Domini di funzioni trascendenti

$\ln = \log_e$

195

$$y = 3x - e^{\frac{1}{1-\ln x}}$$

$$\begin{cases} \boxed{x > 0} & \text{ARG. DEL LOGARITMO} \\ 1 - \ln x \neq 0 & \text{DENOM. ESPONENTE} \end{cases}$$

$1 - \ln x = 0$

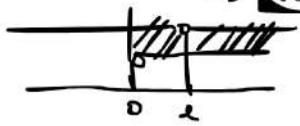
$-\ln x = -1 \Rightarrow \ln x = 1 \Rightarrow \ln x = \ln e^1$

$\Rightarrow \boxed{x = e}$

$\log_e e = 1$

$\log_e e^b = b \cdot \log_e e$

$$\begin{cases} x > 0 \\ x \neq e \end{cases}$$



$e \simeq 2{,}718\ldots$

Dom f: $0 < x < e \ \vee \ x > e$

$]0, e[\ \cup \ ]e, +\infty[$

196

$$y = e^{\frac{3}{\ln x - 2}}$$

$$\begin{cases} \boxed{x > 0} \\ \ln x - 2 \neq 0 \Rightarrow \boxed{x \neq e^2} \end{cases}$$

$2^3 = \boxed{8}$

$\log_2 8 = 3$

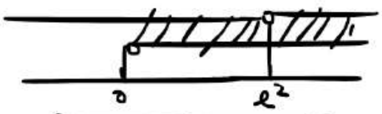
$\ln x - 2 = 0$

$\ln x = 2 \Longrightarrow \ln x = \ln e^2 \Rightarrow \boxed{x = e^2}$

$\log_e e^2 =$

$= 2 \log_e e$

$$\begin{cases} x > 0 \\ x \neq e^2 \end{cases}$$

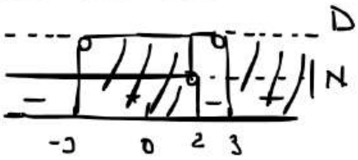


Dom f $\boxed{0 < x < e^2 \vee x > e^2}$

$]0; e^2[\cup]e^2; +\infty[$

197

$$\boxed{y=\log_{\frac{1}{2}}\left(\frac{2-x}{9-x^2}\right)}$$



Dom f

$-3 < x < 2 \vee x > 3$

$]-3;2[\cup]3;+\infty[$

$\frac{2-x}{9-x^2} > 0$

N $2-x>0$

$-x>-2$

$\boxed{x<2}$

D $9-x^2>0$

$-x^2>-9$

$x^2<9$

$x^2=9$

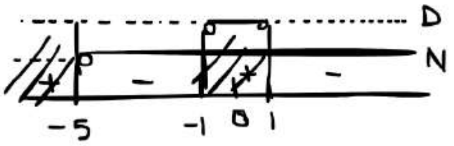
$x=\pm\sqrt{9}=\pm 3$

$x_1=-3$ $x_2=3$

$\boxed{-3<x<3}$

198

$y = \log_2 \frac{x+5}{1-x^2}$



dom f $x < -5 \vee -1 < x < 1$

$]-\infty; -5[\cup]-1; 1[$

$\frac{x+5}{1-x^2} > 0$

N $x+5>0$

$\boxed{x>-5}$

D $1-x^2>0$

$x^2<1$ $x=\pm 1$

$x_1=-1$ $x_2=1$

$\boxed{-1<x<1}$

199

$y = 5^{\frac{x}{2-x^2}}$

$2 - x^2 \neq 0$

$2 - x^2 = 0 \Rightarrow -x^2 = -2 \Longrightarrow x^2 = 2 \Longrightarrow \boxed{x = \pm\sqrt{2}}$

$\boxed{x \neq \pm\sqrt{2}}$ Dom f: $\mathbb{R} \setminus \{\pm\sqrt{2}\}$

$x \neq -\sqrt{2} \vee x \neq \sqrt{2}$

200 $y = 2^{\frac{x+1}{x^2-4}}$

$x^2-4 \neq 0 \Rightarrow x^2 \neq 4 \Rightarrow x \neq \pm\sqrt{4}$

$\boxed{x \neq \pm 2}$

Dom f $\mathbb{R} \setminus \{\pm 2\}$

$x \neq \pm 2$

201

$$y = e^{\frac{\sqrt{x^2-7x+12}}{x-5}}$$

$$\begin{cases} x^2-7x+12 \geq 0 \\ x-5 \neq 0 \end{cases}$$

$x^2-7x+12 \geq 0$

$\Delta = b^2 - 4ac = (-7)^2 - 4(1)(12) = 49-48 = 1$

$x_1, x_2 = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-(-7) \pm 1}{2} = \frac{7 \pm 1}{2}$

$\frac{\cancel{8}^{4}}{\cancel{2}_{1}} = 4$

$\frac{\cancel{6}^{3}}{\cancel{2}_{1}} = 3$

$x_1 = 3 \quad x_2 = 4 \quad x \leq 3 \vee x \geq 4$

$$\begin{cases} x \leq 3 \vee x \geq 4 \\ x \neq 5 \end{cases}$$

$\boxed{x \leq 3 \vee 4 \leq x < 5 \vee x > 5}$

Dom f $]-\infty; 3] \cup [4; 5[\cup]5; +\infty[$

202

$$y=\left(\frac{3}{4}\right)^{\sqrt{2-x^2}}$$

$2-x^2 \geq 0$

$-x^2 \geq -2$

$x^2 \leq 2$

$x^2 = 2$

$x = \pm\sqrt{2}$

$x_1 = -\sqrt{2}$; $x_2 = \sqrt{2}$

$\boxed{-\sqrt{2} \leq x \leq \sqrt{2}}$

Dom f $\quad -\sqrt{2} \leq x \leq \sqrt{2}$

$[-\sqrt{2}; \sqrt{2}]$

203 PERSONALIZZATO

$$y = \sqrt{\left(\frac{1}{2}\right)^{\frac{x-3}{x-5}} - \frac{1}{8}}^{\,-1}$$

$$\begin{cases} x-5 \neq 0 \\ \left(\frac{1}{2}\right)^{\frac{x-3}{x-5}} - \frac{1}{8} \geq 0 \end{cases}$$

$$\left(\frac{1}{2}\right)^{\frac{x-3}{x-5}} \geq \left(\frac{1}{8}\right) \Rightarrow \boxed{\left(\frac{1}{2}\right)^{\frac{x-3}{x-5}} \geq \left(\frac{1}{2}\right)^{3}} \qquad \boxed{\frac{1}{2} < 1} \qquad \frac{1}{8} = \left(\frac{1}{2}\right)^{3}$$

$$\boxed{\frac{x-3}{x-5} \leq 3} \qquad \left(\frac{1}{2}\right)^{3} > \left(\frac{1}{2}\right)^{4} \Rightarrow 3 < 4$$

$$2^3 > 2^2 > 2^1 \qquad \left(\frac{1}{2}\right)^3 < \left(\frac{1}{2}\right)^2 < \left(\frac{1}{2}\right)^1$$

$$\frac{x-3}{x-5} - \frac{3}{1} \leq 0 \Rightarrow \frac{x-3-3(x-5)}{(x-5)} \leq 0$$

$$\frac{x-3-3x+15}{x-5} \leq 0 \qquad \frac{12-2x}{x-5} \leq 0$$

N $12-2x \geq 0$

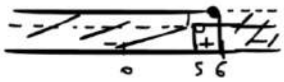
$-2x \geq -12$

$\cancel{2}x \leq \cancel{12}\,6$

$x \leq 6$

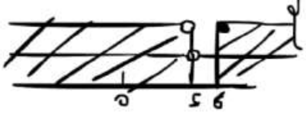
D $x-5>0$

$x>5$



$x<5 \lor x \geq 6$

$$\begin{cases} x \neq 5 \\ x<5 \lor x \geq 6 \end{cases}$$



Dom f. $x<5 \lor x \geq 6$

$]-\infty; -5[\cup [6; +\infty[$

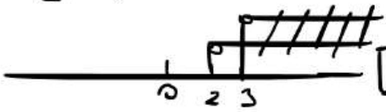
209 $y = \ln[\ln(x-2)]$

$$\begin{cases} x-2>0 & \text{ARG. DEL LOGARITMO PIÙ INTERNO} \\ \ln(x-2)>0 & \text{ARG. DEL LOGARITMO PIÙ ESTERNO} \end{cases}$$

$$\begin{cases} x>2 \\ \ln\boxed{(x-2)} > \ln \boxed{e^0} \end{cases} \Longrightarrow x-2 > 1 \Longrightarrow x > 3$$

$\ln = \log_e$ $\quad \boxed{e > 1}$

$$\begin{cases} x>2 \\ x>3 \end{cases}$$



$\boxed{x>3}$

$\boxed{\text{Dom} f \;]3;+\infty[}$