

# Problem 7.1

Given  $\forall x.p(f(x))$ , use the Fitch system to prove  $\forall x.p(f(f(x)))$ .

To apply a rule of inference, check the lines you wish to use as premises and click the button for the rule of inference. Reiteration allows you to repeat an earlier item. To delete one or more lines from a proof, check the desired lines and click Delete.

Whenever entering expressions, use Ascii characters only. Use  $\sim$  for  $\neg$ ; use  $\&$  for  $\wedge$ ; use  $|$  for  $\vee$ ; use  $\Rightarrow$  for  $\Rightarrow$ ; use  $\forall$  for  $\forall$ ; use  $\exists$  for  $\exists$ ; and use  $:$  for  $:$  in quantified sentences. Also, for variables use strings of alphanumeric characters that begin with a capital letter. For example, to write the sentence  $\forall x.\exists y.(p(x) \wedge q(y) \Rightarrow r(y) \wedge \neg s(y))$ , write  $\forall x:\exists y:(p(X) \&q(Y) \Rightarrow r(Y) | \sim s(Y))$ .

Proof Editor		
1.	AX:p(f(X))	Premise
2.	p(f(f(X)))	Universal Elimination: 1
3.	AX:p(f(f(X)))	Universal Introduction: 2
Goal	AX:p(f(f(X)))	Complete   Submit
<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Assumption</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Negation Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Implication Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Universal Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Reiteration</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Negation Elimination</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Implication Elimination</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Universal Elimination</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Delete</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">And Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Biconditional Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Existential Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">And Elimination</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Biconditional Elimination</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Existential Elimination</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Or Introduction</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px;">Or Elimination</div> </div> <div style="display: flex; justify-content: center; margin-top: 20px;"> <div style="border: 1px solid #ccc; padding: 5px; margin: 0 10px;">Reset</div> <div style="border: 1px solid #ccc; padding: 5px; margin: 0 10px;">Show XML</div> </div>		