Simulazione

1) B
2) B
3) C
4) C
5) B

6) A
7) B
8) C
9) B
10) C

0 //

$x^2 - 4x \geq 0$

$x(x-4) \geq 0 \quad x \leq 0 \cup x \geq 4$

0 4

$X =]-\infty, 2] \cup]4, +\infty[$

$Y =]-\infty, 5]$

Es. 1 $f(x) = \log\left(\frac{x^2-5x+4}{3-x}\right)$

$E[f(x)] = \{x \in \mathbb{R} : \frac{x^2-5x+4}{3-x} > 0\} =]-\infty, 1[\cup]3, 4[$

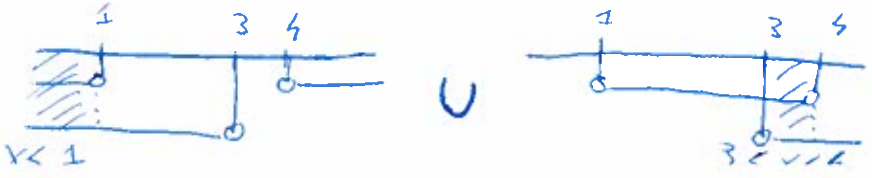
$\frac{x^2-5x+4}{3-x} > 0 \iff \begin{cases} x^2-5x+4 > 0 \\ 3-x > 0 \end{cases}$ (valore esterno) $\cup \begin{cases} x^2-5x+4 < 0 \\ 3-x < 0 \end{cases}$ (valore interno)

1ª eq. associata: $x^2 - 5x + 4 = 0$; $\Delta = b^2 - 4ac = (-5)^2 - 4(1)(4) = 25 - 16 = 9 > 0$;

$x_{1,2} = \frac{5 \pm \sqrt{9}}{2} = \frac{5 \pm 3}{2}$ → $x_1 = \frac{2}{2} = 1$, $x_2 = \frac{8}{2} = 4$

$S1 \cup S2 \iff \begin{cases} x < 1 \ \vee \ x > 4 \\ x - 3 < 0 \end{cases} \cup \begin{cases} 1 < x < 4 \\ x - 3 > 0 \end{cases} \iff$

$\begin{cases} x < 1 \ \vee \ x > 4 \\ x < 3 \end{cases} \cup \begin{cases} 1 < x < 4 \\ x > 3 \end{cases}$



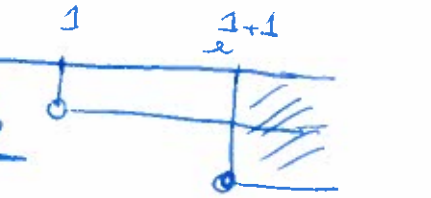
2 Es. 2 $f(x) = \sqrt{\log(x-1)+1}$

Es. Se ho $\log(\log(x-1)+1)$ come cambia il C

$E[f(x)] = \{x \in \mathbb{R} : \log(x-1)+1 \geq 0\} = \left[1+\frac{1}{e}, +\infty\right[$

$\log(x-1)+1 \geq 0 \iff \log(x-1) \geq -1 \iff \begin{cases} x-1 > 0 \\ x-1 \geq e^{-1} \end{cases} \iff$

$\iff \begin{cases} x > 1 \quad \text{(non necessario ma non cambia nulla)} \\ x \geq \frac{1}{e} + 1 \end{cases}$



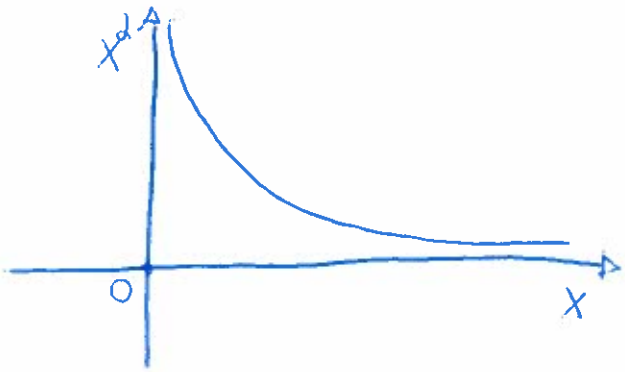
$x \geq 1 + \frac{1}{e}$

$\mathbb{R}$

1.37

Es. 3 $f(x) = x^\alpha$, $\alpha \in \mathbb{R}$ e $\alpha < 0$

$f: x \in \mathbb{R}^+ \to f(x) = x^\alpha \in \mathbb{R}^+$



$X =]0, +\infty[$

$Y =]0, +\infty[$

$\inf f(x) = 0$

$\sup f(x) = +\infty$

f. limitata inferiormente e illimitata superiormente

Estremi relativi: NO

Monotonia: f. strett. decrescente $\forall x \in X$

Funzione né pari né dispari

Funzione suriettiva su $\mathbb{R}^+$

Funzione iniettiva

$\Rightarrow$ funzione biunivoca, quindi invertibile.

$y = f(x) = x^\alpha$

$x = f^{-1}(y) = \sqrt[\alpha]{y} = y^{\frac{1}{\alpha}}$