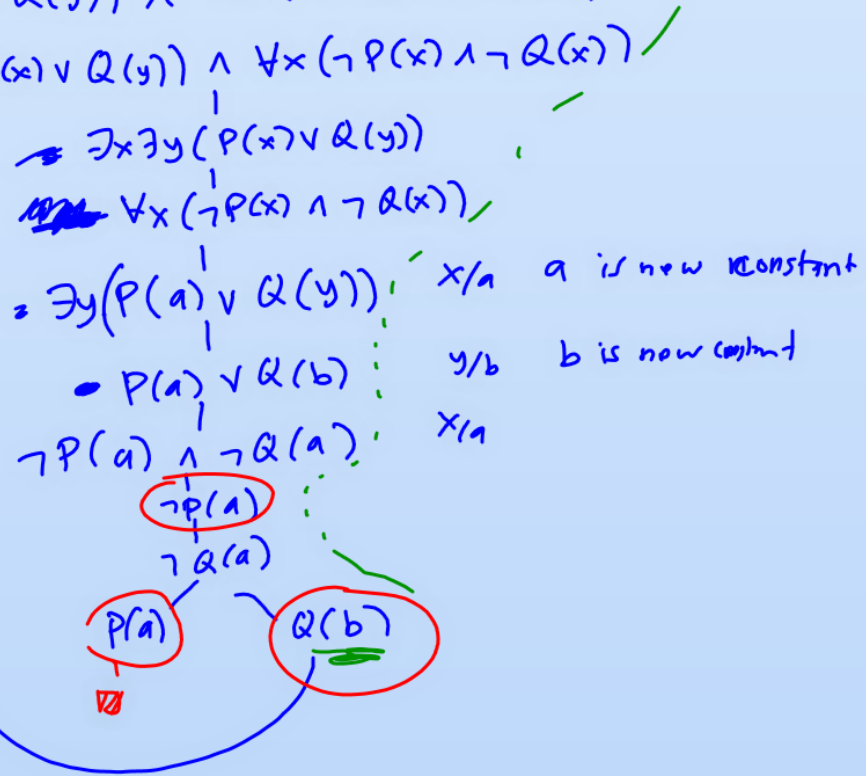
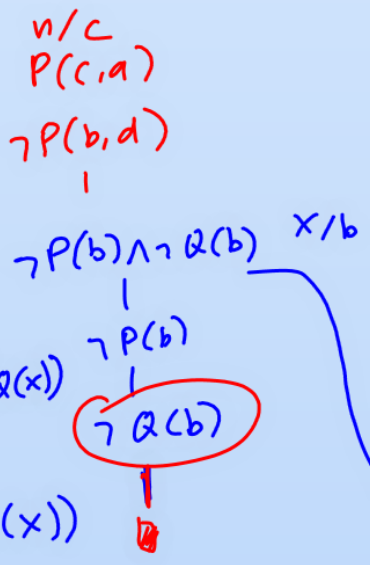


show:  $\exists x \exists y (P(x) \vee Q(y)) \models \exists x (P(x) \vee Q(x))$   
 $\neg$  show  $\exists x \exists y (P(x) \vee Q(y)) \wedge \neg \exists x (P(x) \vee Q(x))$  is unsat.  
 $\exists x \exists y (P(x) \vee Q(y)) \wedge \neg \exists x (P(x) \vee Q(x))$   
 $\equiv \exists x \exists y (P(x) \vee Q(y)) \wedge \forall x \neg (P(x) \vee Q(x))$   
 $\equiv \exists x \exists y (P(x) \vee Q(y)) \wedge \forall x (\neg P(x) \wedge \neg Q(x))$   
 $\exists x \exists y (P(x) \vee Q(y)) \wedge \forall x (\neg P(x) \wedge \neg Q(x))$



because all branches are closed.  
 $\exists x \exists y (P(x) \vee Q(y)) \wedge \neg \exists x (P(x) \vee Q(x))$   
 is unsatisfiable.  
 $\exists x \exists y (P(x) \vee Q(y))$   
 $\models \exists x (P(x) \vee Q(x))$