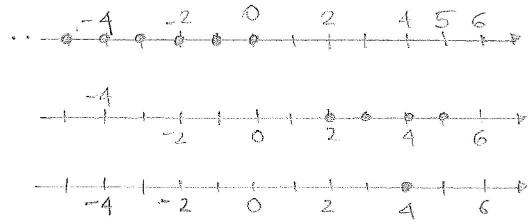
Università degli Studi di Trento – Dip. di Psicologia e Scienze Cognitive
CdL in Scienze e Tecniche di Psicologia Cognitiva
VERIFICA SETTIMANALE DI ANALISI MATEMATICA
a.a. 2014/15 – Rovereto, 29 settembre – 3 ottobre (N. 2)

1) $A = \{n \in \mathbb{Z} : 4n - 1 \leq 2\} = \{n \in \mathbb{Z} : n \leq 3/4\} = \underline{\{\ldots, -3, -2, -1, 0\}}$;

$B = \{n \in \mathbb{N} : 7 \leq 3n + 1 \leq 16\} = \{n \in \mathbb{N} : 6 \leq 3n \leq 15\} = \underline{\{2, 3, 4, 5\}}$;

$C = \{-4, 4\} \cap \mathbb{N} = \underline{\{4\}}$.

a) 

b) $A \cap B = \emptyset$; $A \cup B = \{\ldots, -3, -2, -1, 0, 2, 3, 4, 5\}$;

$B \setminus A = B$; $\mathbb{R} \setminus C =]-\infty, 4[\cup]4, +\infty[$.

c) $-9 \in A$ (V); $1 \in A$ (F); $C \subseteq B$ (V);

$B \cap C \neq \emptyset$ (V), poiché $B \cap C = \{4\}$;

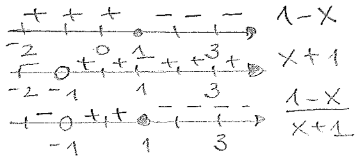
$A \cap C = \{-4\}$ (F), poiché $A \cap C = \emptyset$.

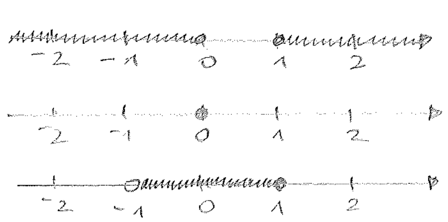
2) $A = \{x \in \mathbb{R} : x^2 \geq x\} = \{x \in \mathbb{R} : x(x-1) \geq 0\} = \underline{]-\infty, 0] \cup [1, +\infty[}$,

$B = \{x \in \mathbb{R} : x^2(x^2+1) = 0\} = \underline{\{0\}}$,

$C = \left\{x \in \mathbb{R} : \frac{2}{x+1} \geq 1\right\} = \left\{x \in \mathbb{R} : \frac{2 - x - 1}{x+1} \geq 0\right\} = \left\{x \in \mathbb{R} : \frac{1-x}{x+1} \geq 0\right\}$

$= \underline{]-1, 1]}$



a) 

b) $A \cap B = B$ (V); $A \cup B = A$ (V); $A \subset \mathbb{R} \setminus B$ (F), poiché $0 \in A$ e $0 \notin \mathbb{R} \setminus \{0\}$;

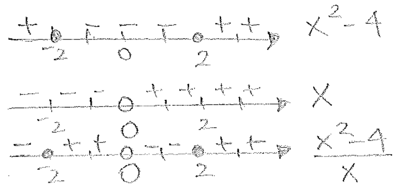
$\{0\} \subset B$ (V); $[-1, 0] \in \mathcal{P}(A)$ (V), poiché $[-1, 0] \subset A$.

$\{0\} \in \mathcal{P}(B)$ (V); $B \subset C$ (V); $A \cap C \neq \emptyset$ (V); $\{\{0\}, \{0, 1\}\} \subset \mathcal{P}(C)$. (V)

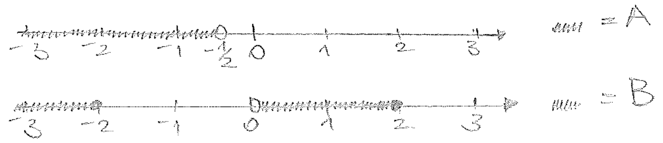
c) A e B non sono disgiunti, poiché $A\cap B=\{0\}\neq\emptyset$.

3) i) $A=\left\{x\in\mathbb{R}:\ \frac{4x-2x^2}{x^2+1}<-2\right\}=\left\{x\in\mathbb{R}:\ \frac{4x+2}{x^2+1}<0\right\}=\left]-\infty,-\frac{1}{2}\right[$.

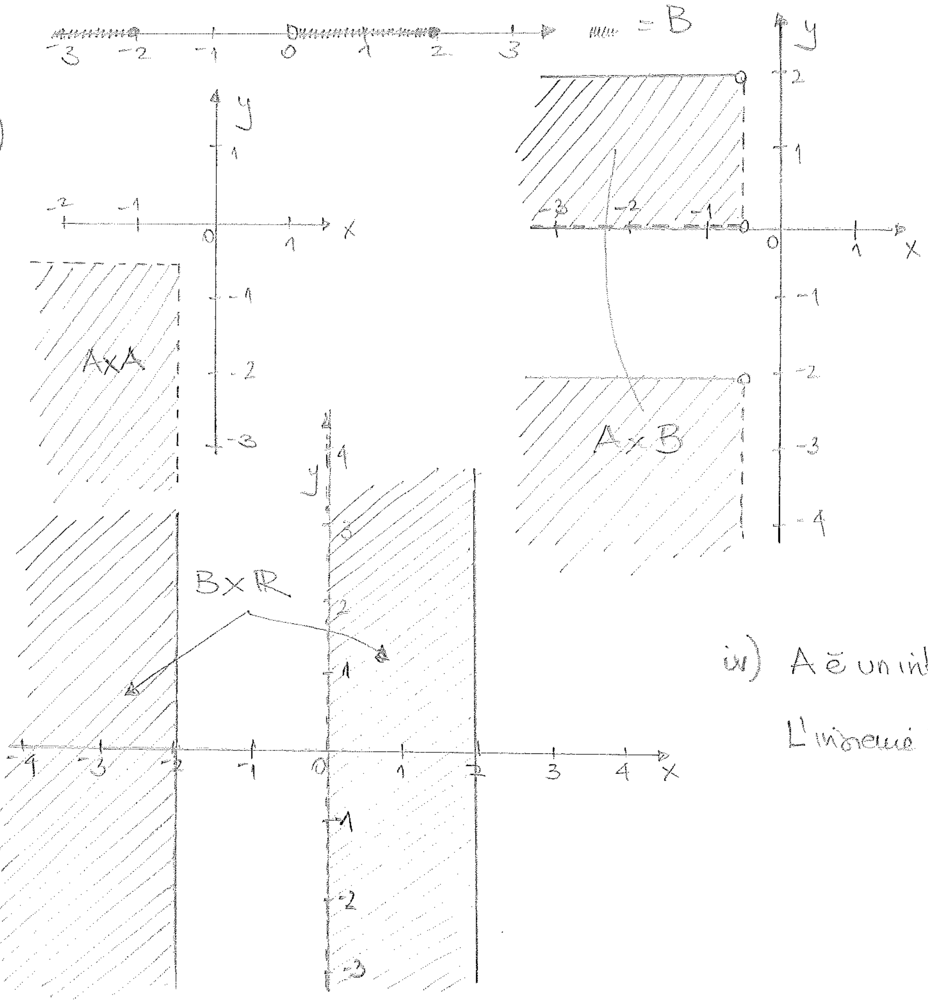
$B=\left\{x\in\mathbb{R}:\ \frac{x^2-4}{x}\leq 0\right\}=\left]-\infty,-2\right]\cup\left]0,2\right]$.



ii)



iii)

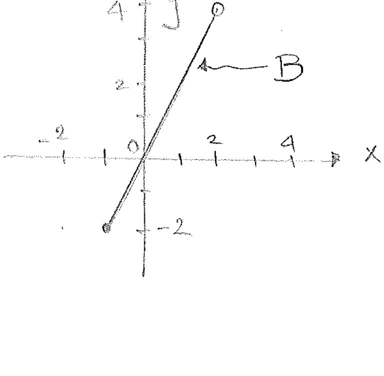


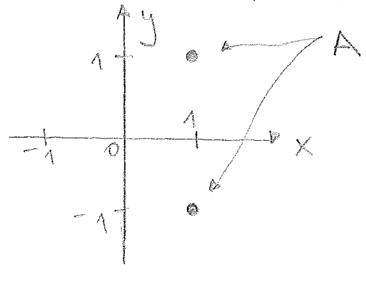
iv) A è un intervallo.

L'insieme B non è un intervallo!

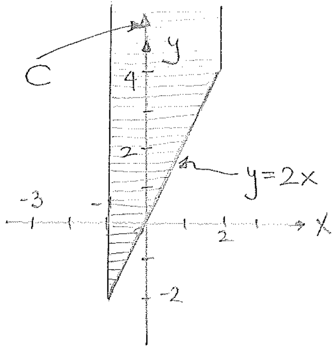
4) i) $A=\{(x,y)\in\mathbb{R}^2: x=1\ ;\ y^2=x\}=\{(x,y)\in\mathbb{R}^2: x=1,\ y=1 \text{ oppure } y=-1\}$

$B=\{(x,y)\in\mathbb{R}^2:\ -1\leq x<2,\quad y=2x\}$



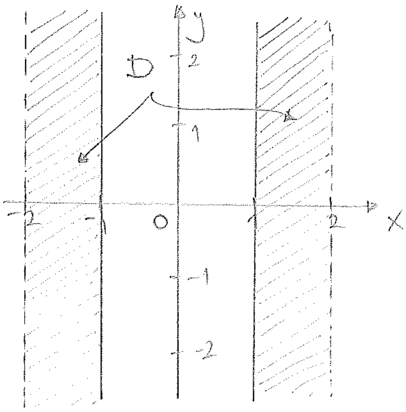


$C=\{(x,y)\in\mathbb{R}^2 :\ -1\le x\le 2\ ,\ y\ge 2x\}$



$D=\{(x,y)\in\mathbb{R}^2 :\ 1\le x^2<4\}=$

$=\{(x,y)\in\mathbb{R}^2 :\ x\in\ ]-2,-1]\cup[1,2[\ \}$



ii) $A\subset D$ (V), poiché $(1,1)\in D$ e $(1,-1)\in D$.

$B\cap D\neq\emptyset$ (V), poiché $(-1,-2)\in B$ e $(-1,-2)\in D$ (per esempio).

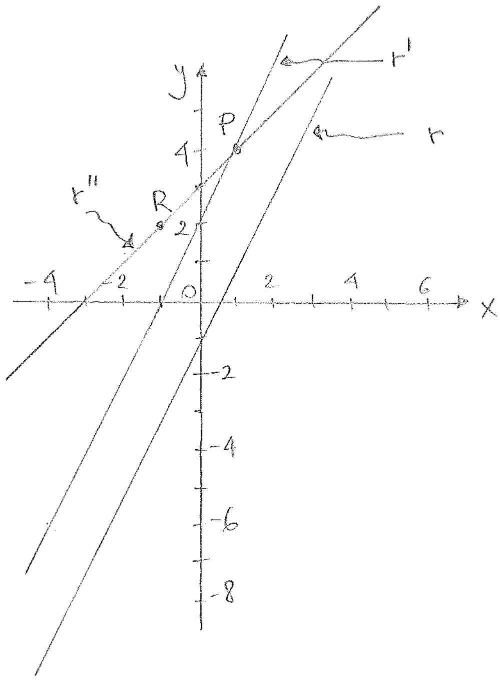
$(0,1)\in C$ (V), poiché $-1\le 0\le 2$, e $y=1\ge 2\cdot 0$.

$(-1,3)\in B$ (F).

5) i) $\underline{y=2x-1}$

ii) r': $y=4+2(x-1)$

$\underline{y=2x+2}$



iii) $\underline{y=-\frac{1}{2}x+q}$, $q\in\mathbb{R}$.

iv) $P=(1,4)$ $R=(-1,2)$

r'': $\dfrac{y-4}{2-4}=\dfrac{x-1}{-1-1}$

$y-4=x-1$

$\underline{y=x+3}$.

v) retta verticale passante per R : $\underline{x=-1}$;

retta orizzontale passante per R : $\underline{y=2}$.