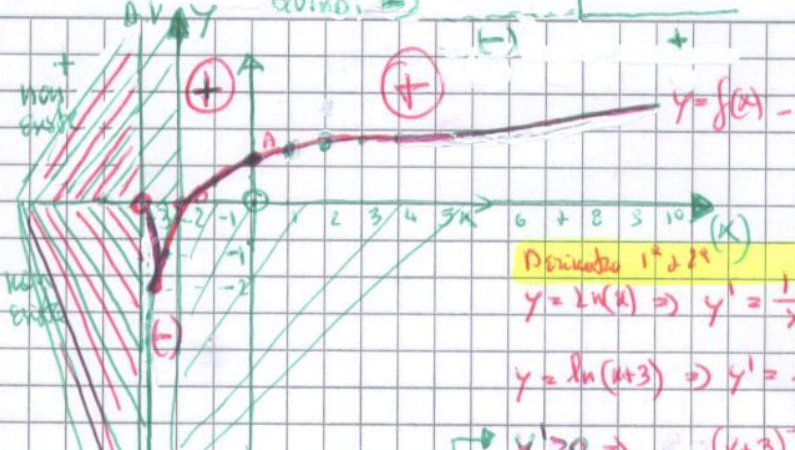


Studio di $f(x)$ logaritmica by P.P.M.

1) $y = \ln(x+3) \Rightarrow$ CE: $\begin{cases} x+3 > 0 & x > -3 \\ x+3 \neq 0 & x \neq -3 \end{cases}$ $y > 0$
 St. segno $\ln(x+3) > 0 \Rightarrow \ln(x+3) > \ln 1 \Rightarrow x+3 > 1$
 $x > 1-3 \Rightarrow x > -2$

« INTERSEZIONE CON GLI ASSI »

| X | Y |
|----|------------------|
| 0 | $\ln 3 = 1,05$ A |
| 1 | $\ln 4 = 1,38$ |
| 2 | $\ln 5 = 1,6$ |
| -1 | $\ln 2 = 0,7$ |
| -2 | $\ln 1 = 0$ |
| 3 | $\ln 6 = 1,8$ |
| 4 | $\ln 7 = 1,9$ |
| 10 | $\ln 13 = 2,56$ |



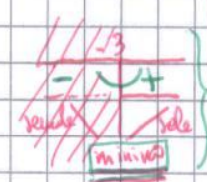
Derivata 1° e 2° (x)
 $y = \ln(x) \Rightarrow y' = \frac{1}{x}$
 $y = \ln(x+3) \Rightarrow y' = \frac{1}{x+3}$

$y > 0 \Rightarrow (x+3)^{-1} > 0 \Rightarrow$
 $\sqrt[0]{0} = \sqrt{(x+3)^{-1}} \Rightarrow x+3 > 0$
 $x > -3$ punto di minimo della $f(x)$.
 poiché $y = x^a \Rightarrow y' = a x^{a-1}$
 $y'' = -1(x+3)^{-2} = -\frac{1}{(x+3)^2}$
 $y'' > 0 \Rightarrow -(x+3)^{-2} > 0 \Rightarrow$
 $x+3 < 0 \Rightarrow x < -3$

b) $\ln(x+3) = 0 \Rightarrow x+3 = 1 \Rightarrow x = -2$
 c) $\ln(x+3) = -1 \Rightarrow x+3 = \frac{1}{e} \Rightarrow x = \frac{1}{e} - 3 = -2,718$

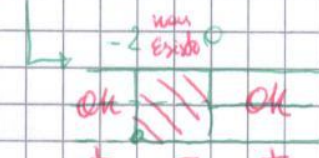
\Rightarrow impossibile
 \Rightarrow impossibile
 \Rightarrow impossibile

la $-x$ si
 scrive
 $\epsilon -3$
 \downarrow
 x cui la y
 negativa in
 questa x è (-2)

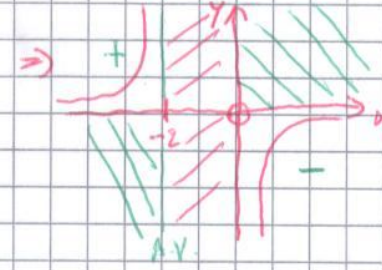


2) $y = \ln\left(\frac{x}{x+2}\right)$ CE $\begin{cases} x+2 \neq 0 \Rightarrow x \neq -2 \\ x > 0; x+2 > 0 \Rightarrow x > -2 \end{cases}$
 Studio del segno $y > 0$

$\ln\left(\frac{x}{x+2}\right) > 0$
 $\ln\left(\frac{x}{x+2}\right) > \ln 1$



$\frac{x}{x+2} > 1 \Rightarrow \frac{x}{x+2} - 1 > 0 \Rightarrow \frac{x - x - 2}{x+2} > 0 \Rightarrow \frac{-2}{x+2} > 0 \Rightarrow \frac{2}{x+2} < 0$



$\frac{2}{x+2} < 0 \Rightarrow$ $x+2 < 0 \Rightarrow x < -2$
 (non si considera!)

3) $y = \frac{e^x}{x^3}$

CE $x^3 \neq 0 \Rightarrow x \neq 0 \in \forall x \in \mathbb{R}$ Studio del segno $y > 0 \Rightarrow \frac{e^x}{x^3} > 0 \Rightarrow$

$\ln(x) \frac{e^x}{x^3} > 0 \Rightarrow \log_e 0 = x \Rightarrow x = \ln 0 \Rightarrow$ impossibile \Rightarrow (non si considera)
 $\ln(x) \frac{e^x}{x^3} > 0 \Rightarrow x > 0$

