$-(x+2)>0 \quad x+2<0 \quad x<-2$

$-f(x)>0 \quad f(x)<0$

$-\frac{4}{3}$ $\frac{2}{3}$

MATEMATICA

123) $y=e^{x^3-2x^2+x}$ $\qquad y=e^x\cdot e^{(x-1)^2}$ $\qquad y'=e^x\cdot e^{(x-1)^2}+e^x\cdot e^{(x-1)^2}\cdot(2x-2)=$

$=e^x e^{(x-1)^2}(1+2x-2)=e^x\cdot e^{(x-1)^2}\cdot(2x-1)$ $\qquad y'>0 \to e^x\cdot e^{(x-1)^2}\cdot(2x-1)>0$ ...

$y=e^{x^3-2x^2+x}$ $\qquad y'=e^{x^3-2x^2+x}\cdot(3x^2-4x+1)=e^{x(x-1)^2}(3x^2-4x+1)$

$y'>0 \to \underbrace{e^{x(x-1)^2}}_{>0\ \forall x\in\mathbb{R}}(3x^2-4x+1)>0$ $\qquad \Delta/4=4-3=1$ $\quad x_{1/2}=\frac{2\pm1}{3}<^{\frac{1}{3}}_{1}$ $\quad x<\frac{1}{3}\wedge x>1$

$y'>0 \to x<\frac{1}{3}\wedge x>1$ $\qquad y'>0$ in $(-\infty;\frac{1}{3}]\cup[1;+\infty)$

$y'<0 \to \frac{1}{3}<x<1$ $\qquad y'<0$ in $(\frac{1}{3};1)$

128) $y=\ln\frac{x+2}{x^2+3}$ $\qquad y'=\frac{x^2+3}{x+2}\cdot$ ~~...~~ $\frac{x^2+3-2x(x+2)}{\cancel{(x^2+3)^2}}=\frac{-x^2-4x+3}{(x+2)(x^2+3)}=-\frac{x^2+4x-3}{(x+2)(x^2+3)}$

↳ rimane (x^2+3)

$D=[-2;+\infty)$

$=-\frac{x^2+4x-3}{(x+2)(x^2+3)}$ $\qquad y'>0 \to -\frac{x^2+4x-3}{(x+2)(x^2+3)}>0 \to \frac{x^2+4x-3}{(x+2)(x^2+3)}<0$

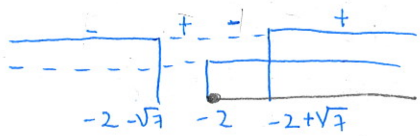
I) $x^2+4x-3>0$ $\qquad x<-2-\sqrt{7}\wedge x>-2+\sqrt{7}$

$\Delta/4=4+3=7$ $\qquad x_{1/2}=-2\pm\sqrt{7}$

II) $x+2>0$ $\qquad x>-2$

III) $x^2+3>0$ $\qquad \forall x\in\mathbb{R}$

$\begin{cases} x<-2-\sqrt{7}\wedge x>-2+\sqrt{7} \\ x>-2 \end{cases}$



↳ INTERSECO CON IL DOMINIO $[-2;+\infty)$

↳ $y'>0$ in $(-2;-2+\sqrt{7})$

$y'<0$ in $(-2+\sqrt{7};+\infty)$

135) $y=\sin^2x+2\sin x+1$ $\quad$ con $x\in(0;2\pi)$

~~$y'=-2\cos x-2\cos x+1$~~

~~$y'=2(\cos x)$~~ $\qquad y=(\sin x+1)^2$

$y'=2(\sin x+1)\cdot\cos x$ $\qquad$ I) $(\sin x+1)>0 \to \sin x>-1 \quad x\neq\pi$

II) $\cos x>0 \to 0<x<\frac{\pi}{2}\wedge\frac{3}{2}\pi<x<2\pi$

$y'>0 \to (0;\frac{\pi}{2})\cup(\frac{3}{2};2\pi)$

$y'<0 \to (\frac{\pi}{2};\frac{3}{2}\pi)$

142) $y = \operatorname{arctg}(x^2 - x)$ $\quad y' = \frac{1}{x^2-x+1} \cdot (2x-1) = \frac{2x-1}{x^2-x+1}$ $\quad y' > 0$ I) $x > \frac{1}{2}$ II) $\forall x \in \mathbb{R}$ FALSO QUADRATO $\quad y' > 0$ in $\left(\frac{1}{2}; +\infty\right)$ $\quad y' < 0$ in $\left(-\infty; \frac{1}{2}\right)$

143) $y = e^{\sin x}$ con $x \in (0; 2\pi)$ $\quad y' = e^{\sin x} \cdot \cos x$ $\quad y' > 0 \rightarrow \underbrace{e^{\sin x}}_{>0\ \forall x \in \mathbb{R}} \cdot \cos x > 0 \quad 0 < x < \frac{\pi}{2} \wedge \frac{3}{2}\pi < x < 2\pi$

$y' > 0$ in $\left(0; \frac{\pi}{2}\right) \cup \left(\frac{3}{2}\pi; 2\pi\right)$ $\quad y' < 0$ in $\left(\frac{\pi}{2}; \frac{3}{2}\pi\right)$

149) $f(x) = e^x + \ln x$ $\quad D = \mathbb{R}^+$ $\quad y = e^x + \ln x \rightarrow$ $x = e^y + \ln y$ $\quad g(y) = e^y + \ln y$ $\quad g'(y) = e^y + \frac{1}{y}$

$g'(e) = \frac{e^{e+1}+1}{e} = e^e + \frac{1}{e}$?

159) $f(x) = \frac{x+1}{x+2}$ $\quad g(x) = \frac{x-1}{x+2}$ $\quad [-1; +1]$ $\quad f'(x) = \frac{x+2-x-1}{(x+2)^2} = \frac{1}{(x+2)^2}$ $\quad g'(x) = \frac{x+2-x+1}{(x+2)^2} = \frac{3}{(x+2)^2}$

HOLETTO MALE

$\frac{\frac{2}{3} - 0}{0 + \frac{2}{1}} = \frac{\cancel{(c+2)^2}}{3\cancel{(c+2)^2}}$ ... $\forall c \in [-1; 1]$

156) $f(x) = -x^2 + 4x + 5$ $\quad g(x) = x^2 - 6x$ $\quad [-1; 3]$ $\quad f'(x) = -2x + 4 = 2(2-x)$ $\quad g'(x) = 2x - 6 = 2(x-3)$

$\frac{-9+12+\cancel{5}+1+4-\cancel{5}}{9-18-1-6} = \frac{\cancel{2}(2-c)}{\cancel{2}(c-3)} \rightarrow \frac{8}{-4} = \frac{2-c}{c-3} \rightarrow 8(c-3) = 4(c-2) \rightarrow 8c - 24 = 4c - 8 \rightarrow 4c = 16$ LASCIAMO PERDERE

$c \neq 3$ $\quad -2c + 6 = 2 - c$ $\quad 4 = c$

$\frac{8}{-16} = \frac{2-c}{c-3} \rightarrow \frac{1}{2} = \frac{c-2}{c-3} \rightarrow c - 3 = 2c - 4 \rightarrow 1 = c \in [-1; 3]$

163) $f(x) = e^{x^2+1}$ $\quad g(x) = x^2 + 2$ $\quad [0; 1]$ $\quad f'(x) = e^{x^2+1} \cdot 2x$ $\quad g'(x) = 2x$

$\frac{e^2 - e}{3 - 2} = \frac{e^{c^2+1} \cdot \cancel{2c}}{\cancel{2c}} \rightarrow e^2 - e = e^{c^2+1}$ $\quad \cancel{e}(e-1) = e^{c^2}$ $\quad e - 1 = e^{c^2}$ $\quad \ln(e-1) = c^2$ $\quad c = \pm\sqrt{\ln(e+1)}$ $\quad c = \sqrt{\ln(e-1)}$

166) $f(x) = (\ln x)^3$ $\quad g(x) = \ln x$ $\quad [e^{-2}; e]$ $\quad f'(x) = 3(\ln x)^2 \cdot \frac{1}{x}$ $\quad g'(x) = \frac{1}{x}$

$\frac{1+8}{1+2} = 3(\ln c)^2 \cdot \cancel{\frac{1}{c}} \cdot \cancel{c}$ $\quad \frac{+9}{3} = 3(\ln c)^2$ $\quad (\ln c)^2 = 1$ $\quad \ln c = \pm 1$ $\quad c = e^{\pm 1}$ $e \notin (e^{-2}; e)$, $e^{-1} \in (e^{-2}; e)$