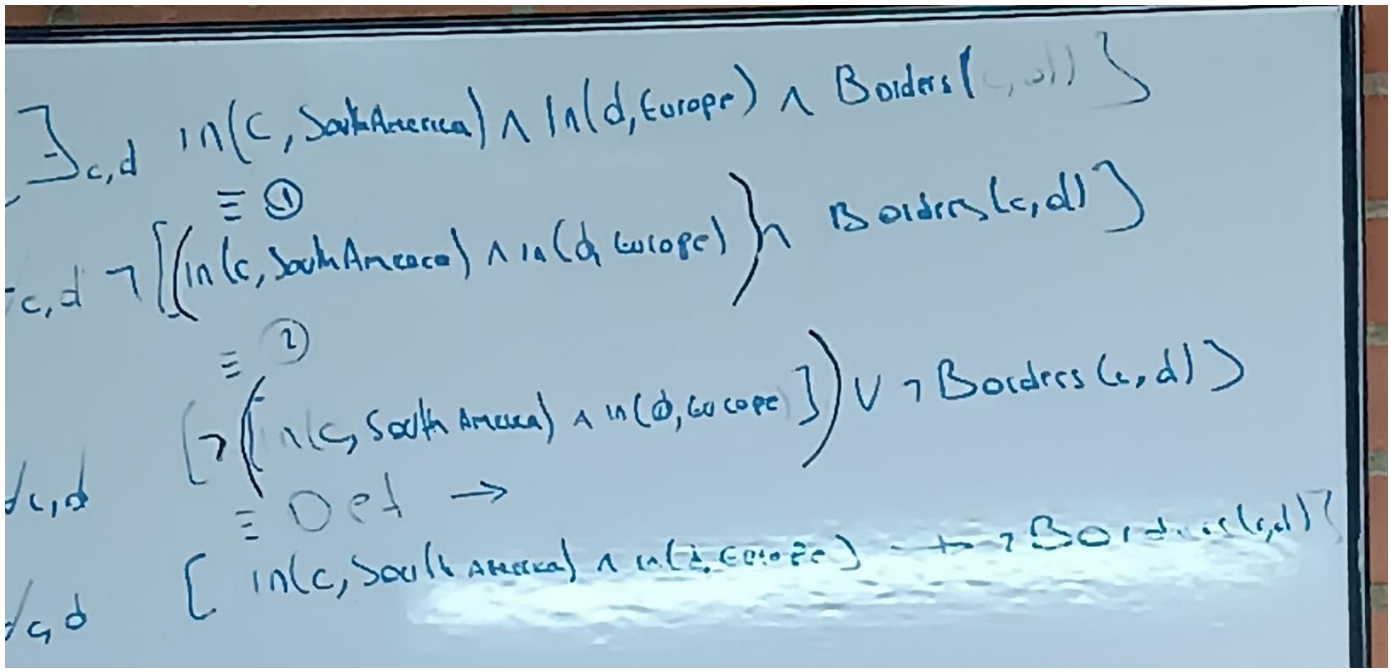
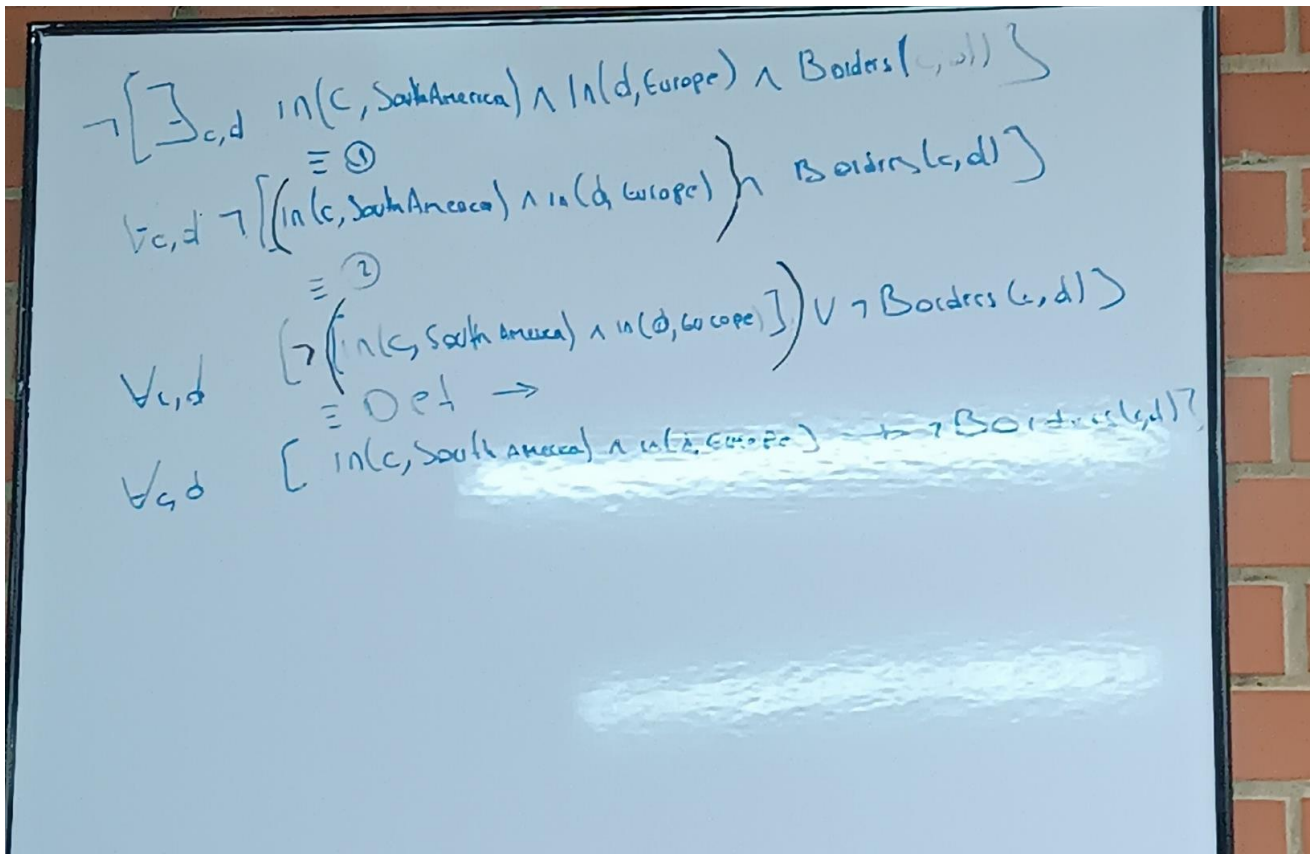
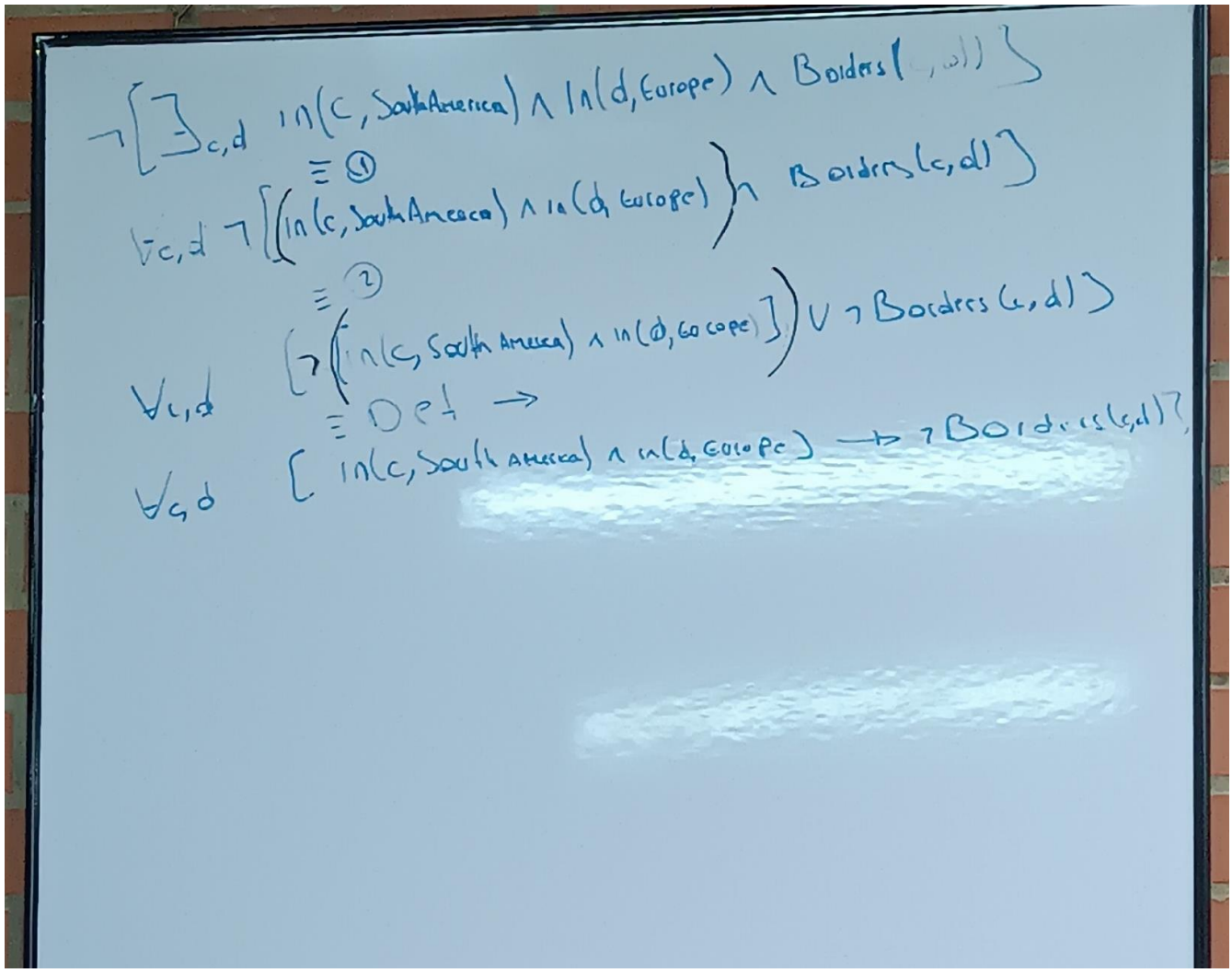
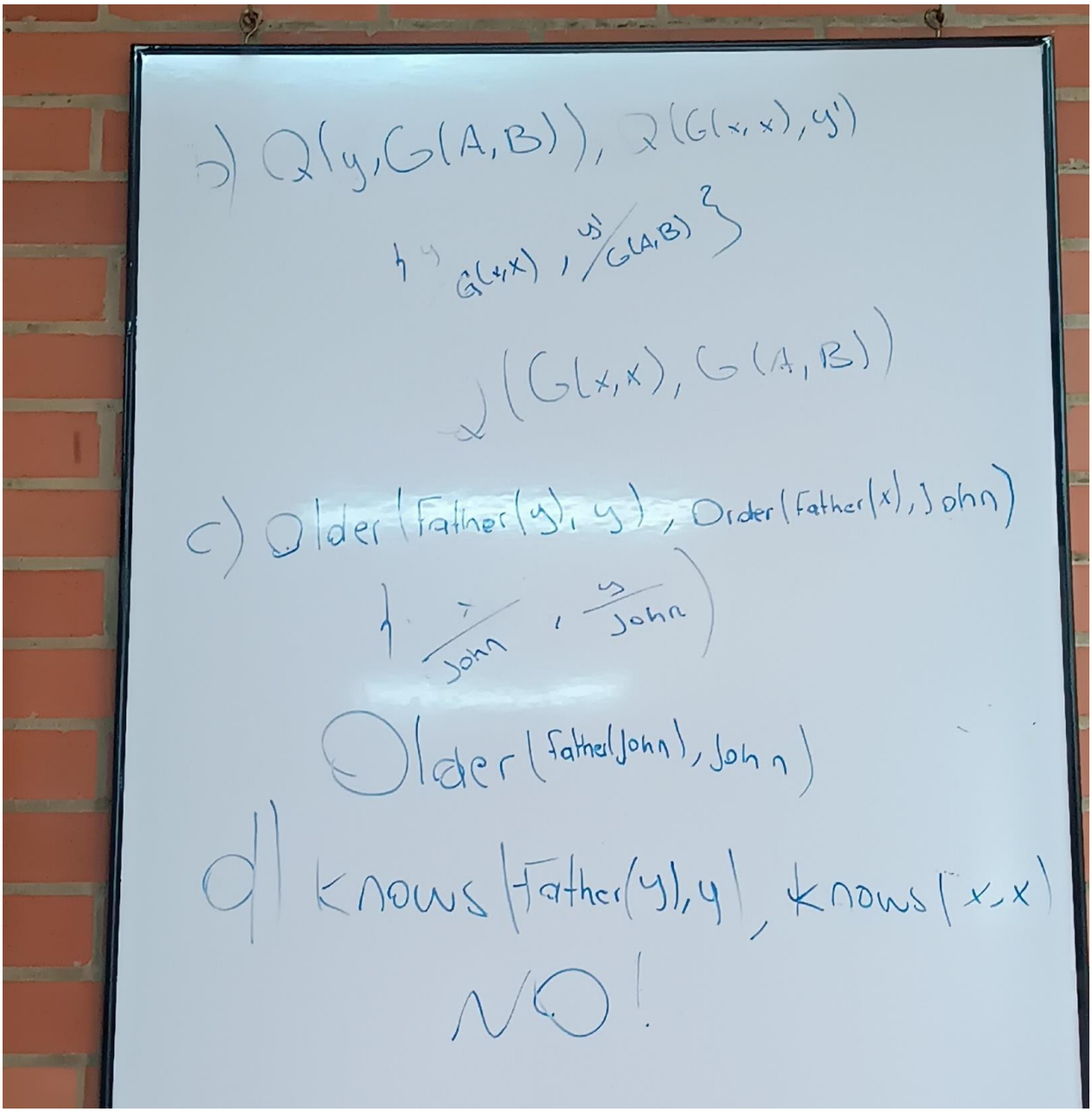

$\exists_{c,d}$ $In(c, SouthAmerica) \wedge In(d, Europe) \wedge Borders(c,d)$
$\equiv$ ①
$\forall c,d \neg[(In(c, SouthAmerica) \wedge In(d, Europe)) \Rightarrow Borders(c,d)]$
$\equiv$ ②
$\forall c,d$ $[\neg(In(c, SouthAmerica) \wedge In(d, Europe)) \vee \neg Borders(c,d)]$
$\equiv$ Def $\rightarrow$
$\forall c,d$ $[In(c, SouthAmerica) \wedge In(d, Europe) \Rightarrow \neg Borders(c,d)]$


$\neg[\exists_{c,d}$ $In(c, SouthAmerica) \wedge In(d, Europe) \wedge Borders(c,d)]$
$\equiv$ ①
$\forall c,d \neg[(In(c, SouthAmerica) \wedge In(d, Europe)) \Rightarrow Borders(c,d)]$
$\equiv$ ②
$\forall c,d$ $[\neg(In(c, SouthAmerica) \wedge In(d, Europe)) \vee \neg Borders(c,d)]$
$\equiv$ Def $\rightarrow$
$\forall c,d$ $[In(c, SouthAmerica) \wedge In(d, Europe) \Rightarrow \neg Borders(c,d)]$


¬[ ]c,d In(c, SouthAmerica) ∧ In(d, Europe) ∧ Borders(c,d)
≡ ①
∀c,d ¬[(In(c, SouthAmerica) ∧ In(d, Europe)) ⇒ Borders(c,d)]
≡ ②
∀c,d [¬(In(c, SouthAmerica) ∧ In(d, Europe)) ∨ ¬Borders(c,d)]
≡ De ↓
∀c,d [In(c, SouthAmerica) ∧ In(d, Europe) → ¬Borders(c,d)]


b) Q(y, G(A,B)), Q(G(x,x), y)
{ y / G(x,x) , y / G(A,B) }
Q(G(x,x), G(A,B))
c) Older(Father(y), y), Order(Father(x), John)
{ x / John , y / John }
Older(Father(John), John)
d) knows(Father(y), y), knows(x,x)
NO!

$$\forall g,c \left[GP(g,c) \leftrightarrow \left[\exists_p P(g,p) \wedge P(p,c) \right] \right]$$

$\equiv (1)$

$$\forall g,c \left[GP(g,c) \rightarrow \exists_p P(g,p) \wedge P(p,c) \right] \wedge$$
$$\left[\exists_p P(g,p) \wedge P(p,c) \right] \rightarrow GP(g,c) \Big]$$

$\equiv (2)$

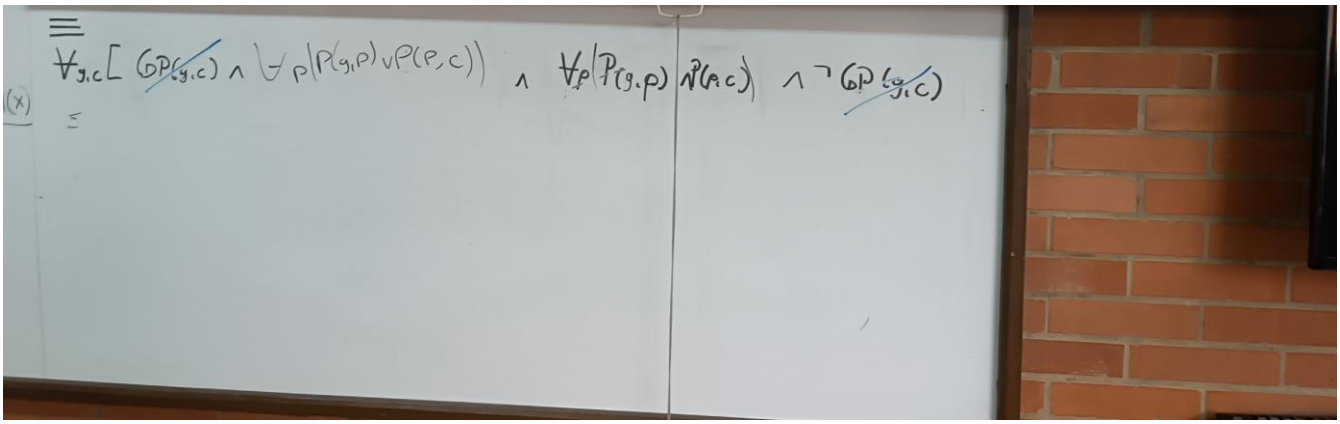
$$\forall g,c \left[\neg (GP(g,c) \vee \exists_p P(g,p) \wedge P(p,c) \right] \wedge$$
$$\left[\left[\neg \exists_p P(g,p) \wedge P(p,c) \right) \vee GP(g,c) \right]$$

$\equiv$ Moiga

$$\forall g,c \left[\neg GP(g,c) \vee \neg \exists_p P(g,p) \vee P(p,c) \right] \wedge$$
$$\neg \exists_p P(g,p) \wedge P(p,c) \big) \vee GP(g,c) \Big]$$

$\equiv (3)$

$$\forall g,c \left[\neg GP(g,c) \vee \left[\forall_x \neg (P(g,p) \vee P(p,c) \right] \wedge \right.$$
$$\left. \left[\neg \forall_p \left[P(g,p) \wedge P(p,c) \right] \vee GP(g,c) \right] \right]$$


(x)