
REPASO DERIVADAS

$$a) f(x) = \operatorname{sen}^3 x \cdot \operatorname{tag} x + \sqrt[3]{x^2} + \frac{2^{\frac{x}{3}}}{5} \cdot \operatorname{Ln}\left(\frac{1}{x}\right)$$

$$b) f(x) = \arctan \frac{x}{\sqrt{1-x^2}} - \operatorname{Ln}\left(\frac{\operatorname{sen} x + 1}{1 - \operatorname{sen} x}\right)$$

$$c) f(x) = \operatorname{arcsen}\left(2x\sqrt{1-x^2}\right) \cdot \left(\cos^5\left(\frac{e^x + 1}{e^x - 1}\right)\right)$$

$$e) f(x) = (x+1)^{\operatorname{tag} x}$$

$$a) y = \sin^3 x \cdot \tan x + \sqrt[3]{x^2} + \frac{2^{x/3}}{5} \cdot \ln\left(\frac{1}{x}\right)$$

$$y' = 3\sin^2 x \cdot \cos x \cdot \tan x + \frac{\sin^3 x}{\cos^2 x} + \frac{2}{3} \cdot \frac{2x}{\sqrt[3]{x}} + \frac{1}{5} 2^{x/3} \ln 2 \cdot \frac{1}{3} \ln\left(\frac{1}{x}\right) + \frac{2^{x/3}}{5} \cdot \frac{1}{\frac{1}{x}} \cdot \left(-\frac{1}{x^2}\right)$$

$$y' = 3\sin^3 x + \frac{\sin^3 x}{\cos^2 x} + \frac{4x}{3\sqrt[3]{x}} + \frac{\ln 2}{15} \cdot 2^{x/3} \ln\left(\frac{1}{x}\right) - \frac{2^{x/3}}{5x}$$

$$b) y = \arctan \frac{x}{\sqrt{1-x^2}} - \ln\left(\frac{\sin x + 1}{1 - \sin x}\right)$$

$$y' = \frac{1}{1 + \left(\frac{x}{\sqrt{1-x^2}}\right)^2} \cdot \frac{1 \cdot \sqrt{1-x^2} - x \cdot \frac{1}{2\sqrt{1-x^2}} \cdot (-2x)}{(\sqrt{1-x^2})^2} -$$

$$- \frac{1}{\frac{\sin x + 1}{1 - \sin x}} \cdot \frac{\cos x \cdot (1 - \sin x) - (1 + \sin x) \cdot (-\cos x)}{(1 - \sin x)^2} =$$

$$= \frac{1}{1 + \frac{x^2}{1-x^2}} \cdot \frac{2(1-x^2) + 2x^2}{2\sqrt{1-x^2} \cdot (1-x^2)} - \frac{(1 - \sin x)}{1 + \sin x} \cdot \frac{2 \cos x}{(1 - \sin x)^2}$$

$1 - \sin^2 x = \cos^2 x$

$$= \frac{1}{\frac{1-x^2+x^2}{1-x^2}} \cdot \frac{2}{2(\sqrt{1-x^2}) \cdot (1-x^2)} - \frac{2 \cos x}{1 - \sin^2 x} =$$

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

$$c) y = \arcsin(2x \cdot \sqrt{1-x^2}) \cdot \cos^5\left(\frac{e^x+1}{e^x-1}\right)$$

$$y' = \frac{1}{\sqrt{1-(2x\sqrt{1-x^2})^2}} \cdot \left(2\sqrt{1-x^2} + 2x \cdot \left(\frac{-2x}{2\sqrt{1-x^2}}\right)\right) \cdot \cos^5\left(\frac{e^x+1}{e^x-1}\right) +$$

$$+ \arcsin(2x \cdot \sqrt{1-x^2}) \cdot 5 \cos^4\left(\frac{e^x+1}{e^x-1}\right) \cdot \left(-\sin\left(\frac{e^x+1}{e^x-1}\right)\right) \cdot \frac{e^x(e^x-1) - (e^x)e^x}{(e^x-1)^2}$$

$$y' = \frac{1}{\sqrt{1-4x^2(1-x^2)}} \cdot \frac{4(1-x^2) - 4x^2}{2\sqrt{1-x^2}} \cdot \cos^5\left(\frac{e^x+1}{e^x-1}\right) +$$

$$+ \arcsin(2x \cdot \sqrt{1-x^2}) \cdot 5 \cos^4\left(\frac{e^x+1}{e^x-1}\right) \cdot \left(-\sin\left(\frac{e^x+1}{e^x-1}\right)\right) \cdot \frac{-2e^x}{(e^x-1)^2} =$$

$$= \frac{1}{\sqrt{1-4x^2+4x^4}} \cdot \frac{2(1-2x^2)}{\sqrt{1-x^2}} \cdot \cos^5\left(\frac{e^x+1}{e^x-1}\right) +$$

$$+ \arcsin(2x \cdot \sqrt{1-x^2}) \cdot 5 \cos^4\left(\frac{e^x+1}{e^x-1}\right) \sin\left(\frac{e^x+1}{e^x-1}\right) \cdot \frac{2e^x}{(e^x-1)^2}$$

$$= \frac{2}{\sqrt{1-x^2}} \cdot \cos^5\left(\frac{e^x+1}{e^x-1}\right) + \arcsin(2x \cdot \sqrt{1-x^2}) \cdot 5 \cos^4\left(\frac{e^x+1}{e^x-1}\right) \sin\left(\frac{e^x+1}{e^x-1}\right) \cdot \frac{2e^x}{(e^x-1)^2}$$

$$d) y = (x+1)^{\tan x} \rightarrow \ln y = \ln(x+1)^{\tan x} = \tan x \cdot \ln(x+1)$$

$$\frac{y'}{y} = \left[\frac{\ln(x+1)}{\cos^2 x} + \frac{\tan x}{x+1} \right] \rightarrow$$

$$y' = (x+1)^{\tan x} \cdot \left[\frac{\ln(x+1)}{\cos^2 x} + \frac{\tan x}{x+1} \right]$$