$$= \frac{x^2-3+(1+x^3)\cdot\frac{6}{x^3}}{\sqrt[3]{(1+x^3)^2}} = \frac{x^5-3x^3+6+6x^3}{x^3\sqrt[3]{(1+x^3)^2}} = \frac{x^5+3x^3+6}{x^3\sqrt[3]{(1+x^3)^2}}.$$

N11.

$$y=(\operatorname{tg}x)^{e^x} \Rightarrow \ln y = e^x\cdot\ln\operatorname{tg}x$$

$$\frac{y'}{y} = e^x\left(\ln\operatorname{tg}x + \frac{1}{\operatorname{tg}x}\cdot\frac{1}{\cos^2 x}\right)$$

$$y' = (\operatorname{tg}x)^{e^x}\cdot e^x\left(\ln\operatorname{tg}x + \frac{1}{\sin x\cos x}\right).$$

N12

$$\begin{cases} x=\ln t \\ y=\frac{1}{2}\left(t+\frac{1}{t}\right)\end{cases} \Rightarrow \quad x'_t = \frac{1}{t}, \quad y'_t = \frac{1}{2}-\frac{1}{2t^2}$$

$$\begin{cases} y'_x = \dfrac{y'_t}{x'_t} = \dfrac{\left(1-\frac{1}{t^2}\right)}{2\cdot\frac{1}{t}} = \dfrac{t^2-1}{2t} \\ x=\ln t. \end{cases}$$

N13

$$F(x,y):\ x-\sqrt[3]{y^3+x}-4$$

$$F'_x = 1-\frac{1}{3}\cdot(y^3+x)^{-\frac{2}{3}}$$

$$F'_y = -\frac{1}{3}(y^3+x)^{-\frac{2}{3}}\cdot 3y^2$$

$$y'_x = -\frac{F'_x}{F'_y} = \frac{3-(y^3+x)^{-\frac{2}{3}}}{3y^2\cdot(y^3+x)^{-\frac{2}{3}}}$$

N14

$$2y\ln y = x \qquad M_1(0;1),\ M_2\left(-\frac{2}{e};\frac{1}{e}\right)$$

у.кас: $x-x_0 = x'_y(y_0)\cdot(y-y_0)$

у.норм: $x-x_0 = -\dfrac{1}{x'_y(y_0)}\cdot(y-y_0)$

M_1: $x_0=0,\ y_0=1;\ x'_y = 2\ln y+2 \Rightarrow x'_y(1)=2$

Укас: $x=2(y-1)$

Унорм: $x=-\frac{1}{2}(y-1)$

M_2: $x_0=-\frac{2}{e};\ y_0=\frac{1}{e};\ x'_y\left(\frac{1}{e}\right)=0$

Укас: $x+\frac{2}{e}=0$

Унорм: $y-\frac{1}{e}=0.$