Quiz 2 - Math 374, Frank Thorne (thorne@math.sc.edu)

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(1) What inference rule is illustrated by the following argument?

> The cat has soft fur and loves to meow. Consequently, the cat loves to meow.

Solution. The argument is of the form $A \wedge B$, therefore B; this is **simplification**.

(2) Use propositional logic to prove that the following argument is valid.

$$(A \to C) \wedge (C \to B') \wedge B \to A'$$

(You may refer to your list of equivalences and inference rules.)

Solution. A sample proof might go as follows:

1. $A \to C$, (hypothesis)
2. $C \to B'$, (hypothesis)
3. B (hypothesis)
4. $A \to B'$ (1, 2, transitivity)
5. B'' (3, double negation)
6. A' (4, 5, modus tollens)

Other correct proofs are also possible. For example, you can use modus tollens twice and not need to use transitivity. It is also possible to use implication and elimination. Can you find still other correct proofs?