FICHA DERIVACIÓN : nº7

122.- $y = \ln(\cos e^{2x})$; $y' = \dfrac{1}{\cos e^{2x}} \cdot (-\operatorname{sen} e^{2x}) \cdot e^{2x} \cdot 2$

123.- $y = \ln\sqrt{(1+\operatorname{sen}x)^3} = \ln(1+\operatorname{sen}x)^{3/2} = 3/2 \cdot \ln(1+\operatorname{sen}x)$

$y' = \dfrac{3}{2} \cdot \dfrac{1}{1+\operatorname{sen}x} \cdot \cos x$

124.- $y = \dfrac{x}{x-1}$; $y' = \dfrac{x-1-x}{(x-1)^2} = \dfrac{-1}{(x-1)^2}$

125.- $y = \sqrt{\operatorname{sen}(8x^2)}$; $y' = \frac{1}{2}(\operatorname{sen} 8x^2)^{-1/2} \cdot \cos 8x^2 \cdot 16x$

126.- $y = \dfrac{3}{2x-1}$; $y' = \dfrac{0\cdot(2x-1) - 3\cdot 2}{(2x-1)^2} = \dfrac{-6}{(2x-1)^2}$

127.- $y = \sqrt{\dfrac{1+\cos x}{1-\cos x}}$; $y' = \dfrac{1}{2}\cdot\sqrt{\dfrac{1-\cos x}{1+\cos x}} \cdot \dfrac{-\operatorname{sen}x(1-\cos x)-(1+\cos x)\cdot\operatorname{sen}x}{(1-\cos x)^2}$

$y' = \dfrac{1}{2}\sqrt{\dfrac{1-\cos x}{1+\cos x}} \cdot \dfrac{-2\operatorname{sen}x}{(1-\cos x)^2}$

128.- $y = \dfrac{x}{2}\cdot\sqrt{x^2-4}$

$y' = \dfrac{1}{2}\cdot\sqrt{x^2-4} + \dfrac{x}{2}\cdot\dfrac{1}{2}(x^2-4)^{-1/2}\cdot 2x$

$y' = \dfrac{1}{2}\sqrt{x^2-4} + \dfrac{x^2}{2\sqrt{x^2-4}} = \dfrac{x^2-4+x^2}{2\sqrt{x^2-4}} = \dfrac{2x^2-4}{2\sqrt{x^2-4}}$

129.- $y = \sqrt{\dfrac{1-\operatorname{sen}^2 x}{\cos^2 x}} = \sqrt{\dfrac{\cos^2 x}{\cos^2 x}} = \sqrt{1} = 1$; $y' = 0$

130.- $y = \ln\left(\sqrt{\dfrac{\operatorname{sen}x - \cos x}{\operatorname{sen}x + \cos x}}\right) = \dfrac{1}{2}\left[\ln(\operatorname{sen}x - \cos x) - \ln(\operatorname{sen}x + \cos x)\right]$

$$y' = \frac{1}{2}\cdot\left[\frac{\cos x + \operatorname{sen}x}{\operatorname{sen}x - \cos x} - \frac{\cos x - \operatorname{sen}x}{\operatorname{sen}x + \cos x}\right]$$

131.- $y = 3^x + x^3$; $y' = 3^x.\ln 3 + 3x^2$

132.- $y = \dfrac{xe^x}{1+e^x}$; $y' = \dfrac{(e^x + xe^x).(1+e^x) - xe^x.e^x}{(1+e^x)^2}$

133.- $y = \sqrt[3]{\ln x}$; $y' = \dfrac{1}{3}(\ln x)^{-2/3}.\dfrac{1}{x}$

134.- $y = \dfrac{e^x + e^{-x}}{e^x}$; $y' = \dfrac{(e^x - e^{-x}).e^x - (e^x + e^{-x}).e^x}{(e^x)^2} = \dfrac{e^x - e^{-x} - e^x - e^{-x}}{e^x} = -2.e^{-2x}$

OTRA FORMA: $y = 1 + \dfrac{e^{-x}}{e^x} = 1 + e^{-2x}$; $y' = 0 + e^{-2x}.(-2)$

135.- $y = e^{\cos\sqrt{x}}$; $y' = e^{\cos\sqrt{x}}.(-\operatorname{sen}\sqrt{x}).\dfrac{1}{2\sqrt{x}}$

136.- $y = \operatorname{sen}(e^{x^2})$; $y' = \cos(e^{x^2}).e^{x^2}.2x$

137.- $y = \sqrt[3]{\dfrac{1-x}{1+x^2}}$; $y' = \dfrac{1}{3}\left(\dfrac{1-x}{1+x^2}\right)^{-2/3}.\dfrac{-(1+x^2)-(1-x).2x}{(1+x^2)^2}$

138.- $y = \sqrt[3]{x^2-1}$; $y' = \dfrac{1}{3}(x^2-1)^{-2/3}.2x$

139.- $y = \ln(\cos x) + x^{-1}$; $y' = \dfrac{1}{\cos x}.(-\operatorname{sen}x) - 1.x^{-2}$

140.- $y = (x^2-1).e^{\operatorname{sen}x}$; $y' = 2x.e^{\operatorname{sen}x} + (x^2-1).e^{\operatorname{sen}x}.\cos x$

141.- $y = \dfrac{\sqrt{x}}{x-1}$; $y' = \dfrac{\frac{1}{2\sqrt{x}}(x-1) - \sqrt{x}}{(x-1)^2}$

142.- $y=e^{\cos x}+e^{\operatorname{sen} x}$; $y'=e^{\cos x}(-\operatorname{sen} x)+e^{\operatorname{sen} x}\cdot\cos x$

143.- $y=x^{\ln x}$

$\ln y=\ln\left[x^{\ln x}\right]$; $\ln y=\ln x.\ln x$

$\frac{1}{y}\cdot y'=\frac{1}{x}\cdot\ln x+\ln x\cdot\frac{1}{x}$

$y'=x^{\ln x}\left[\frac{2}{x}\ln x\right]$

144.- $y=(2x)^{\sqrt{x}}$

$\ln y=\sqrt{x}.\ln 2x$; $\frac{1}{y}\cdot y'=\frac{1}{2\sqrt{x}}\cdot\ln 2x+\sqrt{x}\cdot\frac{2}{2x}$

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

145.- $y=x^{3x}$;

$\ln y=3x.\ln x$; $\frac{1}{y}\cdot y'=3\ln x+3x\cdot\frac{1}{x}$

$y'=x^{3x}\cdot\left[3\ln x+3\right]$

146.- $y=(3x)^x$;

$\ln y=x\ln 3x$; $\frac{1}{y}\cdot y'=\ln 3x+x\cdot\frac{3}{3x}$

$y'=(3x)^x\cdot\left[\ln 3x+1\right]$

147.- $y=(\operatorname{sen} x)^x$

$\ln y=x\ln\operatorname{sen} x$; $\frac{1}{y}\cdot y'=\ln\operatorname{sen} x+x\cdot\frac{1}{\operatorname{sen} x}\cdot\cos x$

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

148.- $y=(1-x).\sqrt{1+x}$

$$y'=-1.\sqrt{1+x}+(1-x).\frac{1}{2\sqrt{1+x}}=\frac{-2(1+x)+(1-x)}{2\sqrt{1+x}}=\frac{-1-3x}{2\sqrt{1+x}}$$

149.- $y=\dfrac{2^{3x}}{x^2}$; $y'=\dfrac{2^{3x}.\ln 2.3.x^2-2^{3x}.2x}{x^4}=\dfrac{2^{3x}.[3x\ln 2-2]}{x^3}$

150.- $y=\tan^2\sqrt{x}$; $y'=2\tan\sqrt{x}.\dfrac{1}{\cos^2\sqrt{x}}.\dfrac{1}{2\sqrt{x}}$

151.- $y=\ln(\tan x)$; $y'=\dfrac{1}{\tan x}.\dfrac{1}{\cos^2 x}$

152.- $y=\sqrt[4]{x^4-2}$; $y'=\frac{1}{4}(x^4-2)^{-3/4}.4x^3$

153.- $y=(x^2-1).5^{2x}$; $y'=2x.5^{2x}+(x^2-1).5^{2x}.\ln 5.2$

154.- $y=x^2.\ln x+x.\ln x^2$

$$y'=2x.\ln x+x^2.\frac{1}{x}+\ln x^2+x.\frac{1}{x^2}.2x$$

$$y'=2x.\ln x+x+\ln x^2+2$$

155.- $y=\ln(e^x-5x^4)$; $y'=\dfrac{1}{e^x-5x^4}.(e^x-20x^3)$

156.- $y=\ln(\ln\cos x)$; $y'=\dfrac{1}{\ln\cos x}.\dfrac{1}{\cos x}.(-\operatorname{sen} x)$

157.- $y=\operatorname{sen} x.3^{2x}$; $y'=\cos x.3^{2x}+\operatorname{sen} x.3^{2x}.\ln 3.2$

158.- $y=\operatorname{sen}^4 x^3.\cos^3 x^4$

$$y'=4\operatorname{sen}^3 x^3.\cos x^3.3x^2.\cos^3 x^4+\operatorname{sen}^4 x^3.3\cos^2 x^4.(-\operatorname{sen} x^4).4x^3$$

159.- $y = \dfrac{\sqrt[3]{x^2+1}}{x^2+1} = (x^2+1)^{-2/3}$; $y' = -\frac{2}{3}(x^2+1)^{-5/3} \cdot 2x$

160.- $y = \operatorname{sen} x^{-4}$; $y' = \cos x^{-4} \cdot (-4) \cdot x^{-5}$

161.- $y = \ln \sqrt{x(2-x)} = \frac{1}{2}[\ln x + \ln(2-x)]$

$y' = \frac{1}{2}\left[\frac{1}{x} + \frac{-1}{2-x} \right] = \frac{1}{2} \cdot \frac{2-x-x}{\cancel{2}(2-x)} = \frac{1-x}{x(2-x)}$

162.- $y = 2^x \cdot \sqrt{4+2^x}$

$y' = 2^x \cdot \ln 2 \cdot \sqrt{4+2^x} + 2^x \cdot \frac{1}{2\sqrt{4+2^x}} \cdot 2^x \cdot \ln 2$

163.- $y = e^{2x^2} - e^x - 2$; $y' = e^{2x^2} \cdot 4x - e^x$

164.- $y = \dfrac{6+6x-5x^2}{x}$; $y' = \dfrac{(6-10x) \cdot x - (6+6x-5x^2) \cdot 1}{x^2}$

165.- $y = \dfrac{x}{x^2-2}$; $y' = \dfrac{1 \cdot (x^2-2) - x \cdot 2x}{(x^2-2)^2}$

166.- $y = \left(\dfrac{x+5}{x}\right)^4$; $y' = 4\left(\dfrac{x+5}{x}\right)^3 \cdot \dfrac{x-(x+5)}{x^2}$

167.- $y = x\sqrt{5x^2-1}$; $y' = \sqrt{5x^2-1} + x \cdot \dfrac{1}{2\sqrt{5x^2-1}} \cdot 10x$

168.- $y = \dfrac{2}{\sqrt{x+1}} - 4\sqrt{x+1} = \dfrac{2-4(x+1)}{\sqrt{x+1}} = \dfrac{-2x-2}{\sqrt{x+1}}$

$y' = \dfrac{-4\sqrt{x+1} - (-4x-2) \cdot \frac{1}{2\sqrt{x+1}}}{(\sqrt{x+1})^2}$

169.- $y = \ln(4x^2 - 6x + 8)$; $y' = \dfrac{8x-6}{4x^2-6+8}$

170.- $y = \ln\sqrt[3]{6+x^2} = \frac{1}{3}\ln(6+x^2)$

$y' = \frac{1}{2} \cdot \dfrac{2x}{6+x^2} = \dfrac{x}{6+x^2}$

171.- $y = x^2 \cdot \ln x$; $y' = 2x \cdot \ln x + x^2 \cdot \frac{1}{x}$

172.- $y = \ln^2(1+x)$; $y' = 2\ln(1+x) \cdot \dfrac{1}{1+x}$

173.- $y = e^{x\sqrt{1+x}}$; $y' = e^{x\sqrt{1+x}} \cdot \left(\sqrt{1+x} + x \cdot \dfrac{1}{2\sqrt{1+x}}\right)$

174.- $y = 8^{-\frac{1}{x}}$; $y' = 8^{-1/x} \cdot \ln 8 \cdot (-(-1) \cdot x^{-2}) = \dfrac{8^{-1/x} \cdot \ln 8}{x^2}$

175.- $y = \operatorname{sen}(8x+2)$; $y' = -\cos(8x+2) \cdot 8$.