Determinare il campo di esistenza delle seguenti funzioni:

$$y=\frac{\left(\frac{x}{x-3}\right)^{\frac{3}{4}}}{\ln(2x+1)} \quad ; \quad y=\log_2\left\{\log_3\left[\log_4(x)\right]\right\} \quad ; \quad y=\frac{\log_{x-1}(2-x-x^2)}{\mathrm{Log}(3^{2x}-9)}$$

Risolvere le seguenti equazioni:

$$\frac{2\ln^2 x+3\ln x-20}{\ln x-2}=12+\ln x^3$$

$$\mathrm{Log}\left(\frac{x+4}{x-1}\right)+\mathrm{Log}\,2=\mathrm{Log}(3x-2)-\mathrm{Log}(x-2)$$

$$x-\log_2\left(2^{x+1}-1\right)=3-\log_2\left(3\cdot 2^x+2\right)$$

Risolvere le seguenti disequazioni:

$$(3\log_3 x+1)\cdot\log_{\frac{1}{3}} 7\le 0$$

$$\frac{\ln(13-3x)}{\ln(x-3)}\ge 2$$

$$\log_2\frac{x+1}{x-1}-\log_{\frac{1}{2}}\frac{x^2-3x+2}{x^2+1}<0$$

$$|\log(3x+4)-\log 7|<1$$

$$\frac{\log_2^2\sqrt{x+1}-2}{\log_2(x+1)+1}\le 1$$

$$\frac{\log_2^6(3-x)-7\log_2^3(3-x)-8}{|\log_2^2 x-1|+2}\le 0$$