

RHYME AND REASON:
ANSWER KEY AND TEACHER GUIDE

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How to use this Teacher's Guide:

Teaching logic is often an imprecise science, so there are places in this answer key where answers are general and the final judgment about whether an exercise has been sufficiently completed will rest with the instructor. That said, the answers and suggestions in this guide are based on real experience and will get you pointed in the right direction.

Each chapter begins with some objectives and a one paragraph commentary on the chapter. These are designed to be a teacher's perspective on what the student is learning in each chapter. The type of summary I provide varies from chapter to chapter: for one chapter I might offer a general overview; on another, I will list several points of practice that ought to be enforced.

Students should not, of course, be required to come up with the word-for-word answers that I have given in this key. My answers are designed to give you an ideal answer. The best answers will look *like* those that I have given (although I do recognize the possibility that a bright student might even come up with a better one). A note about the format of the answers: instructions directed to the teacher are given in italics. The answer you hope to see from the student is given in Roman type.

Theory questions are designed like “study questions” for the chapter, and for this reason the student should always be encouraged to get back into the chapter and look for the answers. Most of the time it will be as simple as finding where the question is addressed; but occasionally, more processing on the part of the student will be necessary.

The **Imitation and Practice** exercises are often even more open ended than the Theory exercises. This leaves the instructor looking for certain kinds of cues to determine how much effort a student is putting into the assignment. The discussion questions for Imitation exercises should help the instructor tell how well a book has been read, and whether the student was able to engage with the material. A number of the Practice exercises provide the student with checklists for completing the assignments. Between these lists and the other suggestions and criteria I've included in this answer key for assessing a writing assignment, even an inexperienced instructor ought to be able to call most of the shots.

Finally, I expect and hope you find this teacher's guide helpful. At the same time, I welcome any suggestions to improve its clarity and usefulness. Please don't hesitate to e-mail or call me (current contact information is available at www.brightrockpress.com).

Chapter 1: Necessary Background: Biblical

Objectives:

1. To provide the most important Biblical background for our study of logic
2. To compare and contrast what the Bible says about truth and reasoning with our basic expectations

Many of us may think that logic is an “exempt” study, like mathematics, when it comes to what the Bible has to say about things. After all, isn't the Bible in the realm of “faith” while logic is the study of “reason”? However, the Bible does have important things to say about reasoning and truth, and we cannot study logic safely without considering what the Scriptures say about these things. Two things the students must understand from this chapter are 1) the fact that (and the reasons why) the Bible shows us truth as something ethical and personal, and 2) that reason is a gift from the Lord and, like other good gifts, can become an idol.

Exercise 1: Theory

a. Summarize the purpose of this book as stated in this chapter.

This book is supposed to give me the intellectual tools for

1. Evaluating my own thoughts
2. Evaluating the thoughts and arguments of others

This involves following the premises to the conclusion, or the reasons to the results. This book should also make the intellectual tools useful enough that I will readily take them with me into everyday life.

b. What is another word for “syllogism”?

A syllogism is an argument. It is made up of premises and a conclusion, or reasons which lead to a particular reasonable result.

c. Is reason a gift from God or a temptation to idolatry, or both?

It is both. As a good gift from God it is useful to man, and it tempts him to idolatry. The many and wonderful uses of reason tempt men to trust in them without acknowledgment of their true Lord and Author.

d. What is the Biblical view of reason?

That reason can be used for good or for ill, and that it is something done by man with personal and ethical implications. It is personal and ethical when it is used to better knowledge of God in one case, or in another, to suppress knowledge of God. The suppressing of the truth of God is offensive to Him and brings wrath on those who use reasoning in this way. In Christ, using reason to learn more about God is pleasing to Him.

e. What, according to the Bible, is truth?

God is Truth. Christ says, “I am the Way, the Truth, and the Life.” God is the author, giver, and source of all truth. This is why truth, and reasoning are personal and ethical.

Exercise 2: Imitation

Read the first half of the book of Proverbs. How does the writer reason? Can you follow his

reasoning?

The completion of the reading is the requirement for this exercise. The questions are to be used for discussion. No set or "correct" answer is expected.

Exercise 3: Practice

Use a concordance or Bible search program to search for passages about reasoning, truth, and wisdom. List the characteristics or qualities given for reasoning, truth, and wisdom.

Strong's Exhaustive Concordance is in almost every Church library, if you do not have it at home. There are also some good freeware Bible programs such as Online Bible, which you can download from the internet. The lists should be either a quotation of the pertinent part of the verse or a paraphrase of the import of the verse. The student should find at least ten references for each word and some come to some general conclusions about each of the lists. A concluding summary paragraph is recommended.

Chapter 25: Propositional Logic: Inference and Replacement

Objectives:

1. To introduce the rules of inference and replacement
2. To show how the rules of inference are common arguments, and the rules of replacement are common equivalences
3. To prepare the student to use these rules to construct formal proofs.

In this chapter the student moves beyond truth tables to begin to understand more about how compound propositions work with one another, rather than just examining them on a truth table. The student will learn these rules best by using them. Probably the most important thing to point out is that the rules of inference are basically arguments, whereas the rules of replacement are basically equivalences. Also realize that this chapter will take more study time than some of the other chapters.

Exercise 1: Theory

a. Check to see if your head hurts.

If it doesn't, you're a whiz!

b. Read the chapter again.

Sorry, but it is necessary. You can take a bathroom break first if you want.

c. Come up with your own English examples for each of the rules.

The student should look carefully at the examples I have given in the chapter and at the symbolic form of each of the rules, and then come up with an example for each. This may take some time. It should not take more than an hour.

d. This one is for free: go drink something refreshing.

See, I do feel your pain. No pain, no gain.

Exercise 2: Imitation

Read the second chapter of Calvin's *Institutes of the Christian Religion*. Does Calvin's view of knowledge sound familiar? What do you think of it?

The completion of the reading is the requirement for this exercise. The questions are to be used for discussion. No set or "correct" answer is expected.

Exercise 3: Practice

Write each of the rules of inference and replacement in symbolic form. Also write the abbreviation for each of the rules beside the full name.

Inference:

1. Modus Ponens (MP)

$p \supset q$

p

$\therefore q$

2. Modus Tollens (MT)

$p \supset q$

$\sim q$

$\therefore \sim p$

3. Hypothetical Syllogism (HS)

$$p \supset q$$

$$q \supset r$$

$$\therefore p \supset r$$

5. Conjunction (Conj)

$$p$$

$$q$$

$$\therefore p \bullet q$$

7. Destructive Dilemma (DD)

$$(p \supset q) \bullet (r \supset s)$$

$$\sim q \vee \sim s$$

$$\therefore \sim p \vee \sim r$$

9. Absorption (Abs)

$$p \supset q$$

$$\therefore p \supset (p \bullet q)$$
Replacement:

1. Tautology (Taut)

$$p \equiv (p \bullet p)$$

$$p \equiv (p \vee p)$$

3. Double Negation (DN)

$$p \equiv \sim\sim p$$

5. Distribution (Dist)

$$[p \bullet (q \vee r)] \equiv [(p \bullet q) \vee (p \bullet r)]$$

$$[p \vee (q \bullet r)] \equiv [(p \vee q) \bullet (p \vee r)]$$

7. Contraposition (Contra)

$$(p \supset q) \equiv (\sim q \supset \sim p)$$

9. Biconditional (Bicon)

$$(p \equiv q) \equiv [(p \supset q) \bullet (q \supset p)]$$

$$(p \equiv q) \equiv [(p \bullet q) \vee (\sim p \bullet \sim q)]$$

4. Disjunctive Syllogism (DS)

$$p \vee q$$

$$\sim p$$

$$\therefore q$$

6. Constructive Dilemma (CD)

$$(p \supset q) \bullet (r \supset s)$$

$$p \vee r$$

$$\therefore q \vee s$$

8. Simplification (Simp)

$$p \bullet q$$

$$\therefore p$$

10. Addition (Add)

$$p$$

$$\therefore p \vee q$$

2. Commutation (Com)

$$(p \bullet q) \equiv (q \bullet p)$$

$$(p \vee q) \equiv (q \vee p)$$

4. Association (Assoc)

$$[p \bullet (q \bullet r)] \equiv [(p \bullet q) \bullet r]$$

$$[p \vee (q \vee r)] \equiv [(p \vee q) \vee r]$$

6. DeMorgan's Law (DM)

$$\sim(p \bullet q) \equiv (\sim p \vee \sim q)$$

$$\sim(p \vee q) \equiv (\sim p \bullet \sim q)$$

8. Implication (Imp)

$$(p \supset q) \equiv (\sim p \vee q)$$

$$(p \supset q) \equiv \sim(p \bullet \sim q)$$

10. Exportation (Exp)

$$[(p \bullet q) \supset r] \equiv [p \supset (q \supset r)]$$

Chapter 28: Analogical Reasoning: Some Directions

Objectives:

1. To highlight some of the extremes to be avoided in relation to analogical reasoning
2. To propose some directions for the study of analogical reasoning

In many ways, analogical reasoning is an area of discovery as much as it is an area of study. This chapter represents my own thoughts on this subject. I am no expert in this area, but I hope that the ideas in this chapter will get people thinking about the possibilities; perhaps someone will even get excited and pursue more careful studies in this new discipline. It is worth noticing that I have modeled my foundational principles for analogical reasoning after the laws of thought. Discuss the pros and cons of this approach.

Exercise 1: Theory

a. What are the two extreme perspectives on analogical reasoning?

On the one hand, some people treat analogical reasoning as something that can be reduced to induction or deduction or a combination of both. On the other, some emphasize the analogical process to the exclusion of induction and deduction.

b. Give at least two reasons to reject both of these extreme views.

We reject the first extreme because the connections formed by analogous reasoning are fundamentally changed when reduced to other systems. We reject the other extreme because it refuses to make use of the other kinds of reasoning to examine analogous reasoning more carefully, in order to understand it. In this way the second extreme is deliberately muddying the water, and abandoning pursuit of knowledge and understanding for a kind of suppression of it.

c. What are the three principles that I suggest for analogical reasoning?

1. Intelligible connections are creative, but once created, they have a real and continuing intellectual existence.
2. Comparison forms intelligible connections between things, which may be more than the identifiable points of connection, but is not less than these points of connection (details and original intent are important).
3. Although analogical reasoning tends to be broad and inclusive in its treatment of issues, good analogical reasoning promotes better understanding of truth, and bad or false analogical reasoning tends away from truth.

d. How does Christ's use of analogy and parable inform each of these principles?

Principle 1: Jesus set an example of using parables or analogous stories to help us understand the kingdom of heaven. These parables are part of the Scriptures, and the connections themselves remain important.

Principle 2: The intent of these parables was not less than the explanations given, but the parable does not necessarily reduce to the explanation either—or why would the parable remain, or have been used in the first place?

Principle 3: Christ's parables teach truth, and promote better understanding in the wise.

e. Explain the matrix of human thought in terms of inductive, deductive, and analogical reasoning.

God has made man so he can reason from the particular to the general (induction), from the general to the particular (deduction), and from noticeable similarities and comparisons to other, more illuminating connections and comparisons (analogical reasoning). In other words, God has made man so that he can class things according to similarity (analogical reasoning), and then draw a general conclusion from the classification (induction), and then apply the general principle to a particular situation (deduction). Or, the other way around, he can argue from a general principle to a particular instance of something (deduction) that is like something else (analogical reasoning) in such a way that classification can begin to form another general principle (induction). These three kinds of reasoning are mutually dependent.

Exercise 2: Imitation

Read Chapter Five of *Calvin's Institutes of the Christian Religion*.

The completion of the reading is the requirement for this exercise.

Exercise 3: Practice

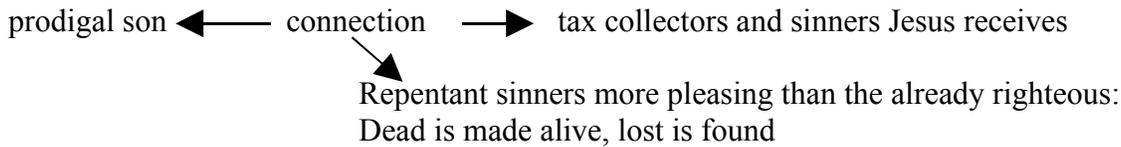
Diagram the following parables according to the source-target model. Then write a paragraph outlining all the implications of the connections you have thought of, beginning with the most obviously intended connections first. Read as much of the surrounding context as necessary to identify the target of the parable.

1. The parable of the Good Samaritan (Luke 10:25-37)

good Samaritan ← connection → who is your neighbor
 ↓
 neighbor is the one who showed mercy:
 "Go and do likewise"

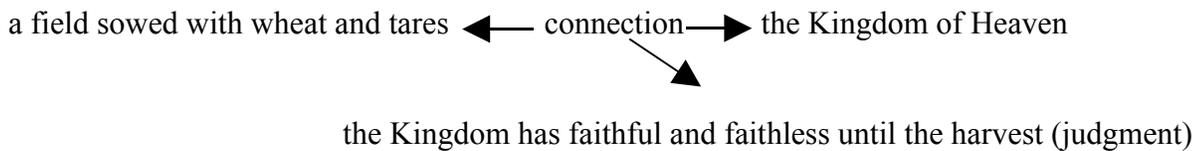
This connection is interesting in that the conclusions are hard to put into words. Christ is answering a question with this parable—the question of who is your neighbor. The parable answer refocuses the question from what the definition of a neighbor is, to how a neighbor *acts*. The lawyer who asked the question was hoping not to have to love certain people. The particular choice of a Samaritan as the neighbor was probably intended to be a convicting example to the Jews who were asking Jesus about the law. Other connections can be brought out of this parable as well. Each of the people who walked by the robbed man without helping him are examples both of what a neighbor is not, and of not keeping the command to love your neighbor as yourself.

2. The parable of the Prodigal Son (Luke 15)



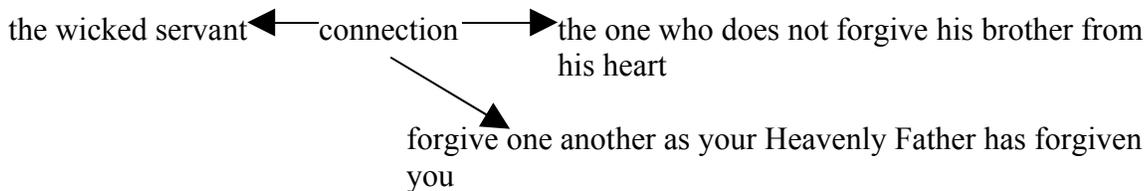
This parable comes in a series of parables about the restoration of something that was lost. Jesus is offering his explanation of why he eats with sinners and tax-collectors. The implication of this parable, of course, is that these sinners were repentant. In the parable at hand they are compared to the prodigal son. The older brother is, also by implication, the Pharisees and scribes. In this parable Christ is comparing himself to a loving father to sinners.

3. The parable of the Wheat and the Tares (Matthew 13:24-30)



In this parable Christ is showing that the Kingdom of Heaven has both true believers and unbelievers in it, until the final judgment. In the parable, the Lord is compared to the land-owner, the devil to the enemy, the fire for burning to the lake of fire, and the barn to heaven. Since the Kingdom of heaven has tares in it, we must assume it is here on earth.

4. The parable of the Wicked Servant (Matthew 18:23-35)



This parable is supposed to show those who are reluctant to forgive another what their sin in this matter amounts to. The exhortation is that God has forgiven you much; go and forgive one another. The conclusion is, if you do not, then you will do your time in the torture chamber.