

# PRECEPTORIA - LISTA 7

## Cálculo Diferencial e Integral I

Data da lista:	23/07, 25/07 e 26/07
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Cursos:	Eng. Mecânica, Eng.Elétrica e Eng. Alimentos
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1. Nos itens a seguir, ache a derivada da função dada.

- (a)  $f(x) = 3\text{sen}(x)$
- (b)  $g(x) = \text{sen}(x) + \text{cos}(x)$
- (c)  $g(x) = \text{tg}(x) + \text{cotg}(x)$
- (d)  $f(x) = 4x^2\text{cos}(x)$
- (e)  $h(x) = 4\text{cos}(x)\text{sen}(x)$
- (f)  $h(x) = x^2\text{sen}(x) + 2x\text{cos}(x)$
- (g)  $f(x) = x^2\text{cos}(x) - 2x\text{sen}(x) - 2\text{cos}(x)$
- (h)  $f(x) = \text{sec}(x)$
- (i)  $f(x) = 3\text{sec}(x)\text{tg}(x)$
- (j)  $f(t) = \text{sen}(t)\text{tg}(t)$

2. Prove que

- (a)  $D_x(\text{cotg}(x)) = -\text{cosec}^2(x)$ .
- (b)  $D_x(\text{cosec}(x)) = -\text{cosec}(x)\text{cotg}(x)$ .

3. Calcule as seguintes derivadas

- (a)  $D_t\left(\frac{\text{sen}(t)}{t}\right)$
- (b)  $\frac{d}{dx}\left(\frac{\text{sen}(x)}{1-\text{cos}(x)}\right)$
- (c)  $\frac{d}{dx}\left(\frac{\text{sen}(x)-1}{\text{cos}(x)+1}\right)$
- (d)  $D_x[(x - \text{sen}(x))(x + \text{cos}(x))]$
- (e)  $D_t\left(\frac{2\text{cosec}(t)-1}{\text{cosec}(t)+2}\right)$
- (f)  $D_y\left(\frac{\text{tg}(y)+1}{\text{tg}(y)-1}\right)$

4. Nos itens a seguir, determine  $f'(a)$  para os valores de  $a$  indicados.

(a)  $f(x) = x \cos(x)$ ;  $a = 0$

(b)  $f(x) = x^2 \operatorname{tg}(x)$ ;  $a = \pi$

(c)  $f(x) = \frac{\sec(x)}{x^2}$ ;  $a = \pi$

(d)  $f(x) = \operatorname{sen}(x)(\cos(x) - 1)$ ;  $a = \pi$

(e)  $f(x) = \operatorname{tg}(x) + \sec(x)$ ;  $a = \frac{\pi}{6}$

(f)  $f(x) = 2 \operatorname{cotg}(x) - \operatorname{cosec}(x)$ ;  $a = \frac{2\pi}{3}$

(g)  $f(x) = \frac{1}{\operatorname{cotg}(x)-1}$ ;  $a = \frac{3\pi}{4}$

5. Ache uma equação da reta tangente ao gráfico da função seno no ponto (a)  $x = 0$ ; (b)  $x = \frac{\pi}{4}$ ; (c)  $x = -\frac{\pi}{4}$ .

6. Ache a derivada da função dada.

(a)  $f(x) = (2x + 1)^3$

(b)  $f(x) = (10 - 5x)^4$

(c)  $f(x) = (x^2 + 4x - 5)^4$

(d)  $f(z) = (z^3 - 3z^2 + 1)^{-3}$

(e)  $f(x) = (x^2 + 4)^{-2}$

(f)  $G(x) = \sec^2(x)$

(g)  $h(x) = \operatorname{sen}(x^2)$

(h)  $f(x) = \cos(3x^2 + 1)$

7. Nos itens a seguir, calcule a derivada indicada.

(a)  $\frac{d}{dx}(\sec^2(x) \operatorname{tg}^2(x))$

(b)  $\frac{d}{dt}(2 \operatorname{sen}^3(t) \cos^2(t))$

(c)  $\frac{d}{dx}[(4x^2 + 7)^2(2x^3 + 1)^4]$

(d)  $D_x[(2x - 5)^{-1}(4x + 3)^{-2}]$

(e)  $\frac{d}{dy}\left[\left(\frac{y-7}{y+2}\right)^2\right]$

(f)  $\frac{d}{dt}\left[\left(\frac{2t^2+1}{3t^3+1}\right)^2\right]$