

Logic Appendix Study Questions

I. Syllogistic Arguments

1. Replace the capital letters in the following argument forms with names which stand for a kind of things (e.g., 'books'), then try to determine whether each of these forms is valid, and explain why.
 - 1.1. No M are P.
Some S are M.
Some S are P.
 - 1.2. All P are M.
Some S are M.
Some S are P.
 - 1.3. No M are P.
No M are S.
No S are P.
2. For each of the following propositions, state whether it is a **logical negation**, and explain why.
 - 2.1. Condoleezza Rice is unmarried.
 - 2.2. Unmarried couples are also eligible for the prize.
 - 2.3. It's not the case that I don't mind.
 - 2.4. He failed in his attempt to regain the world title.
3. Consider the following two propositions. Do you think 3.2 is a **negation** of 3.1? Why?
 - 3.1. All senators are corrupt.
 - 3.2. No senators are corrupt.
4. Put the following categorical statements in syllogistic **standard form** (statements begin with 'all', 'no', 'some').
 - 4.1. Gourmets don't eat their steaks well-done.
 - 4.2. Each tablet contains 15 mg of caffeine.
 - 4.3. There are airline pilots who have an alcohol problem.
 - 4.4. Anybody who races horses must believe in miracles.
 - 4.5. The Vatican guards are all Swiss.
 - 4.6. Not everyone who trains wins.
 - 4.7. Many birds fly at high altitudes.
 - 4.8. He who defiles an Egyptian tomb will perish.

4.9. Nobody is perfect.

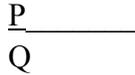
5. What are the four standard forms of categorical statements?
- a) All S are P; Some S are P; Some S are not F; No S are P
 - b) All S are P; Some S are P; Some S are not P; All S are S
 - c) All S are P; Some S are P; All S are not F; Some S are not P
 - d) All S are F; No S are not F; No S are F; All P are S
5. What is the categorical form of the following statement: "Only golfers wear red pants"?
- a) Some golfers are not red-pant-wearers.
 - b) Some red-pant-wearers are not golfers.
 - c) *All* red-pant-wearers are golfers.
 - d) *All* golfers are red-pant-wearers.
6. If it is not possible for the premises to be true while the conclusion is false then the argument is what?
- a) Compound
 - b) Invalid
 - c) A syllogism
 - d) Valid

6.1.

II. Propositional Arguments

7. Translate the following statement(s) into symbolic form.
- 7.1. If there is a blizzard, Highway 401 will be treacherous.
 - 7.2. It is not the case that either chocolate or coffee is bad for you.
 - 7.3. Either chocolate is bad for you or coffee is bad for you.
 - 7.4. If it rains or the sprinkler stays on, then the ground will be wet.
 - 7.5. It's not the case that if you fail logic, your life will be ruined
8. Replace the capital letters in the following argument forms with sentences in ordinary language, then try to determine whether each of these forms is valid, and explain why.
- 8.1. If P, then Q.
- $$\frac{\text{Not P}}{\text{Not Q}}$$
- 8.2. If P, then Q.
- $$\frac{\text{Q}}{\text{P}}$$

8.3. Either P or Q.



9. **MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

9.1. In the exclusive sense, what does "p or q" mean?

- a) Neither p nor q is true.
- b) At least one of p or q is true.
- c) Both p and q are true.
- d) Either p or q is true, but not both of them.

7.2. When is a conditional false?

- a) Only when the antecedent is false, and the consequent is false
- b) Only when the antecedent is false, and the consequent is true
- c) Only when the antecedent is true, and the consequent is true
- d) Only when the antecedent is true, and the consequent is false

10. Yes or No? Is the following is an accurate truth table for a conjunction:

<i>p</i>	<i>q</i>	<i>p and q</i>
T	T	T
T	F	F
F	T	F
F	F	F

11. Is the following is an accurate truth table for a conditional?

<i>p</i>	<i>q</i>	<i>If P, then q</i>
T	T	T
T	F	F
F	T	F
F	F	T

12. For each of the following propositions, (i) identify the antecedent; (ii) indicate which component proposition is the **sufficient/necessary** condition for the other.

- 12.1. Supposing that Maria is a practicing attorney, she has passed the bar exam.
 - 12.2. Had he made the catch, they would have been out of the inning.
 - 12.3. I am extraordinarily patient provided I get my own way in the end.
 - 12.4. Only if Chicago has dangerous levels of air pollutants is its air unhealthy.
13. For each of the following propositions, symbolize it with capital letters provided in brackets.
- 13.1. Neither the CIA (C) nor the FBI (F) tolerates terrorists.
 - 13.2. Either Franklin Roosevelt did not like (L) Stalin at all, or he admired both that Stalin was unyielding (U) against Hitler and that he stuck (S) by his decisions.
 - 13.3. Unless I see (S) it with my own eyes, and hear (H) it with my own ears, I will never believe (B) it.
 - 13.4. If the white (W) Sox are American League champions, then the Yankees (Y) and Boston (B) must both have been eliminated.
14. Identifying the valid form of **affirming the antecedent**. Which of the following five arguments have the valid form of affirming the antecedent? (You should put the argument in standard form before you decide.)
- 14.1. The value to science of any archeological discoveries depends on the laying of a proper grid and careful collection of samples. All you did was pick up the pieces and bring them to the university. Your collection therefore has no scientific value.
 - 14.2. Since the description of what a Pisces is fits me perfectly, astrology is accurate!
 - 14.3. She said that she'd be at the party unless her flu took a turn for the worse. I didn't see her, so I think we should go by her place and make sure she's okay.
 - 14.4. If the new policy results in fewer people applying for assistance, I'd say it's a success. The numbers have gone down by 15%. Success!
15. Identifying the valid form of **denying the consequent**. Which of the following arguments have the valid form of denying the consequent? (Again, it might help if you put the argument in standard form before you decide.)
- 15.1. If near-death experiences were based on birth memories of passing through the tunnel of the vagina into the bright light of the hospital room, then those who were born by Cesarean section should not have tunnel experiences when they are near death. However, they do. Therefore near-death experiences aren't based on birth memories. (Based on Theodore Schick, Jr. and Lewis Vaughn, How to Think About Weird Things, 1998)
 - 15.2. If American women are so equal, why do women represent two-thirds of all poor adults?
 - 15.3. If she arrived before me, I would have seen the tire tracks of her truck in the snow. I didn't see any tracks, so she must've arrived on foot.

- 15.4. If the universe were infinitely old, there would be no hydrogen left in it, since hydrogen is steadily converted into helium throughout the universe, and this conversion is a one-way process. But in fact, the universe consists almost entirely of hydrogen. Thus the universe must have had a definite beginning. (Fred Hoyle, astronomer, paraphrased by Anthony Weston in *A Rulebook for Arguments*, 2008)
16. Identifying the valid form of **reductio ad absurdum**. Which of the following five arguments have the valid form of reductio ad absurdum? (Don't forget to put the argument in standard form before you decide.)
- 16.1. If people played sports only to win, then they'd seek out and play against only those opponents they could most likely beat.
- 16.2. Of a pro football game that lasts three and a half hours, only about sixteen minutes are composed of actual football playing, according to an evaluation of a sample game by the Scripps Howard News Service. The rest is taken up with players' huddling, picking themselves up off of piles of men, running to the line of scrimmage, and rehuddling commercials (twenty-six minutes); halftime (sixteen minutes); penalties (ten minutes); injury delays (six minutes); and other delays including timeouts, official measurements, and fights. Clearly, men who love football are not wading through three and a half hours of television just to see a few spectacular touchdown passes. There must be more to it. (Mariah Burton Nelson, *The Stronger Women Get, The More Men Love Football: Sexism and the American Culture of Sports*, 1994)
- 16.3. Suppose that the world has a Creator like a house does. Now when houses are not perfect, we know who is to blame: the carpenters and masons who created them. But the world is also not wholly perfect. Therefore, it would seem to follow that the Creator of the world, God, is not perfect either. But you would consider this conclusion absurd. The only way to avoid the absurdity, however, is to reject the supposition that leads to it. Therefore, the world does not have a Creator in the way that a house does. (David Hume. *Dialogues Concerning Natural Religion Part V [1779]* 1998)
17. Identifying the **valid** form of a **disjunctive argument**. Which of the following five arguments have the valid form of a disjunctive syllogism? (Remember to put the arguments in standard propositional form.)
- 17.1. Either the animal is suffering from X or Y. If it were suffering from X, it would have these symptoms. But it doesn't. So it must be suffering from Y.
- 17.2. Either he's going to stay at home to raise his kids or he's going to keep working and hire someone else to do it. There's no way he's going to choose his dead-end boring job over his kids, so he's going to stay home.
- 17.3. Either extraterrestrial beings visited Earth sometime in the past or the pyramids are a mirage. I've seen the pyramids with my own eyes, even walked part way up. So ET was here!

- 17.4. John has said that either he will take a trip into the country or visit his mother in city. He told me recently that he was going to see his mother so I guess that is it for his country trip
- 17.5. The doctor said that either I give up smoking or I will die prematurely. I am persuaded so I have given up smoking. Thankfully I will now not have to worry about dying prematurely.
18. Inference with **valid propositional arguments**. Suppose each of the statements in the following pairs is true. What conclusion, if any, can—indeed, must—you draw?
- 18.1. If we have a natural will to survive, suicide is wrong. Suicide is wrong.
- 18.2. If your partner has a sexually infectious disease (STI), then having sex with him/her means you are likely to get the same disease. Do you really want to take the risk?
- 18.3. If you're not present, you can't participate. Participation is important.
- 18.4. The team will win either because they play well together or because they have a few individual stars. I know for a fact there is not one outstanding athlete in the team.
- 18.5. Allowing more people to have more guns cannot lead to both more crime and more safety. Stats show it leads to more crime.
- 18.6. If drug X was working, then you'd be experiencing fewer headaches, but you've still got headaches.
- 18.7. When private money is used for political campaigns, there is unfair competition: the richest have the advantage and the election is unduly influenced by rich private interests. That is totally unacceptable.
- 18.8. If we want to reduce crime we need either to increase jail sentences or increase fines. If we increase jail sentences, the state will have more expenses, but if we increase fines, the state will have more income.
19. Identifying the **invalid form -- affirming the consequent** Which of the following five arguments have the invalid form of affirming the consequent? Put the argument into standard form and add missing premises where necessary.
- 19.1. **McCormack**: I tell you it's a conspiracy! **Germain**: What evidence do you have that they're covering it up? **McCormack**: None! Don't you see? If it was not a conspiracy we would have the evidence. No evidence proves it's a conspiracy—they're covering it up!
- 19.2. Whenever there is sufficient food, little disease, and a good standard of living, a population will increase. In the Philippines, population is increasing. Therefore, there must be sufficient food, little disease, and a good standard of living in Philippines.
- 19.3. If it's true that being married is good for men's health then divorced and single men should get sick and die more often than married men. Since unmarried men do get sick and die more often than married men, I guess it shows that marriage is good for men's health.

- 19.4. If the state mandates that employers pay a living wage, the number of low paying jobs will decline leaving the poor and unemployed even worse off.
- 19.5. The doctor said that if my child is hyperactive, the drug will calm him. Well, I gave him the drug, and sure enough, he calmed right down. I guess he was hyperactive after all!

20. Identifying the **invalid form -- denying the antecedent**. Which of the following five arguments have the invalid form of affirming the consequent?

- 20.1. Religious people are moral people; they have a moral compass, the word of God. It follows that if you're a pagan, someone who hasn't yet found the Lord, you're floundering without a moral compass and any sense of right or wrong to guide you in this life.
- 20.2. If the Genesis is correct and earth is only 6,000 years old, then not only evolution, but most of cosmology, astronomy, physics must be wrong.
- 20.3. If we had a natural will to survive, we wouldn't want to commit suicide. But there are people do want to commit suicide on occasion. So that proves we don't have a natural will to survive.

21. Identifying the **invalid form of affirming a disjunct**. Which of the following five arguments affirm a disjunct? Remember having a false premise (explicit or implicit) does not affect validity

- 21.1. It's not safe to walk on the streets of New York. I'm glad I live in Toronto.
- 21.2. Once again, I can't start my car. Okay, I know from experience that either the battery is dead or the starter needs replacement. Since the lights go on and the engine is at least turning over, I can conclude the battery is not dead. So I must need a new starter.
- 21.3. Looking ahead, if China's per person green house gas emissions were to rise to the level of that in the rich countries, then the planet, will warm to catastrophic levels. And even though China is adopting solar, it will not be enough to seriously reduce their green house gas emissions on the way to Western level prosperity.
- 21.4. I predicted she'd have her father's eyes or her mother's ears. And from the picture you sent, I can see that she did indeed get her father's eyes. She has a cute little hat on so I can't see her ears, but now that I'm taking some logic, I can conclude that she doesn't have her mother's ears.
- 21.5. Perhaps the most telling evidence of Christians' lack of faith in their religion is the fact that they know so little about it. I have yet to meet anyone, apart from some who have a professional interest in it, who has actually read the Bible. Oh yes, the book is everywhere, but how many people read it? If they really believed that this text was the "Word of God," could one not reasonably expect them to know it by heart, or, at least, to be constantly reading it, from cover to cover? (Henry Beissel, "Crisis in Civilization" HiC 36, Autumn 2003)

22. For each of the following deductive arguments, translate into **standard propositional form** and state whether they are valid or invalid and explain why
- 22.1. If the farmers oppose the milk distribution board then it must be a bad idea, and they are opposed so it must be a bad idea.
- 22.2. If the defendant's fingerprints were found on the body, we could be sure he was guilty, but no prints were found on the body, so clearly he is not guilty.
- 22.3. Only when there is a cat in the house do we get fleas. And now it is winter, Puff; will be moving into the house, and now we will have fleas.
- 22.4. Tuition fees will increase unless there is a student strike. A strike is scheduled for tomorrow, so we can be assured that there will be no increase in tuition.
- 22.5. If the government helps the farmer deal with the drought conditions, then the farmers will be able to survive. And since the farm lobby is powerful the government will help and the farmers will survive.
- 22.6. If most people growing up in our society develop a sense of purpose and meaningfulness, then ours is a healthy society. Unfortunately it's not true that most acquire this sense, that's why ours is not a healthy society.
- 22.7. If John is home, then he will answer the phone. He is not answering the phone therefore he's not home.
- 22.8. If the use of Bovine growth hormone is a good idea, then such use won't cause hardship for the small farmer. But the use of BGH will cause hardship for the small farmer therefore its use is not a good idea.
23. For each of the following deductive arguments, translate into **standard propositional form** and state whether they are valid or invalid and explain why:
- 23.1. **Lester:** Is Nancy going to join us?
Juanita: She has a cold but she said she'll join us if she feels better.
Lester: Here she is!
Juanita: I guess she's feeling better.
- 23.2. **Ahmed:** We should serve some non meat dishes at our party. I think Wally's a vegetarian.
Winnie: Why do you think that?
Ahmed: Well, vegetarians are all granola-munching hippies. And Wally is one of those hippy types.
- 23.3. **McGregor:** If the government loosens up on controls on business, companies are in a much better position to compete, they'll make more profits, and there will be a trickle down effect to improve the lot of poor people,

Nancy: So I guess the poor should be happy with the government's new measures which remove some regulations from corporations?

McGregor: Definitely! They'll be much better off.

23.4. **Nancy:** If everyone stopped driving their cars every second day, that would go a long way toward dealing with the climate change problem

Sophia: You'll never get people to give up their cars to that extent.

Nancy: Then I guess the planet is in trouble.

23.5. **Ravi:** : If the game lets out at 10, there'll be a lot of traffic on the road and we'll be late for the party

Sophia: But the game's supposed to be over at 9:30.

Ravi: Then we should have no problem getting to the party on time.

23.6. **Ahmed:** They say you can't trust anyone over thirty.

Phil: But that salesman is only twenty-eight.

Ahmed: I guess we can trust him then.