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1) a) $A \vee B \rightarrow \neg C \wedge (A \rightarrow B)$

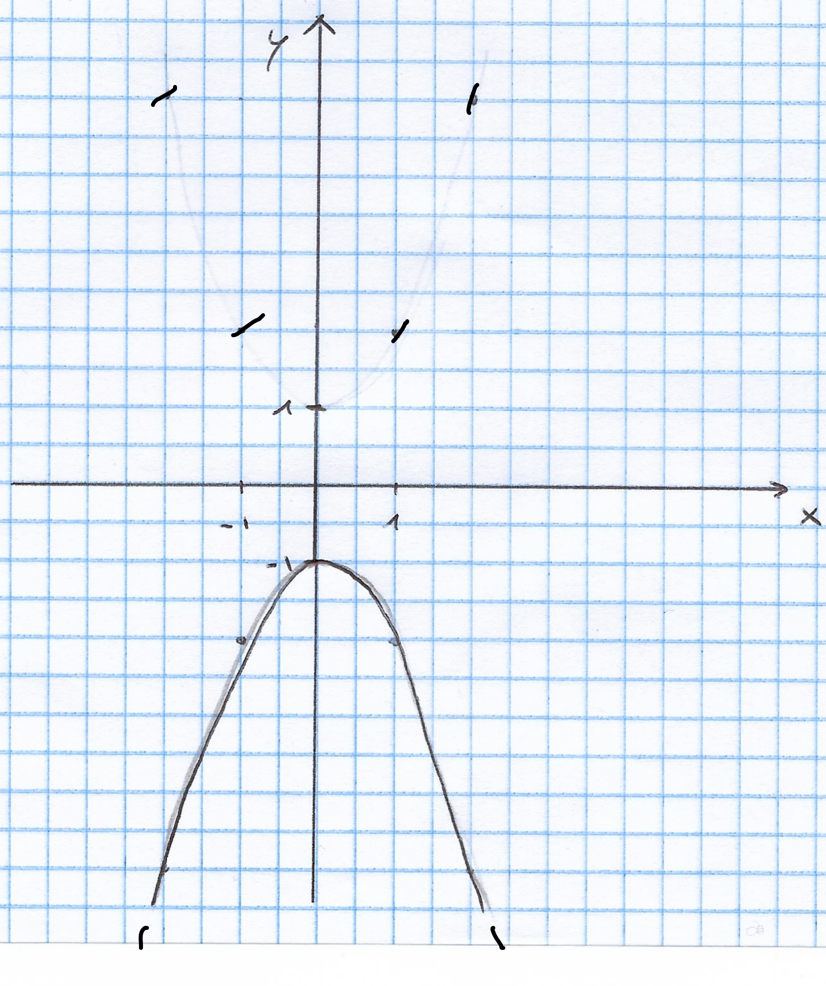
- se A e B sono entrambi falsi P vera
- se $i(A \vee B) = 1$, $i(A \rightarrow B) = 1$, se $i(\neg C) = 0$ allora $i(P) = 0$
  soddisfacibile ma non valida " $i(\neg C) = 1$ allora $i(P) = 1$

b) $\varphi: \forall x\, P(x) \rightarrow P(g(x,y))$ $FV(\varphi) = \{x, y\}$

2) $\varphi(x,y): ((x \cdot x) + y) + 1 = 0$

Nel linguaggio aritmetico si traduce in un'equazione di secondo grado: $y = x^2 + 1$ (PARABOLA)

a) $\varphi(\mathcal{R}) = \{(a,b) \in \mathbb{R} \mid (a \cdot a) + b + 1 = 0\}$
$= \{(a,b) \in \mathbb{R} \mid \mathcal{R} \models \varphi[x/a, y/b]\}$



2.b) $\exists x\, (((x \cdot x) + y) + 1 = 0)$

$\varphi(\mathcal{R}) = \{ k \in \mathbb{R} \mid \exists x\, (((x \cdot x) + y) + 1 = 0)[y/k] \}$

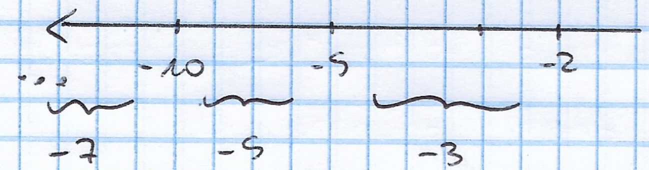
ad esempio, ~~per~~ $k = -2$ lo ottengo da $1^2 - 2 + 1 = 0$

$k = -5$ '' $2^2 - 5 + 1 = 0$

$k = -10$

$k = -17$

incremento di un fattore dispari



3) 1. $G(g) \wedge T(g) \wedge \forall x\, (G(x) \wedge T(x) \rightarrow x = g)$

2. $\forall x\, (C(x) \wedge A(x, g) \rightarrow T(x))$

3. $G(g) \wedge \exists x \exists y\, (C(x) \wedge C(y) \wedge p(x) = p(y) \wedge x \neq y)$

4) a) $\mathcal{A} \models \varphi \wedge \psi$

$\mathcal{A} = (A, R^{\mathcal{A}}, \underbrace{a, b}_{})$

universo, simbolo relazionale, costanti

Preso $R^{\mathcal{A}} = \{(a,a), (b,a), (a,b), (b,b)\}$

$A = \{a, b\}$

ottengo in φ implicazione vera ~~[illegible]~~ $\mathcal{A} \models \varphi$ e $\mathcal{A} \models \psi$

b) $\mathcal{B} \models \varphi \wedge \neg\psi$

$\mathcal{B} = (B, R^{\mathcal{B}}, a, b)$

Presa $R^{\mathcal{B}} = \emptyset$

$B = \{a, b\}$

ottengo in φ l'implicazione vera, mentre in ψ ~~non ottengo~~ l'AND assume valore falso

$\mathcal{B} \models \varphi$

$\mathcal{B} \models \neg\psi$