

On the final exam, you'll be permitted to use the full power of substitution and replacement. For propositional validities, you can just cite "prop taut", and we'll trust that you know how to prove it. That includes replacement as applied to subformulas of quantified formulas. So, for example, you could replace  $\forall x((Fx \wedge Gx) \rightarrow Hx)$  with  $\forall x(Fx \rightarrow (Gx \rightarrow Hx))$  and cite "prop taut", since the formula  $(Fx \wedge Gx) \rightarrow Hx$  is propositionally to  $Fx \rightarrow (Gx \rightarrow Hx)$ . For quantifier validities, you would need also to include a proof in your exam booklet. So, for example, you could derive  $\forall x\exists y\neg(Fx \rightarrow Gx)$  from  $\neg\exists x\forall y(Fx \rightarrow Gy)$  by substituting two quantifier equivalences; but you'd also need to prove  $\neg\exists xPx \vdash \forall x\neg Px$  and  $\neg\exists yQy \vdash \forall y\neg Qy$ .