CALCOLO DERIVATE

12) $y = \frac{x}{\ln^2 x}$ $\quad y' = \frac{\ln^2 x - x \cdot 2\ln x \cdot \frac{1}{x}}{\ln^4 x} = \frac{\ln^2 x - 2\ln x}{\ln^4 x^3} = \frac{\ln x - 2}{\ln^3 x}$ (B)

13) $y = \frac{\sqrt{x^2+4x}}{x}$ $\quad y' = \frac{\frac{2x+4}{2\sqrt{x^2+4x}} \cdot x - \sqrt{x^2+4x}}{x^2} =$

$= \frac{x^2+2x}{\sqrt{x^2+4x}} - \sqrt{x^2+4x} \Big/ x^2 = \frac{x^2+2x-x^2-4x}{x^2\sqrt{x^2+4x}} = \frac{-2x}{x^2\sqrt{x^2+4x}}$

$= \frac{-2}{x\sqrt{x^2+4x}}$;

14) $y = \frac{x+1}{x-2}$ $\quad y' = \frac{x-2-x-1}{(x-2)^2} = \frac{-3}{(x-2)^2}$

15) $y = \frac{\ln x}{x^3}$ $\quad y' = \frac{\frac{1}{x} x^3 - \ln x (3x^2)}{x^6} = \frac{x^2(1-3\ln x)}{x^6 q}$

16) $y = x^{\ln x}$ $\Rightarrow$ $\boxed{y = f(x)^{g(x)} \Rightarrow y' = f(x)^{g(x)} \left[g'(x)\ln f(x) + \frac{g(x) f'(x)}{f(x)} \right]}$

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

17) $y = \frac{2\sqrt[4]{x^3} - 3\sqrt[3]{x}}{\sqrt{x}}$ $\quad y = 2x^{3/4 - 1/2} - 3x^{\frac{1}{3}-\frac{1}{2}} = 2x^{\frac{1}{4}} - 3x^{-\frac{1}{6}}$

$y' = 2 \cdot \frac{1}{4} x^{-3/4} - 3\left(-\frac{1}{6}\right) x^{-\frac{7}{6}} = \frac{1}{2\sqrt[4]{x^3}} + \frac{1}{2\sqrt[6]{x^7}}$

18) $y = \ln x^2 + \frac{1}{2}\ln^2 x$ $\quad y' = \frac{2x}{x^2} + \frac{1}{2} \cdot 2 \ln x \cdot \frac{1}{x} =$

$y' = \frac{2}{x} + \frac{1}{x}\ln x = \frac{1}{x}(2 + \ln x)$

19) $y = \frac{x^2-2x+3}{x-1}$ $\quad y' = \frac{(2x-2)(x-1) - x^2 + 2x - 3}{(x-1)^2} = \frac{2x^2 - 2x - 2x + 2}{(x-1)^2}$

$\frac{-x^2+2x-3}{} = \frac{x^2-2x-1}{(x-1)^2}$