Practice Exercises

Throughout the book, you will find a series of practice problems that review and explore the material covered in the chapter. There is no substitute for actually working through some problems, because logic is more about a way of thinking than it is about memorizing facts.

Part A Decide whether the following passages are statements in the logical sense and give reasons for your answers.

Example: Did you follow the instructions?
Answer: Not a statement, a question.

(1) England is smaller than China.

(2) Greenland is south of Jerusalem.

(3) Is New Jersey east of Wisconsin?

(4) The atomic number of helium is 2.

(5) The atomic number of helium is π.

(6) I hate overcooked noodles.

(7) Blech! Overcooked noodles!

(8) Overcooked noodles are disgusting.

(9) Take your time.

(10) This is the last question.

Part B Decide whether the following passages are statements in the logical sense and give reasons for your answers.

(1) Is this a question?

(2) Nineteen out of the 20 known species of Eurasian elephants are extinct.

(3) The government of the United Kingdom has formally apologized for the way it treated the logician Alan Turing.

(4) Texting while driving

(5) Texting while driving is dangerous.

(6) Insanity ran in the family of logician Bertrand Russell, and he had a life-long fear of going mad.

(7) For the love of Pete, put that thing down before someone gets hurt!

(8) Don't try to make too much sense of this.

(9) Never look a gift horse in the mouth.

(10) The physical impossibility of death in the mind of someone living

Part C Rewrite each of the following arguments in canonical form. Be sure to remove all indicator words and keep the premises and conclusion as complete sentences. Write the indicator words and phrases separately and state whether they are premise or conclusion indicators.

Example: *An ancient philosopher writes* There is no reason to fear death. Why? Because death is a time when you will not exist, just like the time before you were born. You are not troubled by the fact that you didn't exist before you were born, and the time that you won't exist after you are dead is no different. (Based on Lucretius [50 BCE/2001])

Answer: P_1: Death is a time when you will not exist.
P_2: Death is not different than the time before you were born.
P_3: You are not troubled by the fact that you didn't exist before you were born.

C: There is no reason to fear death.

Premise indicator: Because

(1) *A detective is speaking:* Henry's finger-prints were found on the stolen computer. So, I infer that Henry stole the computer.

(2) *Monica is wondering about her co-workers political opinions* You cannot both oppose abortion and support the death penalty, unless you think there is a difference between fetuses and felons. Steve opposes abortion and supports the death penalty. Therefore Steve thinks there is a difference between fetuses and felons.

(3) *The Grand Moff of Earth defense considers strategy* We know that whenever people from one planet invade another, they always wind up being killed by the local diseases, because in 1938, when Martians invaded the Earth, they were defeated because they lacked immunity to Earth's diseases. Also, in 1942, when Hitler's forces landed on the Moon, they were killed by Moon diseases.

(4) If you have slain the Jabberwock, my son, it will be a frabjous day. The Jabberwock lies there dead, its head cleft with your vorpal sword. This is truly a fabjous day.

(5) *A detective trying to crack a case thinks to herself* Miss Scarlett was jealous that Professor Plum would not leave his wife to be with her. Therefore she must be the killer, because she is the only one with a motive.

Part D Rewrite each of the following arguments in canonical form. Be sure to remove all indicator words and keep the premises and conclusion as complete sentences. Write the indicator words and phrases separately and state whether they are premise or conclusion indicators.

1) *A pundit is speaking on a Sunday political talk show* Hillary Clinton should drop out of the race for Democratic Presidential nominee. For every day she stays in the race, McCain gets a day free from public scrutiny and the members of the Democratic party get to fight one another.

2) You have to be smart to understand the rules of Dungeons and Dragons. Most smart people are nerds. So, I bet most people who play D&D are nerds.

3) Any time the public receives a tax rebate, consumer spending increases. Since the public

just received a tax rebate, consumer spending will increase.

4) Isabelle is taller than Jacob. Kate must also be taller than Jacob, because she is taller than Isabelle.

Part E Identify each passage below as an argument or a nonargument, and give reasons for your answers. If it is a nonargument, say what kind of nonargument you think it is. If it is an argument, write it out in canonical form.

Example: *One student speaks to another student who has missed class:* The instructor passed out the syllabus at 9:30. Then he went over some basic points about reasoning, arguments and explanations. Then he said we should call it a day.

Answer: Not an argument, because none of the statements provide any support for any of the others. This is probably better classified as a narration because the events are in temporal sequence.

(1) *An anthropology teacher is speaking to her class* Different gangs use different colors to distinguish themselves. Here are some illustrations: biologists tend to wear some blue, while the philosophy gang wears black.

(2) The economy has been in trouble recently. And it's certainly true that cell phone use has been rising during that same period. So, I suspect increasing cell phone use is bad for the economy.

(3) *At Widget-World Corporate Headquarters:* We believe that our company must deliver a quality product to our customers. Our customers also expect first-class customer service. At the same time, we must make a profit.

(4) *Jack is at the breakfast table and shows no sign of hurrying. Gill says:* You should leave now. It's almost nine a.m. and it takes three hours to get there.

(5) *In a text book on the brain:* Axons are distinguished from dendrites by several features, including shape (dendrites often taper while axons usually maintain a constant radius), length (dendrites are restricted to a small region around the cell body while axons can be much longer), and function (dendrites usually receive signals while axons usually transmit them).

Part F Identify each passage below as an argument or a nonargument, and give reasons for your answers. If it is a nonargument, say what kind of nonargument you think it is. If it is an argument, write it out in canonical form.

(1) *Suzi doesn't believe she can quit smoking. Her friend Brenda says* Some people have been able to give up cigarettes by using their will-power. Everyone can draw on their will-power. So, anyone who wants to give up cigarettes can do so.

(2) *The words of the Preacher, son of David, King of Jerusalem* I have seen something else under the sun: The race is not to the swift or the battle to the strong, nor does food come to the wise or wealth to the brilliant or favor to the learned; but time and chance happen to them all. (Ecclesiastes 9:11, New International Version)

(3) *An economic development expert is speaking.* The introduction of cooperative marketing into Europe greatly increased the prosperity of the farmers, so we may be confident that a similar system in Africa will greatly increase the prosperity of our farmers.

(4) *From the CBS News website, US section.* Headline: "FBI nabs 5 in alleged plot to blow up Ohio bridge." Five alleged anarchists have been arrested after a months-long sting operation, charged with plotting to blow up a bridge in the Cleveland area, the FBI announced Tuesday. CBS News senior correspondent John Miller reports the group had been involved in a series of escalating plots that ended with their arrest last night by FBI agents. The sting operation supplied the anarchists with what they thought were explosives and bomb-making materials. At no time during the case was the public in danger, the FBI said. (CBS News, 2012)

(5) *At a school board meeting.* Since creationism can be discussed effectively as a scientific model, and since evolutionism is fundamentally a religious philosophy rather than a science, it is unsound educational practice for evolution to be taught and promoted in the public schools to the exclusion or detriment of special creation. (Kitcher 1982, p. 177, citing Morris 1975.)

Part G Label the following tautology, contradiction, or contingent statement.

Example: Caesar crossed the Rubicon.

Answer: Contingent statement.

(The Rubicon is a river in Italy. When General Julius Caesar took his army across it, he was committing to a revolution against the Roman Republic. Since that time, "crossing the Rubicon" has been a expression referring to making an irreversible decision.)

(1) Someone once crossed the Rubicon.

(2) No one has ever crossed the Rubicon.

(3) If Caesar crossed the Rubicon, then someone has.

(4) Even though Caesar crossed the Rubicon, no one has ever crossed the Rubicon.

(5) If anyone has ever crossed the Rubicon, it was Caesar.

Part H Label the following tautology, contradiction, or contingent statement.

(1) Elephants dissolve in water.

(2) Wood is a light, durable substance useful for building things.

(3) If wood were a good building material, it would be useful for building things.

(4) I live in a three story building that is two stories tall.

(5) If gerbils were mammals they would nurse their young.

Part I Which of the following pairs of statement are logically equivalent?

(1) Elephants dissolve in water.

If you put an elephant in water, it will disintegrate.

(2) All mammals dissolve in water.
   If you put an elephant in water, it will disintegrate.

(3) George Bush was the 43rd president.
   Barack Obama is the 44th president.

(4) Barack Obama is the 44th president.
   Barack Obama was president immediately after the 43rd president.

(5) Elephants dissolve in water.
   All mammals dissolve in water.

Part J Which of the following pairs of statement are logically equivalent?

(1) Thelonious Monk played piano.
   John Coltrane played tenor sax.

(2) Thelonious Monk played gigs with John Coltrane.
   John Coltrane played gigs with Thelonious Monk.

(3) All professional piano players have big hands.
   Piano player Bud Powell had big hands.

(4) Bud Powell suffered from severe mental illness.
   All piano players suffer from severe mental illness.

(5) John Coltrane was deeply religious.
   John Coltrane viewed music as an expression of spirituality.

Part K Consider again the statements on p.**??**:

(a) There are at least four giraffes at the wild animal park.

(b) There are exactly seven gorillas at the wild animal park.

(c) There are not more than two Martians at the wild animal park.

(d) Every giraffe at the wild animal park is a Martian.

Now consider each of the following sets of statements. Which are consistent? Which are inconsistent?

(1) Statements (b), (c), and (d)

(2) Statements (a), (c), and (d)

(3) Statements (a), (b), and (d)

(4) Statements (a), (b), and (c)

Part L Consider the following set of statements.

(a) All people are mortal.

(b) Socrates is a person.

(c) Socrates will never die.

(d) Socrates is mortal.

Which combinations of statements form consistent sets? Mark each consistent or inconsistent.

(1) Statements (a), (b), and (c)

(2) Statements (b), (c), and (d)

(3) Statements (b) and (c)

(4) Statements (a) and (d)

(5) Statements (a), (b), (c), and (d)

Part M Which of the following is possible? If it is possible, give an example. If it is not possible, explain why.

(1) A valid argument that has one false premise and one true premise

(2) A valid argument that has a false conclusion

(3) A valid argument, the conclusion of which is a contradiction

(4) An invalid argument, the conclusion of which is a tautology

(5) A tautology that is contingent

(6) Two logically equivalent sentences, both of which are tautologies

(7) Two logically equivalent sentences, one of which is a tautology and one of which is contingent

(8) Two logically equivalent sentences that together are an inconsistent set

(9) A consistent set of sentences that contains a contradiction

(10) An inconsistent set of sentences that contains a tautology

Part N Which of the following is possible? If it is possible, give an example. If it is not possible, explain why.

(1) A valid argument, whose premises are all tautologies, and whose conclusion is contingent

(2) A valid argument with true premises and a false conclusion

(3) A consistent set of sentences that contains two sentences that are not logically equivalent

(4) A consistent set of sentences, all of which are contingent

(5) A false tautology

(6) A valid argument with false premises

(7) A logically equivalent pair of sentences that are not consistent

(8) A tautological contradiction

(9) A consistent set of sentences that are all contradictions

Chapter 1

Bibliography

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