Tutorial A05 Answer Key

A05.9 Exercises

Question 1. Consider the following arguments. Identify the forms of all valid arguments.

1. If Jesus loves me, then I love Jesus. I do not love Jesus. Therefore, Jesus does not love me.

   Answer: Modus tollens

2. Either Jimmy is walking the dog or Cathy is feeding the cat (or both). Cathy is feeding the cat. Therefore, Jimmy is not walking the dog.

   Answer: Invalid

3. Either Jimmy is walking the dog or Cathy is feeding the cat. Cathy is not feeding the cat. Therefore, Jimmy is walking the dog.

   Answer: Disjunctive syllogism

4. If X is a man, then X is a human being. If X is a human being, then X is an animal. Therefore, if X is a man, then X is an animal.

   Answer: Hypothetical syllogism

5. If I do not have Yellow Tail sashimi, then I shall have scallop sushi instead. Now, I have Yellow Tail sashimi. So I do not have scallop sushi.

   Answer: Invalid

6. If some sheep are black, then some ducks are pink. It is not true that some ducks are pink. Therefore, it is not true that some sheep are black.

   Answer: Modus tollens

7. Either she is right or she is wrong. If she is right, then he is wrong. If she is wrong, then he is also wrong. Therefore, he is wrong either way.

   Answer: Dilemma

8. Paul is a bachelor. Paul is single. So at least one bachelor is single.

   Answer: Valid, but not one of the following patterns: modus ponens, modus tollens, hypothetical syllogism, disjunctive syllogism, dilemma, or reduction ad absurdum.
9. Either she is in China or she is in Europe. If she is in China, then she is in Beijing. If she is in Europe, then she is sleeping. Hence, either she is in Beijing or she is sleeping.

*Answer*: Dilemma

*Question* 2. Identify the conclusions that can be drawn from these assumptions. Which basic patterns of valid arguments should be used to derive the conclusion?

1. If God is perfect, then God knows what people intend to do in the future. If God knows what people intend to do in the future, then God can stop people from bringing about evil.

*Answer*: “If God is perfect, then God can stop people from bringing about evil” by hypothetical syllogism.

2. If he is dead, then there will be no pulse. If there is no pulse, then the red light will turn on. There is no red light.

*Answer*: The conclusions are “there is a pulse” and “he is not dead” by two applications of modus tollens.

3. Either Krypto is hot or Pluto is hot. If Krypto is hot, then there is no ice on its surface. But there is.

*Answer*: The conclusions are “Krypto is not hot” and “Pluto is hot” by modus tollens and then disjunctive syllogism.

4. Either you speak justly or unjustly. If you speak justly, then men will hate you. But if you speak unjustly, the gods will hate you.

*Answer*: “Either men will hate you or the gods will hate you” by dilemma.

5. Johannes is either in Hong Kong or in Thailand. He is not at home. If he is in Thailand he is staying at the Peninsula. If he is in Hong Kong, he is at home.

*Answer*: By dilemma, we get “Either Johannes is at home or he is staying at the Peninsula.” By disjunctive syllogism, the conclusion is that Johannes is at the Peninsula.

*Question* 3. If the following statements are all true, who killed Pan and where was Jones in 1997? Which piece of information is not needed?

1. Jones was either in HK or in London in 1997.
2. If Jones did not kill Pam, then Peter did.
3. If Pam died of suffocation, then either Jones killed her, or Pam committed suicide.
4. If Jones was in HK in 1997, then Jones did not kill Pam.
5. Pam died of suffocation but she did not kill herself.

**Answer:** Jones killed Pam, and he was in London. The second piece of information is not needed.

**Question 4.** Suppose someone thinks that there is only a finite number of integers. How would he criticize the proof that there are infinitely many primes? Which step would he reject?

**Answer:** If there are only finitely many integers, then it might not be possible to find a number Q that is larger than P.

**Question 5.** Here is a very nice example taken from the philosopher, James Pryor:

A computer scientist announces that he’s constructed a computer program that can play the perfect game of chess: he claims that this program is guaranteed to win every game it plays, whether it plays black or white, with never a loss or a draw, and against any opponent whatsoever. The computer scientist claims to have a mathematical proof that his program will always win, but the proof runs to 500 pages of dense mathematical symbols, and no one has yet been able to verify it. Still, the program has just played 20 games against Gary Kasparov and it won every game, 10 as white and 10 as black. Should you believe the computer scientist’s claim that the program is so designed that it will always win against every opponent?

How would you use the *reductio* method to argue against the computer scientist?

**Answer:** What if two computers running the same program were to play against each other?