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Philos 12A
Klaus / 106

Assignment #7

Exercise 8.1

1. Affirming the Consequent is **invalid**
2. Modus Tollens is **valid**
3. Strengthening the Antecedent is **valid**
4. Weakening the Antecedent **invalid**
5. Strengthening the Consequent is **invalid**
6. Weakening the Consequent is **valid**
7. Constructive Dilemma is **valid**
8. Transitivity of the Biconditional is **valid**

Exercise 8.4

We can assume this is conditional proof.

The unicorn, if horned, is elusive and dangerous.
If elusive and mythical, the unicorn is rare.
If mammal, the unicorn is not rare.

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The unicorn, if horned, is not a mammal.

Proof: Assuming that the unicorn is horned we want to prove that it is not a mammal. Through proof by contradiction, we can assume that it is a mammal. Through the third premise know that the unicorn is not rare and the first premise, the unicorn is elusive. The second premise shows that the unicorn is rare therefore this proves the contraction thus proving that the assumption is false.□

Exercise 8.14

To prove that Irrational(x) → Irrational(√x) we can use proof of contrapositive. If √x is rational then x is rational so then we would get something like this: $\sqrt{x} = \frac{m}{n}$. For the integers m and n, n cannot be equal to 0. Then once we square both sides to get rid of the square root we end up with $x = \frac{m^2}{n^2}$. This is rational because m^2 and n^2 are integers. Every square of a rational number is rational so that would also prove through proof of contrapositive that if Irrational(x) → Irrational(√x).□