REPASO DERIVADAS

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

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

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

$$e)\, f(x) = (x+1)^{tagx}$$

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

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

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

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

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

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

$$= \frac{1}{1 + \frac{x^2}{1-x^2}} \cdot \frac{2(1-x^2) + 2x^2}{2\sqrt{1-x^2} \cdot (1-x^2)} - \underbrace{\frac{\cancel{(1 - \operatorname{sen} x)}}{1 + \operatorname{sen} x} \cdot \frac{2\cos x}{(1 - \operatorname{sen} x)^{\cancel{2}}}}_{1 - \operatorname{sen}^2 x = \cos^2 x}$$

$\dfrac{1 - x^2 + x^2}{1 - x^2} \rightarrow$

$$= \frac{1}{\frac{1}{\cancel{1-x^2}}} \cdot \frac{\cancel{2}}{\cancel{2}\left(\sqrt{1-x^2}\right) \cdot \cancel{(1-x^2)}} - \frac{2\cos x}{1 - \operatorname{sen}^2 x} =$$

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

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

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

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

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

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

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

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

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

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

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

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