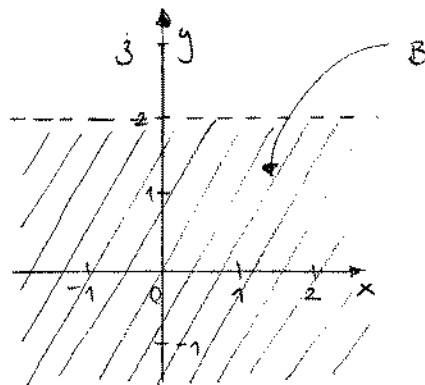
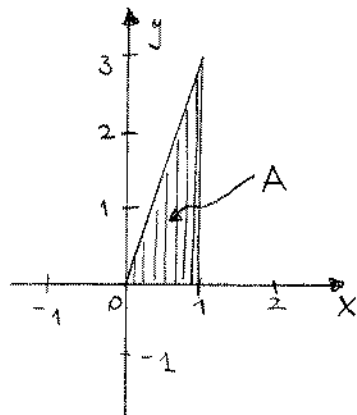
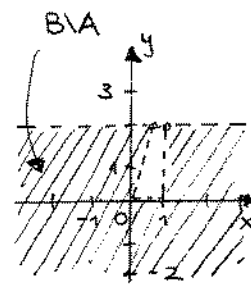
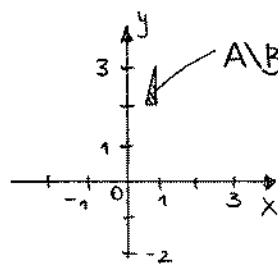
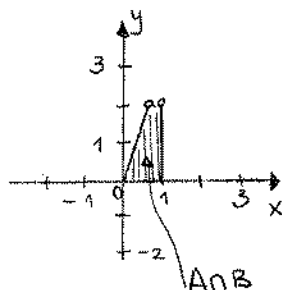
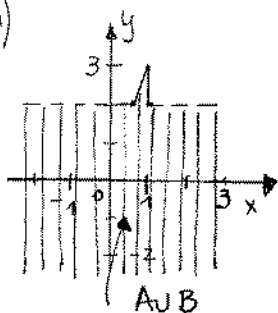


Terza verifica settimanale di ANALISI MATEMATICA - CdL in STPCA -
2.2.2007/08 - Roronto, 1-5/10/07

1) i) $A = \{(x,y) \in \mathbb{R}^2 : 0 \leq x \leq 1, 0 \leq y \leq 3x\}$, $B = \{(x,y) \in \mathbb{R}^2 : y < 2\}$

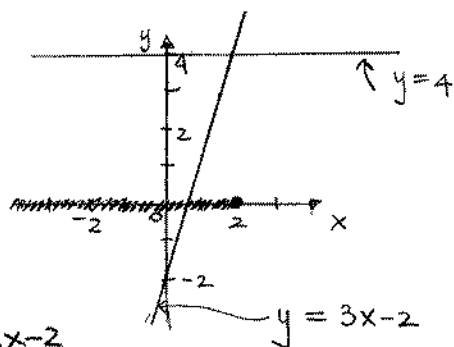


ii)



2) i) • $3x - 2 \leq 4 \Leftrightarrow 3x \leq 6 \Leftrightarrow x \leq 2$

$S =]-\infty, 2]$

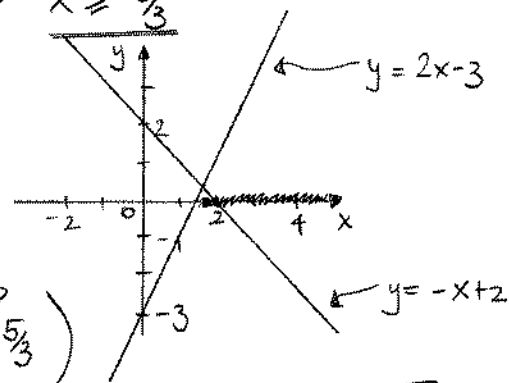


(interpret. geom.: la retta di eq. $y = 3x - 2$

"sotto" la retta di eq. $y = 4$ se e solo se $x \leq 2$) $\square$

• $2x - 3 \geq -x + 2 \Leftrightarrow 3x \geq 5 \Leftrightarrow x \geq \frac{5}{3}$

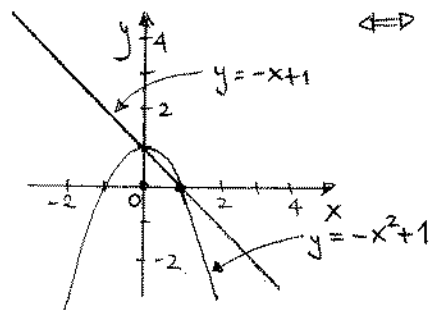
$S = [\frac{5}{3}, +\infty[$



(interpret. geom.: la retta di eq. $y = -x + 2$

"sotto" la retta di eq. $y = 2x - 3 \Leftrightarrow x \geq \frac{5}{3}$) $\square$

$$\bullet -x+1 = -x^2+1 \iff -x = -x^2 \iff x^2-x=0 \iff x(x-1)=0$$

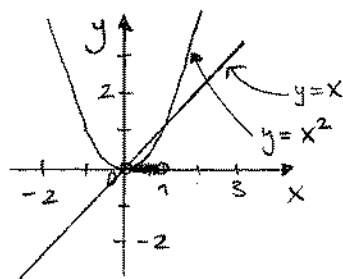


$$\iff x=0 \text{ oppure } x=1.$$

$$\underline{\underline{S = \{0, 1\}}}.$$

(interpret. geom.: la retta di eq. $y = -x+1$ interseca la parabola di eq. $y = -x^2+1$ per $x=0$ oppure $x=1$). $\square$

$$\text{ii)} \bullet x^2 < x \iff x^2 - x < 0 \iff x(x-1) < 0$$

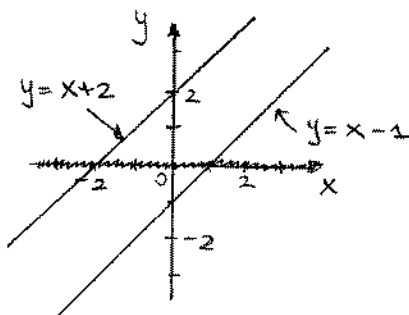


$$\iff 0 < x < 1$$

$$\underline{\underline{S =]0, 1[}}.$$

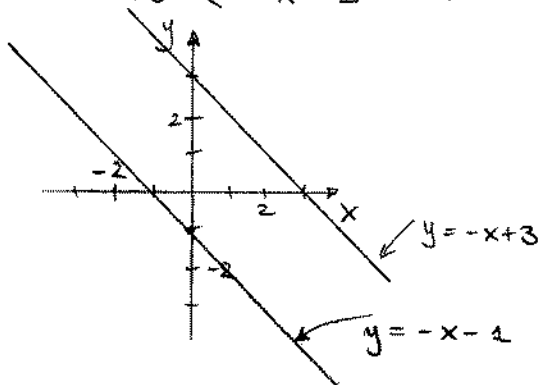
(interpret. geom.: la parabola di eq. $y = x^2$ "sta sotto" la retta di eq. $y = x$ solo per $x \in]0, 1[$). $\square$

$$\bullet x-1 \leq x+2 \iff -1 \leq 2 \Rightarrow \underline{\underline{S = \mathbb{R}}}.$$



(interpret. geom.: la retta di eq. $y = x-1$ "sta sotto" la retta di eq. $y = x+2$ per ogni $x \in \mathbb{R}$). $\square$

$$\bullet -x+3 < -x-1 \iff 3 < -1 \Rightarrow \underline{\underline{S = \emptyset}}$$



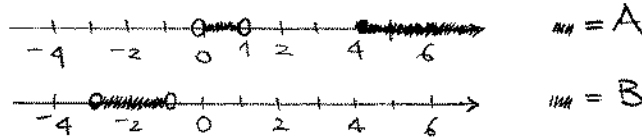
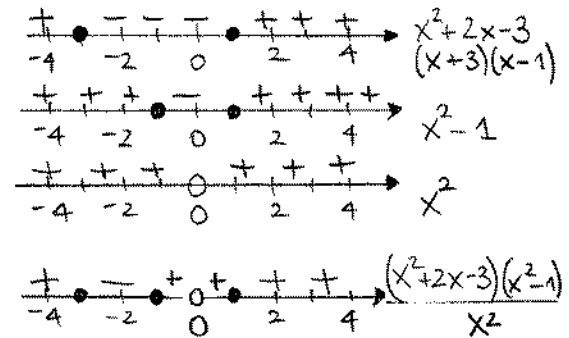
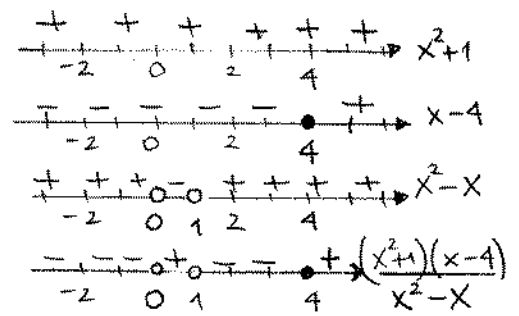
(interpret. geom.: la retta di eq. $y = -x+3$ "non sta mai sotto" la retta di eq. $y = -x-1$). $\blacksquare$

3)i) $A = \{x \in \mathbb{R} : \frac{(x^2+1)(x-4)}{x^2-x} \geq 0\}$

$=]0, 1[\cup [4, +\infty[$

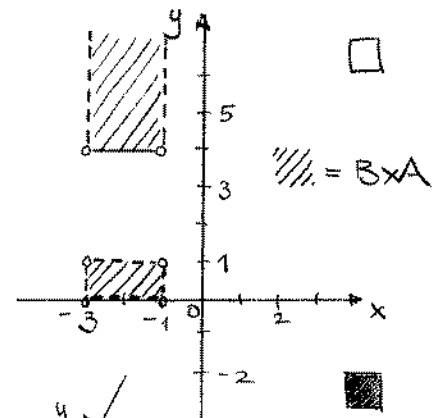
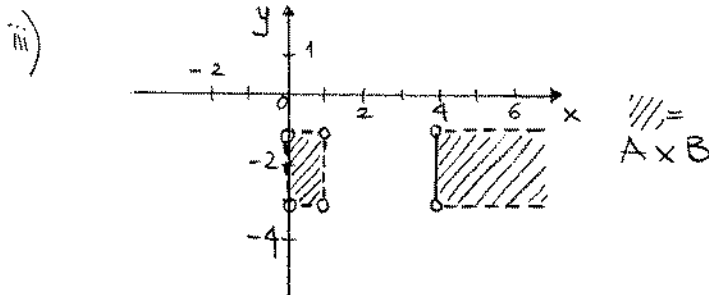
$B = \{x \in \mathbb{R} : \frac{(x^2+2x-3)(x^2-1)}{x^2} < 0\}$

$=]-3, -1[$



ii) $A \cup B =]-3, -1[\cup]0, 1[\cup [4, +\infty[$

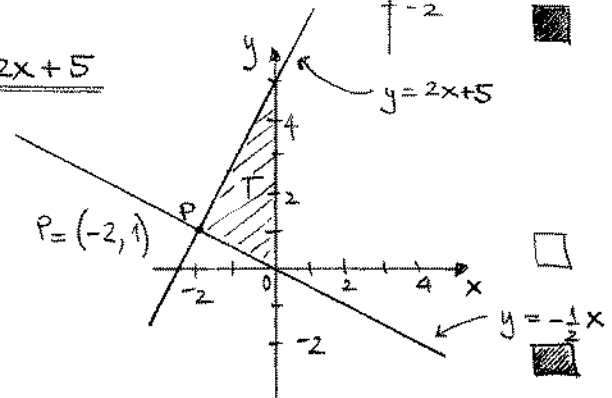
$A \cap B = \emptyset$ $A \setminus B = A$



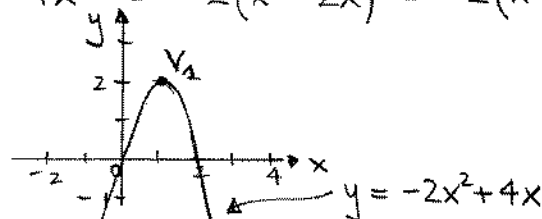
4)i) $y = 2(x+2) + 1 \Rightarrow \underline{y = 2x + 5}$

ii) $y = -\frac{1}{2}x$

iii) area T = $\frac{5 \cdot 2}{2} = 5$



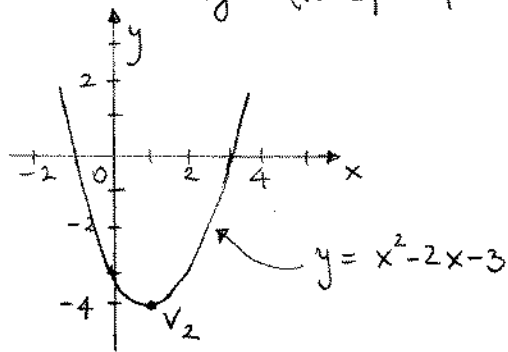
5)i) $y = -2x^2 + 4x = -2(x^2 - 2x) = -2(x-1)^2 + 2 \Rightarrow \underline{V_1 = (1, 2)}$



- 4 -

$$y = x^2 - 2x - 3$$

$$\Leftrightarrow y = (x-1)^2 - 4 \Rightarrow V_2 = (1, -4)$$



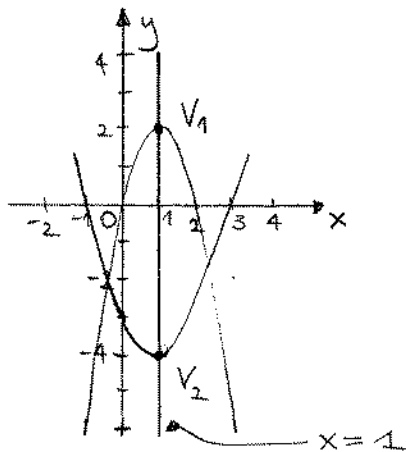
□

$$ii) \quad V_1 = (1, 2)$$

$$V_2 = (1, -4)$$

$\Rightarrow$ l'eq. della retta passante per

V_1 e V_2 è data da $x = 1$.



■