-x^2}$

$$\frac{d}{dx}(yy') = (yy')'$$

$$= y' \cdot y' + y \cdot y'' = (y')^2 + y \cdot y''$$

$$\frac{d}{dx}(\text{arctg } x) = \frac{1}{1+x^2}$$

$$\frac{d}{dx}(\text{arc cos } x) = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\text{arc cossec } x) = -\frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\text{arc sec } x) = \frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}(\text{arc cotg } x) = -\frac{1}{1+x^2}.$$

$$\frac{d}{dx}\left(\log_a x\right) = \frac{1}{x \ln a}$$

$$\frac{d}{dx}\left(\ln x\right) = \frac{1}{x}$$

$$\frac{d}{dx} \ln\left(\operatorname{sen} x\right) = \frac{1}{\operatorname{sen} x} \cdot \cos x = \operatorname{cotg} x$$

$$\frac{d}{dx}\left(\ln|x|\right) = \frac{1}{x} \qquad \int \frac{1}{x}\,dx = \ln|x|$$

$$y = \frac{x^{3/4}\sqrt{x^2+1}}{(3x+2)^5} \Rightarrow \ln y = \frac{3}{4}\ln x + \frac{1}{2}\ln\left(x^2+1\right) - 5\ln(3x+2)$$

$$y' = y\left(\frac{3}{4}\ln x + \dots\right)'$$

$$e = \lim_{x \to 0}\,(1+x)^{1/x} = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$$

$$e^x = \lim_{n\to\infty}\left(1+\frac{x}{n}\right)^n$$

linearização de f em a : $L(x) = f(a) + f'(a)\cdot(x-a)$.

$$\sqrt{4{,}05} \Rightarrow L(x) = \sqrt{a} + \frac{1}{2\sqrt{a}}\cdot(x-a) = 2 + \frac{1}{4}(x-4)$$

$f(x) = \sqrt{x}$, $a = 4$

$$L(4{,}05) \cong f(4{,}05)$$

$$\frac{dy}{dx} = f'(x) \Rightarrow dy = f'(x)\underbrace{dx}_{\cong (x-a)} = \frac{1}{2\sqrt{x}}\,dx$$

$$dy = \frac{1}{2\sqrt{4}} \cdot 0{,}05 = \frac{0{,}05}{4}$$

Cap. 4:

(2)

$V = 1000\,mL$

$$A(r) = 2\pi r^2 + 2\pi r h =$$

$$= 2\pi r^2 + \frac{2000}{r}$$

$$\pi r^2 \cdot h = 1000$$

$$h = \frac{1000}{\pi r^2}$$

$$A'(r) = 0$$

$$r \Rightarrow h$$

c é ponto crítico

$c \in D(f)$ é uma cond. necessária

$$f(x) = \frac{1}{x} \Rightarrow f'(x) = -\frac{1}{x^2}$$

$0 \notin D(f)$

← o ñ é pto crítico

Cap. 5:

$$\int_1^e \frac{2}{x}\,dx = 2\int_1^e \frac{1}{x}\,x = \Big[2\left(\ln|x| + C_1\right)\Big]_1^e =$$

$$= \Big[2\ln|x| + C\Big]_1^e =$$

$$= \left(2\ln|e| + \cancel{C}\right) - \left(2\ln|1| + \cancel{C}\right) =$$

$$= 2\ln e - 2\ln 1 = 2\cdot 1 - 2\cdot 0 = 2.$$

$$\int_a^b f(x)\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i^*) \cdot \Delta x$$

Se f for contínua em $[a,b]$, ou f tiver apenas um nº finito de descont. de saltos, então f é integrável em $[a,b]$, ou seja, $\int_a^b f(x)\,dx$ existe

$g(x) = \int_a^x f(t)\,dt$ é cont. e deriv. em (a,b) e

$g'(x) = f(x)$

$$f^{-1}(f(x)) = x$$

$$\int_a^b f(x)\,dx = F(b) - F(a) \quad , \quad F' = f$$

$$\Updownarrow$$

$$\int_a^b f(x)\,dx = \left[F(x)\right]_a^b = F(b) - F(a)$$

desc. de salto:

$\lim_{x\to a^-} f(x)$ e $\lim_{x\to a^+} f(x)$ existem (não são $\pm\infty$), mas são distintos.