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INSTRUCTOR'S MANUAL
to accompany

Understanding Arguments
An Introduction to Informal Logic

Ninth Edition

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INTRODUCTION

This Instructor's Manual for the Ninth Edition of *Understanding Arguments* has four main components. First, it contains some suggestions about how to construct a variety of syllabi for courses using the book. Second, it contains supplementary discussions of the philosophical motivations that lie behind the book's approach, some of which are necessarily technical and liable to confuse the introductory student. In this section, the manual also reports our own experience of how students are likely to react to this material—where they will find it easy, where difficult, where interesting, where boring. Third, the manual provides answers to the exercises and some of the discussion questions. Finally, the manual presents a set of classroom-tested questions for tests, with answers.

In addition to this manual, other aids for teachers that are new to this Ninth Edition are the lectures, exercises, and quizzes in the associated MOOC (Massive Open Online Course) titled "Think Again: How to Reason and Argue", which is available for free on the Coursera website and is co-taught with Ram Neta from the University of North Carolina at Chapel Hill. That MOOC (or parts of it) can be used alongside this textbook in order to free up class time for discussion, working through exercises, and related writing assignments. Although the textbook and MOOC are designed to work together, they can also be used independently. Hence, we will not discuss the MOOC further in this instructor's manual, because we realize that some teachers will use the textbook without the MOOC.

In the preparation of this manual as well as in our teaching, we have been aided by two computer programs. The first, named "Venn," was developed by James Moor and Mark Bedau. This elegant and useful program enables students to test their skills in categorical logic by using Venn diagrams to perform a variety of tasks on innumerable examples. The second program, named "Turning the Tables," was developed by James Moor and Walter Sinnott-Armstrong. It teaches students how to use truth tables to test the validity of arguments in propositional logic. Both programs may be obtained at a link to this web site:
http://www.dartmouth.edu/~phil/links/

For help in preparing this instructors' manual, we are very grateful to Gordon Steenbergen.

SYLLABI

The material in this text is written so that it can be presented in many different ways. Of course, it is possible simply to work through the chapters in the order in which they appear in the book. The course then breaks down into five large parts:

A – How to Analyze Arguments (Chapters 1-5)
B – How to Evaluate Arguments: Deductive Standards (Chapters 6-7)
C – How to Evaluate Arguments: Inductive Standards (Chapters 8-12)
D – Fallacies (Chapters 13-17)
E – Areas of Argumentation (Chapters 18-22)

Additional applications can, of course, be added from a variety of sources. We sometimes end the course with a discussion of paradoxes to show the limits of reason and argument, and we assign a paper (sometimes in two drafts) on a topic concerning one of the applications in Chapters 18-22.

Many teachers find that this book contains too much material for a single term, but it is written so that parts can be omitted without disruption. Some teachers might want to skip Part II because their departments offer formal logic in a different course. Similarly, some teachers want to skip the chapters on probability and decision-making, Chapters 11-12, because these are more formal and some students find them difficult. In addition, there is no need to cover all of the areas of argumentation in Part V. It is easy to pick one or two of these chapters and use that material as an example to show how the more abstract methods in earlier chapters applies to an important problem in detail. Thus, teachers who find that their students cannot cover all of this material and who want to focus on the less difficult and less formal topics can work through chapters 1-5, 8-10, 13-17, and maybe one chapter from 18-22. That reduces the total reading to about 260-280 pages.

It is also possible to skip some sections within chapters, including the discussion of capital punishment in Chapter 5, Bayes' theorem in Chapter 11, the section on decisions under ignorance in Chapter 12, the discussion of self-sealers in Chapter 16, and several other sections throughout the book. In this Ninth edition, we deleted several sections that many users skipped for various reasons.

The order in which chapters are covered is also flexible. We moved the material in Chapter 1 to its present position, because we found it motivating to start with an important example of an argument, but this chapter could be used, instead, right after Chapter 5, right before discussing inference to the best explanation in Chapter 9, or after Chapter 17 so as to present refutation as another use of argument alongside justification and explanation.

Some professors have found it useful to cover informal fallacies immediately after Part I on informal analysis and before Parts II-III on deduction and induction. These chapters have been written to allow a different order, such as this:

A – How to Analyze Arguments (Chapters 1-5)
B – Fallacies (Chapters 13-17)
C – How to Evaluate Arguments: Deductive Standards (Chapters 6-7)
D – How to Evaluate Arguments: Inductive Standards (Chapters 8-12)
E – Areas of Argumentation (Chapters 18-22)

This order puts informal logic up front, and keeps the more difficult chapters for later in the course. Of course, one could also skip formal logic (Part II), and one need not cover all of Part V, when using the chapters in this order.

Finally, some teachers prefer to intersperse applications into the other chapters so that their students will have a break and a chance to test their knowledge. There are many places to do this. (a) One could start the course with any of the applications in Part V (Chapters 18-22) to get students wondering about how to analyze and evaluate arguments. (b) After the discussion of evaluative language in Chapter 3 on pages 54-57, one could turn to Chapter 19 on moral reasoning as an in-depth example of evaluation. (c) After Chapter 4 on close analysis, students could use any of the applications in Part V (or just the discussion questions on pages 395-396) to practice close analysis. (d) After Chapter 5 on deep analysis, the selections on legal reasoning in Chapter 18 work well, since the final section of Chapter 5 discusses the constitutionality of capital punishment, and the arguments in the legal cases lend themselves to interesting deep analyses. Another possibility after Chapter 5 is the reconstruction of arguments for and against abortion in the introduction to Chapter 19. The articles by Warren and Marquis in Chapter 19 could also be subjected to deep analysis at this point in a course. (e) After the discussion of inference to the best explanation in Chapter 9, the selections on scientific reasoning in Chapter 20 follow naturally. Another extended example of inference to the best explanation can be found in Marquis's argument against abortion in Chapter 19. (f) After the general discussion of analogical arguments in Chapter 9, students could look at the discussions of analogical reasoning from legal precedents in Chapter 18 (pages 357-361), of analogical reasoning in ethics in Chapter 19 (pages 392-394), and of Pereboom's use of analogies in philosophical reasoning in Chapter 22. (g) After Chapter 13 or Chapter 16, the legal and moral arguments in Chapters 18 and 19 could be inserted to look for examples of slippery-slope arguments and other fallacies. (h) The Exercises of Chapter 4 on Close Analysis provide additional examples of various forms of argument that could be discussed along with the corresponding chapters.

Here is one example of a syllabus that weaves theory and application together in a way that works:

A – An Example of Argument: Religious Reasoning in Chapter 21
B – Language in Arguments: Chapters 1-3
C – An Example of Evaluative Language: Chapter 19 on Moral Reasoning
D – Close and Deep Analysis: Chapters 4-5
E – An Example for Deep Analysis: Legal Reasoning in Chapter 18
F – Deduction: Chapters 6-7
G – Examples of deductive arguments about God in Chapter 21
H – Induction: Chapter 8-10

I – Examples of inference to the best explanation in scientific reasoning in Chapter 20 and religious reasoning in Chapter 21
J – Example of analogies in legal reasoning in Chapter 18 (pages 357-361), moral reasoning in Chapter 19 (pages 392-394), and philosophical reasoning in Chapter 22 (Pereboom's four cases on pages 485-487)
J – Chance and Choice: Chapters 11-12
K – An example using probability to argue for God's existence (Craig's second reason in Chapter 21, pages 452-453)
L – Informal Fallacies: Chapters 13-17

Greater unity can be achieved by emphasizing how various aspects of argument occur within debates about a single topic. Arguments for and against the existence of God in Chapter 21, along with the numerous exercises and discussion questions on this issue, could be used throughout the course to illustrate the forms of argument discussed in Chapters 1-17. Students could then write term papers on the existence of God. Alternatively, debates about abortion can be studied as examples of rhetoric and evaluation after Chapter 3 using the discussion questions on pages 395-396, then again as an example for close analysis in Chapter 4, as an example of deep analysis using the pro-life argument on pages 385-387 after Chapter 5, as examples of inductive arguments from analogy (see pages 392-394 and Discussion Question 10 on pages 408-409), inference to the best explanation (the form of Marquis's argument on pages 409-419), and necessary and sufficient condition tests (deployed in the discussion of the status of the fetus on pages 388-390) after Chapter 10, and, of course, as an example of a slippery slope while reading Chapter 13. Finally, one could focus on legal cases in various chapters, using material from Chapter 14.

These are just a few examples of how this book can be presented to students.

SUPPLEMENTARY DISCUSSIONS

In this section of the Instructor's Manual, we outline some philosophical motivations behind this book. We also report how our students have reacted to its various parts. Our goal is to help teachers present this material more effectively.

PART I: How to Analyze Arguments

CHAPTER 1: Uses of Arguments

Like much philosophy, we begin with a definition of our topic. We build on Monty Python's definition, so we often show their skit, "The Argument Clinic," in the first class and then discuss it. This opening teaches students that philosophy can be fun and funny.

The skit and its definition also brings out some crucial points: First, arguments are made up of sentences, statements, or propositions. Although sentences, statements, and propositions differ, the differences are not important at this stage, and we do not want to go into unnecessary detail or to confuse students this early. The main lesson is simply that we cannot fully understand arguments without understanding the language out of which arguments are made.

Second, arguments also need to be understood in terms of their purposes. Here the analogy to artifacts and organs is illuminating, for we also cannot understand pianos or hearts without understanding their purposes. However, whereas pianos and hearts seem to have a single main purpose (music and pumping blood, respectively), we emphasize that arguments are presented for a variety of purposes. This point can be made clearly by contrasting examples, such as political debates versus mathematical proofs where everyone already accepts the conclusion.

We use justification and explanation as examples of two of the main purposes for which arguments are given. This dichotomy is not meant to be exhaustive, of course.

Justifications. This section introduces the distinction between changing people's minds and giving them good reasons to change their minds. Although arguments are sometimes used just as tools to bring about changes in what certain people believe, this is not the only purpose in most contexts, so students need to start wondering about what they want to accomplish when they present an argument and also about what would count as a good reason to change one's mind. In addition, this discussion contains illustrations of some ways in which the force of an argument can depend on its audience. Such personal or dialectical uses of arguments are often denigrated by philosophers, but they are widespread in everyday life, so it is important to teach students to recognize them.

Explanations. Explanations will be discussed in more detail in Chapter 9, which examines inductive inferences to the best explanation. In Chapter 1, our only goal is to impart some sense of how deductive arguments can be used to formulate explanations. Though this chapter considers explanations that take a deductive form, the discussion does *not* contain an unrestricted commitment to a deductive model of explanation. Certain explanations cannot naturally be treated as deductive in form—narrative explanations, for example—and not every sound deductive argument has explanatory force. Still, explanations *often* have the form of a deductive argument, and it is important to see that arguments are often used in this way.

Using arguments to introduce a systematic structure into a subject matter is an activity closely related to explanation, since it allows us to understand interconnections among basic concepts. This is another case where an argument is not used to establish its conclusion, because its conclusion is accepted already. We sometimes discuss this additional use of arguments during a lecture.

Combinations. This section makes a simple point: arguments are rarely simple. Students sometimes find these examples confusing, so we tell them that they are not expected to understand them yet. The goal of the course is to teach them how to do something that they cannot do at the start.

This first chapter does not try to develop a complete theory of justification or explanation. It only illustrates how much arguments vary. A point worth emphasizing here is that it is sometimes but not always okay to use premises that one's audience rejects, and what determines when it is okay is the purpose of the argument. This point shows students that the standards for determining which arguments are good can sometimes depend on the purpose for which the argument is given. This little bit of pragmatism is useful in a course on informal logic.

Since many contemporary theorists claim that reason and argument have little or no real effect on belief and action, it is also useful to show students how much importance some arguments have, so that they will be motivated to continue in the course. There is no better example for this purpose than Colin Powell's argument to the United Nations that played a significant role in getting the United States into the Iraq War (excerpted in the discussion question on pages 13-15). This example is both complicated and controversial. Because it is complicated, it gives students a sense of the complexity of real arguments right from the start in order to motivate them to learn how to break arguments down into parts. Because it is controversial, some students get too wrapped up in their own political positions to analyze arguments about such an emotional topic. We use this tendency to teach a lesson about how hard and yet how important it is to learn how to analyze arguments impartially.

CHAPTER 2: The Web of Language

The underlying assumption of this chapter is that presenting an argument is a *linguistic activity* that is best understood against the background of a theory of how language functions *in general.* The basic theoretical ideas in this chapter come from

two main sources: the theory of *speech acts* developed by J. L. Austin and the account of *conversational implication* developed by H. P. Grice. The chapter dwells on three main themes: the *conventionality* of language, the *diversity* of uses of language, and the ways in which meaning can be conveyed *indirectly.*

Conventionality. Since it is almost a platitude that words get their meanings through conventions and these conventions can vary, it is not difficult to convince students that language is conventional. It is more difficult to convince them (or show them) that conventionality does not have immediate relativistic or skeptical consequences. Some students are fond of saying that *everything is a matter of definition*, a facile claim that can make the serious and detailed analysis of argument seem unnecessary. One obvious point made in this chapter is that *truth* is typically *not* a matter of definition.

A deeper point is that linguistic conventions actually bring meanings into existence. They are, as some philosophers have said, *constitutive* of meaning. Here, following Austin's distinctions between locutionary acts, illocutionary acts, and perlocutionary acts, we speak of linguistic acts, speech acts, and conversational acts. A good way to explain the differences between these levels of language is to examine how pieces in a game (say checkers or chess) gain their significance *as* pieces in a game. There are the rules that specify what moves are legal (like linguistic rules). Second, there is the making of a move in an actual game (like the speech act). Finally, there is the purpose of making the move (like the conversational act).

Diversity. The second main point in this chapter is that the uses of language—in particular, the different types of speech acts—are varied and diverse. In particular, we do more things with language than communicate information and feelings. To reinforce this claim, the text contains a discussion of J. L. Austin's notion of performative utterances. This is useful for two purposes: (i) performatives themselves provide clear instances of a use of language that is not just a matter of communicating information or emotion, and (ii) performative utterances themselves, in particular, those that Austin called *explicit performatives,* contain verbs (like "promise," "warn," "appoint," "renounce," and so on) that indicate different kinds of speech acts.

The *thereby test* is introduced as a method for picking out explicit performatives. In our experience, you have to be very careful and insistent in explaining why quotations marks appear on the left-hand side of the formula but do not appear on its right-hand side. Instead of writing, for example:

In saying "I promise," I thereby promise.

students sometimes garble things in the following way:

In saying "I promise," I thereby "promise."

In fact, students show no end of ingenuity in putting quotation marks in the wrong place. You might tell them that they get only two quotation marks, then explain why:

The thereby test takes us from words (inside the quotation marks) to the world (outside the quotation marks).

Conversational Acts. The discussion of conversational acts is intended to emphasize the point that language is often used to bring about effects. To do this efficiently, a speaker engaged in transmitting information is expected to believe that the things he says are true and have good reason for thinking this; he needs to give the right amount and the relevant kind of information; and he must be brief, orderly, etc. It often helps to illustrate Grice's rules by drawing an analogy with some other practical activity, such as making a cake or writing a paper. An analogy of this kind can make Grice's conversational rules seem more natural to students.

Conversational Implication. The third theme in this chapter is that, in everyday communication (both in speaking and writing), we leave a great deal unexpressed. Recognizing this is important for the analysis of actual arguments, because they are rarely spelled out in full detail and typically rely on unexpressed (or suppressed) premises. To provide the student with a systematic way of understanding the difference between what is actually stated and what is implied, the chapter contains a brief exposition of H. P. Grice's theory of *conversational implication.*

Students usually have little difficulty in grasping the notion of a conversational implication, largely because it is easy to produce examples that relate to their own lives. Occasionally, some students will confuse a mere paraphrase with a conversational implication. Thus, when asked for something that is conversationally implied by:

> No one has spoken with Harold all evening.

they might put down:

> Harold has not been engaged in conversation.

instead of something like:

> People don't seem to like Harold.

To avoid this confusion, we often use Grice's test of cancellation and ask whether the original sentence can still be true when what is supposed to be conversationally implied is not true. For example, it does make sense to say:

> No one has spoken with Harold all evening, but I am not suggesting that no one likes him.

The possibility of cancellation marks the relationship as one of conversational implication. In contrast, it would be inconsistent to say:

> No one has spoken with Harold all evening, but I am not suggesting that he has not been engaged in conversation.

Another method is to require students to cite the specific conversational rule that generates the conversational implication.

Some students get frustrated with the imprecision of the rules in this chapter. It is often hard to say exactly which speech act is being performed, what are "the current purposes of the exchange," or what is "relevant." We have found it useful to emphasize that many such problems are the fault of speakers who are not clear about what they are saying or doing. One should not expect perfectly precise rules in this area.

Once imprecision has been accepted, it is easy to have fun with this material. Weird and amusing cases can be used to illustrate speech-act rules and conversational rules. We sometimes give a whole lecture on jokes that rely on conversational implications. Legal cases (such as homosexual marriage and contracts in the Discussion Questions on page 28) also show that these concepts have practical importance. These examples can be used to make students look forward to the rest of the course.

Rhetorical Devices. One of the main aims of this text is to provide students with methods for analyzing and evaluating arguments encountered in daily life, for example, in editorials, talk shows, campaign speeches, and dormitory bull-sessions. Only rarely do such arguments consist of a series of literal factual premises presented in support of a literal factual conclusion. Departures from such austerely stated arguments take place in two ways. The language is often figurative rather than literal; it is often evaluative rather than merely factual or descriptive.

When we employ various rhetorical devices, language is used figuratively rather than simply literally. Employing ideas developed by Paul Grice, this section presents an account of the way some standard rhetorical devices function. It might seem that figurative language, just in being figurative, cannot be treated in a systematic way. There are, in fact, many subtle and difficult cases, for example, rich, many-faceted metaphors and rhetorical devices embedded in other rhetorical devices. Even so, the Gricean machinery introduced in this chapter can give students a broad understanding of how rhetorical language functions and, thereby, provide a basis for deciding whether these devices are being used correctly or incorrectly, fairly or unfairly, in real arguments that they encounter in their lives.

CHAPTER 3: The Language of Argument

This chapter introduces the most fundamental terms for the construction and identification of arguments. It begins with the notion of an argument marker—the basic device for giving certain statements the status of premises and other statements the status of conclusion. We tell our students that identifying premises and conclusions is the first and most fundamental move in the analysis of an argument.

Standard Form. The next step is to put arguments in standard form. Students usually find this easy. The only common mistake that we have encountered is to put the premises and conclusion in the wrong order either because students sometimes

reproduce the order of the sentences in the text being interpreted or because they think the argument would be better if the conclusion were treated as a premise (and sometimes they are right about this).

The Regress Problem. As soon as an argument is put in standard form, a serious problem becomes evident. If you are allowed to use any premises you want, then you can prove anything—no matter how nonsensical or absurd. We give examples in class to drive this home. The only solution is to require premises to be justified. However, this creates a regress: We need arguments to support arguments to support arguments to support arguments to support arguments, and so on forever. This skeptical regress has played a large role in epistemology, so sometimes we discuss that philosophical heritage. However, the main point here is to show why non-philosophers need special tools to help them use arguments effectively.

Assuring, Guarding, and Discounting. The second part of Chapter 3 considers some of the ways in which arguments are strengthened in everyday language. We have seen that argument markers introduce the fundamental argumentative form by designating premises and conclusions. The remaining argumentative devices are intended to protect arguments against possible criticisms. These include the devices of assuring, guarding, and discounting. Students often have trouble with the notion of *discounting* something and confuse it with the idea of *denying* something. It is important to remind them that in discounting, one often *acknowledges the truth* of something, but then indicates that this truth is overridden by other considerations. Here is an example illustrating the difference:

Discounting: Although every precaution was taken, a chance of an accident remained.
Denying: Officials were wrong in saying that every precaution had been taken.

In the first example it is acknowledged that every precaution was taken, whereas in the second it is denied.

It is worth emphasizing that each of these devices can be used either legitimately or illegitimately. Students like to discuss standards for criticizing these devices in questionable cases.

Evaluative Language. This section contains a brief and unavoidably controversial examination of evaluative language. It is unavoidably controversial because no consensus has emerged concerning the proper way to analyze evaluative language. The view presented here is clearly incompatible with a simple emotivist or subjectivist account of the meaning of evaluative terms. However the story is told in detail, we hold that evaluative judgments, unlike mere expressions of personal feeling, lay claim to a measure of objectivity. For this reason, arguments can be presented both for and against them.

Certain evaluative terms (“good”, “bad”) are easily identified. Often, however, a word has both a factual and evaluative component. The word “murder” is a good

example since it does not simply mean a killing, but a wrongful (or perhaps, illegal) killing. This is important for students to recognize, because in a debate (for example, a debate concerning the morality of abortion), calling an abortion murder already prejudges the point at issue, the wrongness of such a killing. It is therefore useful to have students rewrite sentences both neutralizing and reversing evaluative and expressive force.

The biggest problem that we have faced in teaching evaluative language is that some students confuse the question of whether the words themselves are evaluative with the question of whether the speaker is using those words in a particular context to support an evaluative conclusion. For example, if someone says, "The sunset was extraordinary," then the speaker probably thought (and conversationally implied) that the sunset was beautiful and, in that way, good. However, all he said explicitly was that it was out of the ordinary. That is all that "extraordinary" means literally. The word "extraordinary" by itself is not evaluative, because a hurricane can also be extraordinary, and then it is bad to be extraordinary. The only way to teach students this distinction between evaluative words and evaluative uses of words is to work through examples and ask them whether the same word can be used with a contrary evaluative valence.

CHAPTER 4: The Art of Close Analysis

This chapter attempts to instruct through example rather than precept. It is largely dedicated to the close analysis of a single speech before the United States House of Representatives. As explained in the text, the speech was selected because the subject matter is not particularly controversial. A more important reason for selecting this speech is that the argument presented in it is, in fact, very complex, subtle, and strong—especially when judged in comparison with most other speeches made in Congress. The best way to teach students how to argue well is with examples of good arguments rather than examples of bad arguments so that they will have models to follow when they try to construct their own arguments.

Our experience is that most students have a pretty good ability to analyze arguments provided that they are reminded to stay in close contact with the text and cautioned not to wander off into airy abstractions. To achieve this end, the detailed labeling of the argumentative devices in an argument is absolutely essential. A student will learn more from a detailed analysis of a short argument than from a general and abstract critique of a longer argument. The art of close analysis is connected with the art of close reading. Both require practice. For that reason we have extensive exercises in this chapter, although instructors could add their own favorite examples, ask students to bring their favorite arguments (from the internet), or to use examples from Part V of this textbook.

Since so many terms contain evaluative force, labeling all of them can become a chore and can actually cover up more important argumentative labels. Here you might suggest that only the more important and literally evaluative terms—those that play a central part in the argument—need be labeled. We have also tried telling

students that they should label three clear instances of each category within a given passage. That reduces over-labeling.

CHAPTER 5: Deep Analysis

This chapter teaches students how to go beyond the explicit words of an argument to reveal its underlying structure. The goal is to reveal enough structure to allow the argument to be evaluated fairly. The overall method is called *reconstruction*. Its ultimate goal is to discover the deep underlying principles that often divide people on fundamental issues such as the constitutionality of the death penalty, which is examined in detail at the end of the chapter.

Although not all arguments are deductive, it is much simpler to teach reconstruction by focusing on deductive arguments. That is why we do so. For this reason, this chapter offers an *informal* exposition of *validity* and *soundness.* Only later, in Chapters 6-7, is the notion of validity developed more rigorously. Luckily, students usually have little difficulty understanding validity prior to any formal apparatus. At least most of them can figure out validity well enough to determine when a suppressed premise is needed. That is what matters in this chapter.

Some students have trouble with reconstruction because they simply list every premise in the text and then add the conclusion. It is important to emphasize that a reconstruction is supposed to be illuminating. It is supposed to show how the various claims fit together in a coherent structure. It is supposed to bring out what the arguer assumes without stating explicitly. A mere list does not show this. Similarly, you can always make an argument valid by adding this premise: "If the premises are true, then the conclusion is true." However, this is not a good candidate for a suppressed premise if it does not show how the conclusion is related to the premises.

The murder mysteries in Exercise XIII on pages 108-110 reveal a different kind of reconstruction. Here, instead of reconstructing someone else's argument, students are asked to reconstruct (or construct) their own arguments. We sometimes contrast yet another kind of reconstruction in the discussion of the pro-life argument against abortion in the introduction to Chapter 19 (pages 385-387). The goal of this third kind of reconstruction is not to capture any actual bit of text but rather to produce the best chain of reasoning that an idealized opponent would go through. After comparing these examples, we can discuss the differences between these uses of deep analysis in order to help students understand what they are doing when they reconstruct arguments.

PART II —
HOW TO EVALUATE ARGUMENTS:
DEDUCTIVE STANDARDS

Teachers of logic often find that students fall into two classes: those who grasp the material at once and tend to get bored with the slow pace of the course, and those who find the subject matter baffling. Since there are relatively few students in between, grade curves tend to be bimodal. Part of the reason is that some students are better at abstract reasoning than others.

Granting this, it also seems that some students are "turned off" by formal logic because they don't see what value it is supposed to have. It is sometimes suggested that studying formal logic will help one to think better—though it is far from clear why it should. It is also suggested that the elementary techniques of formal logic will have direct and nontrivial applications to arguments as they occur in everyday life. In general, this is not true. To avoid false expectations, it is important to make two things clear from the start: (1) Formal logic is concerned with only one aspect of arguments—validity. (2) The formal techniques that can be developed in introductory courses are not adequate to test the validity of many arguments that occur in daily life.

Validity is a necessary condition for a good deductive argument, but a good deductive argument needs to pass other tests as well. Here again it is important to remind students of the difference between validity and soundness (discussed in Chapter 5) and to point out that formal logic will not, in general, allow us to declare an argument sound as well as valid. Beyond this, an argument may be sound as well as valid and still be of no particular use. For example, "2 + 2 = 4, so 2 + 2 = 4." This argument is both valid and sound, but it is hard to see what purpose it could serve. One way to explain the situation is to say that calling an argument valid is not high praise.

There are two reasons why the formal logic presented in most introductory logic courses does not have immediate application to arguments as they arise in daily life. First, there is no complete characterization of validity for all arguments that arise in natural language. Indeed, there are many quite simple arguments whose validity has not been analyzed in a generally accepted way. Second, even where adequate techniques do exist for the evaluation of some class of arguments, it usually takes a great deal of sophistication to transform statements of everyday language into the required canonical form.

It is important, then, not to raise false expectations about the immediate practical value of formal logic. It is, however, equally important to stress the theoretical or systematic importance of the study of formal logic. Validity is the central concept in logic, but so far in the text it has been treated as an intuitive or commonsense notion. Thus, in Chapter 5, students were expected just to be able to *see* whether or not a conclusion followed validly from a set of premises. The study of formal logic is intended to make articulate the logical notions implicit in such exercises.

CHAPTER 6: Propositional Logic

Chapter 6 contains an elementary presentation of the Propositional Logic. The system is developed completely on the basis of truth-table definitions. Although truth tables do provide an effective procedure for deciding upon the validity or invalidity of arguments that turn upon truth-functional connectives, they are not used primarily for this reason. Truth-table definitions are employed because they supply the proper semantics for understanding truth-functional connectives. Less technically, they give an insight into the meaning of such terms as "and," "or," and "not."

Conjunction. The strategy in this chapter is to develop all the leading ideas with respect to *conjunction* and then to extend the procedures progressively to other connectives. It is important from the very start for the student to understand the distinction between a statement and a statement form. This is the basis for the later distinction between an argument and an argument form that, in turn, is used to define validity. Exercises I-III offer practice in employing these notions. Exercise IV then raises issues concerning translation from English into propositional conjunction.

The section on conjunction closes by introducing the notion of an argument form and using it to lay down the basic principle that an argument is valid if it is a substitution instance of a valid argument form. Exercise V gives examples of arguments involving only conjunction that provide more practice with translation. These examples are boring but useful for some students encountering formal logic for the first time. Exercise VI then tests students' understanding of relations between the validity of arguments and the validity of argument forms.

Disjunction and Negation. Using the discussion of conjunction as a model, *disjunction* and *negation* are truth-functionally defined. Now that we have three logical notions, it is possible to construct more complex and more interesting truth-functionally compound statements. Exercises VII-VIII teach students to draw scope distinctions in informal ways. Exercise IX provides practice in translating English disjunction and negation into propositional logic. Exercises X and XI ask students to talk about validity in non-technical terms. Exercise XII then drives home the point that the truth value of a truth-functionally compound statement can be derived mechanically from the truth values of the basic propositions it contains.

Testing for Validity. It is important to insist that students use *precisely* the form for truth-tables described in this section. First, it is easy for the student to make mistakes when the format is varied. Second, variations in format make correcting student papers almost impossible. Exercises XIII-XV give examples to practice using the technique. Many more examples can be found by using the computer program "Turning the Tables" by James Moor and Walter Sinnott-Armstrong, which is available for free at: http://www.dartmouth.edu/~phil/links/

Some Further Connectives. Students often confuse inclusive and exclusive disjunction. These connectives are distinguished in the next section, and then

Exercises XVI-XVII test whether students understand the difference. Exercises XVIIII-XIX then test students' understanding of truth-functional equivalence.

Conditionals cause more trouble than any other connective, so we go into more detail in our discussion of conditionals. Exercises XX-XII concern the classic argument-forms called *modus tollens* and *affirming the consequent*, which mislead many people in everyday life. We sometimes discuss the Wason Selection task that psychologists use to investigate why people get so confused by these forms of argument. Exercise XXIV includes plenty of arguments with conditionals to test for validity using the standard truth table technique. These examples have been ordered to help students see which changes in premises or conclusion affect the validity of arguments involving conditionals. Conditionals also provide an interesting and important example of translating English into propositional logic. Exercises XXVII-XXVIII provide practice in translating English conditionals (including "unless" and biconditionals) into propositional logic.

CHAPTER 7: Categorical Logic

This chapter contains a rudimentary exposition of the theory of deductive arguments involving categorical propositions, including immediate inferences and categorical syllogisms. The main aim of the chapter, like that of the previous chapter, is to provide insight into the notion of validity by examining it in an area where it has been given a clear formal development. For these purposes, the use of Venn diagrams is most appropriate.

The standard theory of figures and moods is not mentioned, since the techniques that use these notions, however efficient their application, seem artificial and external to the subject matter. We also do not include the classical approach to categorical logic, because our students have found it more confusing than illuminating. Those who want to add the classical approach can give their students the Appendix to this chapter from the Eighth Edition.

Categorical Propositions. After some introductory remarks, the chapter turns to the four basic propositions and the Venn diagrams associated with them. The only tricky part here is how to translate English sentences into standard categorical form. Exercise I asks students to extract information from Venn diagrams and rephrase it in categorical form, then Exercise II tests skills at translating from English into standard categorical form.

After individual categorical propositions, the text turns to relations between two categorical propositions. The first relation discussed is that of contradictories. Exercise III concerns this relation. The next relation is between universal and particular propositions—so-called existential commitment. Exercise IV concerns that relation.

Validity for Arguments Containing Categorical Propositions. This discussion is straightforward and not altogether entertaining. It is, we think,

important to check out the validity of these inferences in detail. It is also important for the student to do a good number of the exercises. Careful drill in the use of the four basic propositions and the Venn diagrams associated with them, with a gradual rise in the level of complexity, will produce both the understanding and the ease of handling that are needed for correctly analyzing more-difficult syllogisms.

Immediate Inferences come in many forms, but the text discusses only conversion. This allows professors to avoid getting tangled up in complementary classes, which confuse many students. Exercise V contains examples of simple immediate inferences.

The Theory of the Syllogism. This section presents a straightforward treatment of the syllogism from a modern (or Boolean) perspective. Given suitable practice using Venn diagrams, the extension of this technique to syllogisms should not be difficult. Exercise VII provides numerous examples for practice. Exercise VIII is worth asking in class. Mystery 2: Trivia and Significa on pages 109-110 provides a fun example of a sorites or chain of syllogisms to test for validity. Many more examples can be found by using the computer program "Venn" by James Moor and Mark Bedau, which is available for free at: http://www.dartmouth.edu/~phil/links/

The last section and the discussion questions remind students of the limits of categorical logic and of the chief difference between propositional logic and syllogistic theory, which is that the former concerns logical concepts that hold *between* propositions whereas the latter concerns logical structures *within* propositions. Here it might be useful to provide a series of specimen prose arguments (which can be taken from earlier exercises) and then ask the students whether propositional logic or syllogistic theory apply to them.

We often end our discussion of deductive arguments asking students in class to translate an obviously strong argument into propositional or categorical form and then test it for validity. When they see that it fails formal tests for validity, we ask them whether it is still a good argument. This discussion shows students why we need to go on to discuss inductive arguments.

PART III —
HOW TO EVALUATE ARGUMENTS:
INDUCTIVE STANDARDS

CHAPTER 8: Arguments to and from Generalizations

Many students come to a logic class having been told that the difference between a deductive argument and an inductive argument is that the former proceeds from the general to the particular, whereas the latter proceeds from the particular to the general. This misunderstanding must be undercut quickly and decisively.

The real difference lies in the claimed relationship between the premises and conclusion in each sort of argument: In a deductive argument, the truth of the premises is supposed to *necessitate* the truth of the conclusion, whereas in an inductive argument, true premises are supposed to give *strong support* for the conclusion. It is worth noting that the distinction does not depend on which relation does in fact hold. The premises do not necessitate the conclusion in a deductive argument that is invalid. Instead, the distinction depends on which relation is claimed by the arguer to hold. That makes it hard to classify arguments as inductive or deductive when the arguer's claims or intentions are unclear. In tricky cases, we tell students to look carefully at the argument's words and form, then classify the argument as deductive if it is valid or has a form that might be mistaken to be valid. If the person who gave the argument is in front of you, and if the argument is invalid, then you can point out that it is invalid and see whether this bothers the arguer. If not, the argument was meant to be inductive.

Another way to make this point is to say that there are two kinds of relations between premises and conclusions and, hence, two standards for judging whether the relation of premises to conclusion in a given argument is adequate. The deductive standard is validity, and the inductive standard is strength. Which standard is the appropriate one to apply depends on which standard the arguer was trying to meet. That is why it is useful to classify arguments by the arguer's intentions.

A deeper understanding of deductive and inductive standards comes from recognizing further differences. First, deductive validity does not come in degrees, but inductive arguments can be more or less strong. More importantly, deductive validity is indefeasible or monotonic, whereas the inductive strength is defeasible or nonmonotonic. This means that the introduction of further premises can never make a valid argument invalid, but adding true premises can weaken a hitherto strong inductive argument. Indeed, the discovery of some new fact can completely undercut an inductive argument. Nonetheless, it is crucial to emphasize that defeasibility does not make inductive arguments any less useful or, in the ideal case, less convincing than deductively valid arguments.

Inductive arguments come in various forms that can be studied in various orders. We start with **statistical generalization**. With a statistical generalization, we cite characteristics of a sample of a population to support a claim about the character of the population as a whole. This is the classic form of inductive argument that runs

from the particular to the general. A rigorous examination of these inferences falls into the province of statistical theory, but in this discussion no effort is made to introduce formal statistical procedures. Instead, the discussion concentrates on some common sources of bias in sampling. These include: (1) samples that are too small, (2) samples that are gathered in ways that skew results, and (3) prejudices, stereotypes, and slanted questions that lead people to misinterpret samples. If students become aware of these common errors and learn to avoid them, a lot will have been accomplished without technical mathematics.

With **statistical applications** (also known as statistical syllogisms), we reason in the reverse direction from statistical generalizations: From information concerning the population, we draw a conclusion concerning a member or subset of that population. This common form of reasoning provides a clear example of inductive reasoning moving down from the more general to the less general. Statistical syllogisms, though commonly employed, present a serious problem that admits of no simple solution: What determines which populations are relevant in a particular context? This is an important question, because very different conclusions can arise with changes in the population that we select.

CHAPTER 9: Inferences To the Best Explanation and From Analogy

Inferences to the best explanation occur constantly in everyday life. Inferences to the best explanation are also easy to grasp without any technical apparatus, and they vividly illustrate the differences between inductive arguments and deductive arguments. There is a gold mine of examples of this kind of inference in the form of puzzles of the following sort: You are presented with a curious fact, and then, through a series of questions, you are supposed to give a sensible explanation of it. For example, a person, when alone, invariably rides the elevator to the tenth floor and then walks up the remaining two flights to his apartment on the twelfth floor. He never does this when someone else is on the elevator. Why? The answer is that he is too short to reach any higher than the button for the tenth floor. Your students will probably have a large repertoire of such puzzles. Exploit them. Another source of examples is Sherlock Holmes stories and movies (which could be shown in class).

Arguments from analogy are also extremely common in everyday life, as well as in law and morality. It surprises some people that scientists also use arguments from analogy, so we mention several examples in science. Most, if not all, such arguments from analogy can be seen as a kind of inference to the best explanation, where the explanation is less explicit. By listing numerous cases and respects in an analogy, arguments from analogy avoid specifying any precise principle to explain the phenomenon under consideration. Still, the criteria for judging arguments from analogy are related to those for inferences to the best explanation, and many actual arguments (such as those in the Discussion Questions on pages 210-213) could be classified and analyzed in either way. Our discussion of arguments from analogy provides important background material for our treatments of both legal and moral reasoning in Chapters 18-19 of Part V.

CHAPTER 10: Causal Reasoning

Whereas surveys can support predictions about how many people vote for a candidate, they do not show what causes those people to vote for that candidate. Yet it is crucial in many cases to determine what causes what.

Causal reasoning is difficult to discuss in a non-controversial way, since there is still much disagreement about the correct account of causal relations and causal inferences. Because of this disagreement, we do not attempt to define causal relations or give a full account of causal inferences. Instead, we have been content to give examples of causal reasoning and then note certain characteristics of such reasoning.

The basic idea is that causal generalizations are based on correlations found between sets of events. Instead of using some variation of Mill's Methods, as is standard in most introductory logic texts, we have decided to carry out the entire discussion in terms of the underlying notions of **necessary conditions** and **sufficient conditions**. The fundamental idea is that the Sufficient Condition Test (SCT) and the Necessary Condition Test (NCT) are used to eliminate candidates from a list of potential causes. The function is, thus, negative. As we argue in the text, a further positive claim that something is a cause or a causal factor can only be made against the background of further theoretical commitments.

Since applying both the NCT and SCT depends upon finding cases where certain types of events are present and where certain other types of events are absent, these tests cannot be applied to types of events that are always present to some degree. To deal with cases like this kind, we follow Mill by introducing the test of **concomitant variation.** After finding a correlation, say, between phenomena of type A and phenomena of type B, four possibilities present themselves:

Type A events cause type B events.
Type B events cause type A events.
Some third sort of event C causes them both.
The correlation is not causal but accidental.

Exercise VI on pages 237-238 and the Discussion Questions on page 238 raise issues concerning the direction (if any) of a causal relation. These issues often generate lively discussions. Here is another example that students might find challenging: It turns out that 90% of those elected to Congress have raised more campaign funds than their opponents. See if your students can find causal explanations of the first three kinds listed above.

Although it is sometimes clear that one of two correlated factors causes the other, we often need to test our hypotheses experimentally. Then manipulation is the gold standard. To illustrate manipulation as a method for testing causal hypotheses, we often ask students to design an experiment to determine whether a restaurant's popularity causes its low prices or vice-versa, whether a golfer's caddy causes her low scores or vice-versa, and so on. Students from science are good at this.

CHAPTER 11: Chances

This chapter presents a very elementary discussion of probability theory. Its point is to alert students to some pervasive mistakes that people fall into when making choices involving probabilities. The discussion of **fallacies** and **heuristics** that opens the chapter shows how common mistakes in probability are when people are not careful. This motivates students to learn the technical rules that follow. In addition, teaching students how to detect and avoid the **gambler's fallacy** may be one of the nicest things you can do for them.

The following presentation of rules of probability is mathematical, which causes trouble for some students. Still, it is useful for them to learn a little about probability. We also emphasize the theoretical point that the claimed relation between the premises and conclusion in an inductive argument can be understood in terms of probability, much as the claimed relation between premises and conclusion in a deductive argument can be understood in terms of formal logic.

This chapter ends with an advanced section on **Bayes's theorem**. This discussion is more difficult than other parts of the chapter, and it can easily be skipped. This topic was added because of its importance and interest, and also because some users told us that they would like to have the option of going into more depth in this area.

CHAPTER 12: Choices

One of the most important applications of probability is in deciding what to do. To avoid mistakes in decision-making, it is useful to understand the probability of an outcome, but that is not enough. Various values are at stake, so students also need to understand (1) the **expected monetary value** of an outcome and (2) the **expected overall value** of an outcome. In this chapter, the notion of expected monetary value is developed in a fairly rigorous way using standard rules. In contrast, the overall value of an outcome usually involves a rough-and-ready adjustment of the expected value to the particular needs, preferences, and circumstances of a person in a particular context.

In many cases, we have no knowledge of the probabilities of outcomes. Often we cannot even reasonably guess a range of probabilities. Then how can we decide? This is the topic of **decisions under ignorance**. Many rules have been proposed, but no consensus has emerged. Moreover, these rules are complex, so discussions can become difficult. Nonetheless, they are important, both because they affect everyday life and also because they are used in political theories, such as that of Rawls (which we sometimes discuss in class). These controversial rules can be skipped if necessary, but, if they are skipped, it is important to make sure that students recognize the limits of expected utility calculations as a method for making decisions.

PART IV: FALLACIES

Instead of giving a long list of fallacies, this part focuses on four important families of fallacies: fallacies of vagueness, of ambiguity, of relevance, and of vacuity. We have found that, once students understand a few examples in each family, they are able to spot other kinds of examples within the larger family. The method of "That's just like arguing..." in Chapter 17 can also be used to test for additional kinds of fallacies.

CHAPTER 13: Fallacies of Vagueness

Vagueness is the most common and in many ways the most dangerous form of unclarity. It is important to get students to see that vagueness typically causes trouble in borderline cases and that a term that is vague in some contexts might be perfectly serviceable in others.

Vagueness is the source of two kinds of fallacies: **arguments from the heap** and **slippery-slope arguments**. Though arguments from the heap probably cause no confusions in daily life, they are interesting because it is not entirely clear how they should be dealt with. In contrast, slippery-slope arguments—in their various forms—are a constant source of difficulties. Since a variety of fallacies have been called slippery-slope arguments, we have attempted to introduce some order into the discussion by distinguishing three kinds of slippery-slope arguments: conceptual, causal, and fairness.

CHAPTER 14: Fallacies of Ambiguity

In this text we do not call an expression **ambiguous** simply because it has more than one meaning. An expression is said to be ambiguous if, in a given context, it is unclear which of a number of possible meanings the expression is intended to convey. The notion of ambiguity will serve no useful purpose for the evaluation of arguments if every multiple meaning word is labeled an ambiguity. However, if an argument depends on ambiguity in an illegitimate way, then it does commit a fallacy of **equivocation**.

Definitions can be useful in responding to fallacies of vagueness and ambiguity. However, we emphasize that definitions should not be overdone. Moreover, when you give or are given a definition, it is important to determine which kind of definition is at stake. We disitinguish five kinds: dictionary definitions, disambiguating definitions, stipulative definitions, precising definitions, and theoretical definitions.

CHAPTER 15: Fallacies of Relevance

This chapter discusses a third family of fallacies. **Fallacies of Relevance**, which are committed when the premises are not relevant, or adequately related to, the

conclusion. This group is large and diverse, but many of them do share a certain form, as we show in the text.

Arguments Ad Hominem. In this section we outline three types of Arguments ad hominem. *Deniers* seek to reject some claim or argument on the basis of the arguer's personal attributes. *Silencers* attempt to strip a speaker of the right to make his argument because of his or her position. *Dismissers* claim that the speaker is unreliable or untrustworthy. These arguments may themselves be either good or bad, fallacious or not. An ad hominem fallacy occurs when such an attack is not adequately justified. Though closely related, it is important to distinguish among these types of arguments. The best way to do this is to have students identify what, precisely, the arguments are trying to do, whether it is to directly disprove a claim or do so by calling the speaker's right to speak or general motives and trustworthiness into question. This will help students discover whether the arguments are fallacious.

Appeals to Authority. Unless warned against it, students have a strong tendency to see every appeal to authority as a fallacy. One way to avoid this is to ask them to state explicitly which of the questions on page 317 they are answering in the negative. It is worth dwelling on the significance of the second question, "Is this the kind of question that can be settled by an appeal to expert opinion?", for in citing experts to support their own side of an issue, students often fail to take into consideration other experts who hold competing positions.

CHAPTER 16: Fallacies of Vacuity

A final family of fallacies includes **Fallacies of Vacuity.** Under this heading we have discussed **circular reasoning** and **begging the question**. Since these notions are used in a variety of ways, we have fixed their meanings somewhat arbitrarily. We have defined an argument as *circular* if the conclusion, or some statement synonymous with the conclusion, is used as a premise. We treat *begging the question* as a more pragmatic notion. An argument begs the question if it contains a premise that in the given context presupposes or depends upon the point at issue, so it needs an independent justification. This is a rather loose definition, but begging the question seems to be a loose notion itself.

In our lectures we place a great deal of emphasis on the notion of a **self-sealing** position, since the idea is new to many students and has a wide range of important applications. One example that interests students, and so is a good subject for class discussion, is psychological egoism. We sometimes hold or stage a debate and ask students to comment. Here is also a good place to introduce discussions of ESP, telepathy, holocaust deniers, and miracles. Materials on these topics are easy to find on the internet, and students like to discuss them.

CHAPTER 17: Refutation

A refutation is an argument that provides a reason for rejecting some argument or assertion. It is important to remind students that refuting an argument does not

require one to prove the opposite conclusion. It is sufficient to show either that a premise is false or that the relation between its premises and conclusion is inadequate.

The simplest way of refuting an argument is to show that at least one of its premises (or perhaps its conclusion) is false. We discuss two ways of doing this. Where a premise makes a universal claim, it can often be refuted by finding a *counterexample.* Another way of refuting a claim is to show that assuming it to be true leads one into an absurdity. These are called "reductio ad absurdum arguments." It is worth pointing out that when a *reductio* leads to an explicit contradiction, we have an argument equivalent in force to an *indirect proof* in mathematics. In contrast, if the *reductio* simply leads to something strange or unexpected, one must choose whether to accept the conclusion, strange as it is, or to go back and reject at least one premise that lead to it.

The section on **refutation by parallel reasoning** shows how the invalidity of one argument can be shown by presenting a second, parallel argument where the premises are true and the conclusion is false. Here the second argument is not used to establish its conclusion, for the conclusion is supposed to be false. Instead, the second argument is used to show that the conclusion does not follow in either argument. Students often find this difficult to do. The best strategy is to level with them and acknowledge that the procedure is sometimes difficult, but rewarding when successful. This method could be called "refutation by analogy" in order to bring out its relation to arguments from analogies in Chapter 9. Or it could be called the method of "That's just like arguing…."

It is worth contrasting refutation with justification and explanation in Chapter 1. When someone cites one argument in order to refute another argument by the method of parallel reasoning, the first argument need not be used to justify the denial of the conclusion of the refuted argument or to explain why the argument fails. This comparison brings the course full circle back to where it started and shows students that we are still taking a pragmatic perspective that focuses on what arguments are used for.

PART V: AREAS OF ARGUMENTATION

The task of Parts I-IV was to develop basic techniques for the analysis and evaluation of arguments. Since these techniques concerned the most rudimentary features of argumentation, they are applicable to arguments wherever they arise. Part V then shifts the emphasis to the distinctive features that arguments often have in particular fields. These chapters can be used in any order.

CHAPTER 18: Legal Reasoning

Legal Reasoning operates under special constraints involving sources of legal authority, standards of evidence, burdens of proof, and so on, that give legal argumentation its distinctive rigor. On the other side, for reasons discussed in the introduction to this chapter, legal reasoning often relies heavily on analogies. As a specimen of an important and controversial legal debate, and also to illustrate how law develops over time, Chapter 18 includes a discussion of some civil rights cases from *Plessy v. Ferguson,* through *Brown v. the Board of Education,* to *Regents of the University of California v. Bakke*. Then there are more extensive selections from the important Michigan affirmative action cases (*Grutter* and *Gratz*) in 2003.

Because affirmative action is so controversial, students will often mix together different questions, including: Are explicit affirmative action quotas *constitutional*? Are they *just*? It is crucial to distinguish these questions and get students to focus on constitutional issues right from the start. Even after clarifying the issue, some students, especially when discussing affirmative action, have a hard time rising above slogans like "discrimination is wrong whichever way it goes" or "our Constitution is color-blind." Some students also get lost in legal technicalities, so we usually go through an explicit reconstruction (as in Chapter 5) of the arguments in some opinions. In considering the precedents, we find it useful to fill out a table of the relevant cases and features, so that students can apply the NCT and SCT from Chapter 10 to determine what is necessary and/or sufficient for unconstitutionality in this area. With some help, good students often end up writing excellent term papers on this topic.

CHAPTER 19: Moral Reasoning

Chapter 19 discusses Moral Reasoning in general but quickly focuses on abortion. The introduction lays out some background in a relatively neutral way, then the essays by Warren and Marquis present two of the best arguments on opposite sides of this controversy. Warren covers a number of arguments, and then Marquis presents an inference to the best explanation. Together they illustrate a variety of the argument forms discussed in previous chapters. Arguments about the status of the fetus, discussed on pp. 388-390, can also be presented as applications of the NCT and SCT from Chapter 10, with the help of a table listing cases that include different arrays of the factors that are claimed to be necessary or sufficient for personhood and a right to life.

In analyzing abortion, students often slide over from the question of the morality of abortion to the question of whether it should be legal (and, if so, under which conditions) or even to whether laws against abortion are unconstitutional. It is crucial to get students to see that these are different, though, of course, related questions. One way is to ask them whether they would ever get an abortion or recommend that a friend get an abortion if abortion were legal. Another way is to ask them whether it is always immoral to break the law.

Many students select abortion as their term paper topic. We usually have them write the paper twice, because the first version is invariably wildly slanted whichever side of the issue the students adopt. This problem arises in other topics as well, of course.

CHAPTER 20: Scientific Reasoning

The main readings in this chapter present a lively debate about the scientific evidence for evolution between proponents of intelligent design and defenders of natural selection as a mechanism of evolution. This debate is not terribly sophisticated as science, so it is easier for students to follow than more technical scientific debates. It also has the advantage of being important for politics and religion, so it grabs the attention even of students who are not majoring in science. Because this scientific debate has obvious religious and political overtones, it is important to get students to assess the scientific evidence independent of their religious beliefs and political views.

CHAPTER 21: Religious Reasoning

Chapter 21 now includes a contemporary debate between an evangelical Christian and a non-believer. This debate originally occurred live, so it is lively, but not simple. Some of these readings are dense, but this important and controversial issue stimulates many students. Teachers need to be careful not to present this material in a biased way.

CHAPTER 22: Philosophical Reasoning

Chapter 18 is intended to illustrate the character of philosophical reasoning with the example of the debate over whether people have free will. In the first reading, Susan Wolf clearly lays out a variety of alternatives and settles on her own version of compatibilism. Students enjoy discussing her example of Jojo. The opposite view is then presented in an article by Derk Pereboom, which focuses on his four case argument.

This issue of free will connects with many other areas of philosophy, including philosophy of mind, the metaphysics of causation, epistemology, and moral responsibility. We use this topic to try to get students interested in all of these areas

of philosophy so that they will go on to take more philosophy courses. These readings could, of course, be supplemented by additional readings, if time permits, and many other issues could be used to steer students towards further courses in philosophy.

ANSWERS TO EXERCISES

PART I: HOW TO ANALYZE ARGUMENTS

Chapter 1: Uses of Arguments

Exercise I (page 6)

1. A prime number is defined as a positive integer greater than one that is not evenly divisible by any positive integer other than one and itself. Nine is evenly divisible by three. Three is a positive integer. Three is neither one nor nine. Hence, nine is not a prime number.
2. A prime number is defined as a positive integer greater than one that is not evenly divisible by any positive integer other than one and itself. Seven is not evenly divisible by two, three, four, five, six, or any positive integer higher than seven. Hence, seven is not evenly divisible by any positive integer other than one and itself. Thus, seven is a prime number.
3. Water is H_2O, so each molecule of water is comprised of two hydrogen atoms and one oxygen atom. Two hydrogen atoms plus one oxygen atom equals three atoms total. Thus, each molecule of water has three atoms in it.
4. Water is H_2O, so each molecule of water is comprised of two hydrogen atoms and one oxygen atom. Neither hydrogen nor oxygen is carbon or comprised of carbon. Thus, water is not made up of carbon. (It is possible for "water", as in a collection of H_2O molecules, to have carbon in it in the sense that carbon atoms are interspersed between the water molecules. However, this still does not mean that water is *made up* of carbon.)
5. The U.S. President lives in the White House. The address of the White House is 1600 Pennsylvania Avenue, Washington, D.C. Thus, the U.S. President lives in Washington, D.C.
6. If the Earth were flat, then it would have edges that you could fall off. The Earth does not have edges that you can fall off. Thus, the earth is not flat.
7. There are multiple videos and first-hand accounts of humans walking on the moon. It is unlikely that all of the videos were forged and that everyone involved has been able to keep a secret for over thirty years. Thus, humans have walked on the moon.
8. Almost all of the bicycles that I have ever seen have had two wheels. I have seen lots of bicycles of many kinds. Thus, most bicycles have two wheels. (Some bicycles have training wheels, but there are many more bicycles without training wheels than with. Notice that this argument is fallible, but it still gives a reason to believe its conclusion.)

Discussion Question (page 7)

Here are four cases:
A – A father may attempt to convince his daughter that lying is wrong, because Santa Clause will not bring her any presents if she lies. Although the father knows that Santa Clause doesn't exist (sorry, Virginia), so the child's lying will not change the behavior of Santa Clause, it still might be legitimate to use the child's belief in an

argument, because the argument gets the child to behave properly, and also might show the child that certain behaviors are wrong, without the need for a complex discussion about morality and ethics that a child would most likely not understand.
B – Imagine that your friend asks for job advice. Your friend wants to improve the world, while you believe that the only important aspect of a job is the salary. You still may advise your friend to take a lower-paying job at a non-profit organization because she will improve in the world. Although you don't believe that this premise justifies picking that job, your argument is still legitimate because your friend has different priorities.
C – While I may believe that pie is better than cake, I can still attempt to convince you to order the chocolate cake instead of the apple pie, since I know you like chocolate and hate apples. In this situation, I don't believe the premise that the chocolate cake will taste better than the apple pie, but I can legitimately make an argument based on that premise given your taste preferences.
D – If someone tries to rob me, I can argue that they should not rob me and should run away immediately, because there are police nearby. This lie might be legitimate, though some might disagree.

Exercise II (page 9)

(1) In countries where flooding is a danger, it is safer to place electrical outlets above floor level. (General principles or laws)
(2) The Netherlands is a country where flooding is a danger. (Initial condition)
———————————————
∴ (3) In The Netherlands the electrical outlets are above floor level. (Phenomenon explained in (1)-(3) and initial condition in (3)-(6))
(4) Colonial settlers tend to preserve their home customs, practices, and styles in their colonies. (General principles or laws)
(5) Indonesia was formerly a Dutch colony. (Initial condition)
———————————————
∴ (6) In Indonesia the electrical outlets are above floor level. (Phenomenon explained)

Notice that the phenomenon explained in the first part of the argument (3) becomes an initial condition in the second part of the argument. In complex arguments, it is common to have conclusions to earlier parts of the arguments become premises of later parts. In this argument, we must first explain why it is a Dutch practice to have electrical outlets above floor level before we can explain why a Dutch colony would have this practice as well.

Exercise III (page 9)

1. The initial conditions are that air has a certain density, as does the balloon, and that the balloon is less dense than the air. The general principle employed here is that, if an object in a liquid or gas is less dense than the liquid or gas, then the object will rise. (This is similar to the law of buoyancy discussed earlier in the chapter.) Together, this general principle and initial conditions explain why a lighter-than-air balloon rises.
2. To explain why there is an international date line, we must first explain why there are time zones. We could mark time so that it is noon at every place around the world

at the same time. However, without time zones, it would be dark at noon and sunny at midnight in some areas. People want to avoid this result, which explains why they set up time zones. Once there are time zones, if there were no international date line, other problems would arise. Imagine that Eve is a meter east of the international date line and Wendy is a meter west of the international date line. It is noon on Monday where Eve is, and Wendy is 23 time zones ahead (east) of Eve, so it is 11:00 a.m. on Tuesday where Wendy is. What if Wendy walks two meters east? She enters a new time zone, so it is noon where Wendy ends up, but which day? Without an international date line, it would be noon on Tuesday where Wendy is located after moving. But Wendy is now standing right next to Eve, so we want to avoid saying that it is noon on Monday for Eve and noon on Tuesday for Wendy. (This would make it hard for them to agree to meet on Wednesday, since they would have to ask each other how many times we have gone around the world, and which direction. Consider also what happens if someone runs in circles one meter south of the North pole.) The paradoxes and practical difficulties that would arise without an international date line are our initial conditions. The general principle is that we set up a system of marking time in order to avoid paradoxes and practical difficulties. This general principle plus the initial conditions explain why we have an international date line. It takes more to explain why we have the particular international date line that we have, that is, why it is located in its current position in the Pacific Ocean.
3. Average temperatures tend to be higher closer to the equator because the sunlight is more direct and passes through less atmosphere.
4. There are usually more college freshman who plan to go to medical school than there are seniors who still plan to go to medical school, because pre-med classes are hard, so many pre-meds switch to another field or track.
5. Almost no textbooks are more than eighteen inches high, because they would not fit in backpacks, so they would be harder to carry, and people would not buy them.
6. Most cars have four tires (instead of more or fewer), because 4 tires provide more stability than 2 or 3, and 4 tires cost less than 6 or more.
7. Paintings by Van Gogh cost so much because he is so well-known and well-loved.
8. Wages go up when unemployment goes down, because there is less supply of workers for the same demand by employers, and because potential employees are not as scared to turn down a job with low wages.

Discussion Question (page 10)

The contention that science tells of *how* but not *why* things happen is correct insofar as it refers to ultimate explanations in terms of basic laws. Science provides no explanation of *why* we have the laws of physics and physical constants that we have, instead of other logically possible laws of physics. These laws tell us only *how* such things happen. Nonetheless, this contention is not correct in that science can and does tell us *why* particular things happen (given scientific laws). For example, science can explain *why* the Earth orbits the sun and not the other way.

Discussion Questions (page 13)

Most of this speech is a justification providing reasons to the UN Security Council why they should believe that Saddam Hussein and the Iraqis are still pursuing nuclear weapons.

In the middle of the speech, Powell argues that there is no adequate explanation of why Iraqis would need aluminum tubes with such high tolerances if they were not going to use them to build nuclear weapons. Assuming that people do not go to so much trouble without a reason, this lack of any other explanation is supposed to justify the belief that the Iraqis were attempting to acquire such tubes for their ongoing nuclear weapons program.

Next Powell describes how magnets *can* be used in a gas centrifuge program and claims that they *were* used for gas centrifuges before the Gulf War. He adds evidence that Iraq *was* trying to obtain balancing machines that *can* be used for enriching uranium. He does not here explicitly say that such magnets and balancing machines cannot be used for anything else that would be legitimate, nor does he provide evidence that the Iraqis have not stopped trying to acquire these magnets and balancing machines before the time of his speech. Still, he seems to be arguing here, as above, that there is no evidence that they have stopped trying to acquire these things and also no other explanation of why Iraq would be trying to acquire such magnets and balancing machines other than to enrich uranium, so this lack of alternative explanation provides a justification for believing that Iraq is attempting to enrich uranium.

*Note that this passage includes many more examples of arguments, including explanations, justifications, and combinations. Not everything from the discussion question is covered here.

Chapter 2: The Web of Language

Exercise I (page 21)

1. Yes, a linguistic act was performed. This sentence means that elderly people ("the old") are in charge of ("man") the ship. It might not seem meaningful if it is interpreted so that "old" acts as an adjective modifying the noun "man", since then there would be no verb in the sentence. Instead, "the old" is the subject, and "man" is the verb.
2. No, a linguistic act was not performed.
3. Yes, a linguistic act was performed. The first sentence is a simile meaning that time flies in a similar fashion as an arrow (presumably continuously in one direction). In the second sentence "flies" is no longer a verb, but instead a noun modified by "fruit". The verb in this second sentence is "like", and thus this second sentence means that the insects called fruit flies enjoy eating bananas. (This sentence might not be totally incomprehensible when interpreted as another simile, but it does not make much sense to say, "pieces of fruit fly through the air in the same way as bananas fly through the air.")
4. Yes, a linguistic act was performed. The sentence means that the cotton, of which clothing is made, is grown in Mississippi. It might seem nonsensical because it can seem as though "cotton" is an adjective modifying the noun "clothing", and then "made" is the verb in the sentence.
5. No, a linguistic act was not performed, even though it sounds a bit like "The square root of nine is three." (It might be possible that "The square root of pine is tree" means "Square roots of pine trees are made of tree material", but that is not the intended meaning here.)
6. Yes, a linguistic act was performed. The sentence means that the man who whistles performs the act of tuning pianos. It could seem non-meaningful in that "tunes" could be interpreted as what the man whistles, rather than the action the man performs.
7. No, a linguistic act was not performed.
8. This doesn't make sense because it seems to be mixing two sentences: "People tell me one thing one day and another thing the next" and "In one ear and out the other." It doesn't make sense to say that people "tell me out" which is what the structure of the sentence requires.
9. This doesn't make sense, although it might seem meaningful if one confuses this sentence with something like "Today I feel much like I did yesterday".
10. This doesn't make sense because a crucial reference is missing from the utterance. One wants to ask, "Your throat is closer to what?"
11. This sentence doesn't make sense because it is impossible to have sensation in one's shirt, so one can't *lose* sensation in one's shirt.
12. This sentence doesn't make sense because "thing" is so general and abstract. It might seem to make sense because there can be only one person for me to marry or only one place for me to live.

Discussion Questions (page 22)

1. She does not perform a linguistic act because to perform a linguistic act, at least some words are needed and humming involves no words.

2. A speaker can only mispronounce words within a linguistic act because meaningless words and sounds cannot be mispronounced.

Exercise II (page 25)

1. EP	2. N	3. N	4. N
5. N	6. N	7. N	8. N
9. N	10. N	11. EP	12. EP
13. N	14. N	15. EP	16. N
17. EP	18. N	19. N	20. N
21. EP	22. EP		

Exercise III (page 27)

1. No
2. Speech Act
3. No
4. Speech Act (when said by a jury)
5. No
6. No
7. Speech Act (when said by a judge)
8. Speech Act
9. Speech Act
10. No

Exercise IV (page 27)

For example: to say, to ask, to sanctify, to baptize, to christen, to dedicate, to name (as in naming a ship or naming someone to a position), to fire (from a position), to confer (a rank), to move (i.e. make a motion in a legislature), to warn

Discussion Questions (page 28)

1. Whether the speech act of getting married presupposes that the people to be married have different sexes depends on whether marriage is a legal or a religious institution and then on whether the relevant laws or religions allow same-sex marriage. This shows how speech acts can depend on institutional setting. Notice also that, even if marriage does *in fact* presuppose different sexes, it does not follow that this *should* be presupposed. Laws and religious restrictions can be changed. It is important to think about how the rules governing speech acts can restrict people's actions and abilities and about appropriate ways to criticize such rules.
2. In discussing *Hawkins v. McGee*, it is illuminating to bring out (a) the special position of the doctor (both his role and the physical location where the words were uttered), (b) the actual words uttered by the doctor, (c) the presupposition of control behind many guarantees, (d) the response of the patient's parent, and (e) the intention of the doctor. Consider also reasonable expectations. If you ask whether a movie is any good, and I respond, "I guarantee that you'll like it," do I really guarantee anything?

Exercise V (page 30)

1. If I say, "I think you did it," I do not thereby think you did it. I could be lying or misreporting my beliefs. Contrast this with my saying, "I state that you did it." Thus, "I think you did it," does not pass the thereby test. So thinking is not a speech act. Thinking is also not a standard effect of a conversation. While believing or being convinced that he did it would be a conversational act, thinking is not. Thus, the verb here ("thought") names neither a speech nor a conversational act.
2. If I say, "I assert that he did it," I do, in fact, assert that he did it. Thus, asserting is a speech act. Notice that "She asserted" is not a performative, but the verb "asserted" still names a speech act, and that is what the question is here.
3. Convincing is the standard or desired effect of asserting, so this verb names a conversational act.
4. In saying "I condemn" something I do thereby condemn it, so condemning is a speech act, named by the verb "condemned."
5. Just saying "I challenge your integrity" (or "I challenge you to a fight") is enough for me to challenge your integrity (or challenge you to a fight), so challenging is a speech act, named by the verb "challenged."
6. If I say, "I embarrass you" I don't thereby embarrass you (though I might embarrass myself by my poor English). Embarrassing is the result of condemning or mocking, so the verb "embarrass(ed)" names a conversational act.
7. Denying passes the thereby test, so this verb names a speech act.
8. Belief is the result of an assertion or statement (or denial), so this verb names a conversational act.
9. In saying "I encourage you to admit it" I do thereby encourage you to admit it, so this verb names a speech act.
10. In saying "I tell you to get lost," I do in fact tell you. Thus, telling is a speech act, named by this verb.
11. By saying, "I praise you," I do thereby praise you, so praising is a speech act.
12. Making someone happy is a standard intended effect of praising, so it is a conversational act.
13. If I say, "I threaten to reveal your secret," I do thereby threaten. Even if my threat is hollow, it has still been successfully accomplished. Thus, this verb names a speech act.
14. If I say to my boss in the right circumstances, "I resign," I am thereby resigning. Thus, resigning is a speech act. Hence, if "I submit my resignation," is just another way of saying, "I resign," then submitting my resignation is also a speech act. Things might seem different if I cannot submit my resignation without actually submitting a piece of paper. I could change my mind between saying, "I am submitting my resignation," and actually submitting the piece of paper. Still, in this exercise says that he submitted his resignation, so the paper was submitted. Furthermore, the paper counts as a resignation because of the meaning of the words on it. So this verb does name a speech act.
15. Presumably she did not intend to frighten him half to death, so this verb does not name either a conversational act or a speech act.
16. If I say, "I advise you to go to another line of work" I do thereby advise you. I could be giving you bad advice, or even advice that I know to be detrimental, but I have still advised you. Thus, this verb names a speech act.

17. In saying "I blame you" I do thereby blame you. The blame could be misplaced, but you are still being blamed. Thus, this is a speech act.
18. Enlightening is the standard intended effect of lecturing, so this is a conversational act.
19. If I say "I amuse you" I do not thereby amuse you (at least not in all cases, it is possible that there is something amusing about the way I say "I amuse you"), so it is not a speech act. However, it *is* an intended consequence of joke-telling, so it is a conversational act.
20. Except in unusual cases, confusion is not the intended effect of a book. Even in weird cases where a book is intended to confuse, confusion is not the standard effect of a book. Hence, this verb does not name a conversational act or a speech act.

Exercise VI (page 33)

1. Relevance
2. Quality (known to be false)
3. Manner (wrong order)
4. Quality (known to be false)
5. Quantity (less information than desired)
6. Quality (no reason to believe)
7. Manner (not being brief)
8. Quantity (less information than desired)

Exercise VII (page 35)

1. This can conversationally imply such things as "close the window" or "turn up the heat," because the statement provides a *good reason* for doing these things. The homeowner asks himself why the statement is relevant, and infers that the speaker must want more heat. Therefore, the rule of Relevance is involved. A situation in which a different conversational implication would arise is a chef standing in a walk-in fridge waiting for it to cool to the correct temperature.
2. The implication here is something along the lines of "Please lend me your pen." This question involves the rule of relevance because it would be irrelevant to ask about the friend's mental state unless the speaker wanted the friend to lend his pen. This question could have a different implication if the friend just loaned the pen but looks angry, so the speaker really wants to know whether the friend minds or is angry about something else.
3. The conversational implication in this context is that of the child actually asking her parents to get more soda. Again, relevance is at play since uttering "we are out of soda" when no one wants more soda would usually not make sense. In a different context, a person could say, "we are out of soda" to a guest when offering them a drink, which would imply that soda is not an option for the guest to choose.
4. Here the implication is that I should get to buy my ticket before he does, since the statement provides a good reason for this. Thus, Relevance is the important rule, possibly coupled with a belief in fairness. In a different context, "I got here before he did" could imply experience or seniority. For example, say in an office setting someone says "I got here before he did", they may be implying that they know more about the way things work or are more familiar with the institutional memory of the company.

5. This implies both that the speaker believes that trouble will follow from the action, and serves as a reminder that they think such an action is a bad idea and they will share no fault in the bad consequences. Again, this statement would be irrelevant if such an implication were not attached. In a different context, this statement could be seen as a plea. Say one child dares another child to do something, and upon the second child's acceptance, the first child begs not to be told on if the first gets in trouble for the action.
6. This statement implies that the speaker would like to take that seat. Such a question would be irrelevant if the speaker were not actually interested in sitting there or, at least, interested in having a member of her party sit there. The implication could be different, however, if it was asked by an usher in the same theater. In this instance, it is assumed that the usher *is not* interested in sitting there, but instead in getting a count of the open seats, finding enough seats for a group of people, etc.
7. In this context, the statement conversationally implies "I don't know." If I did know the answer, there would be no reason not to ask me. Thus, the rule of relevance is employed here. In a different context, this statement could also imply that I know the answer, but I don't want to tell you, perhaps because I promised not to tell a secret or because answering would be cheating during a test.
8. In this context, the implication is that you will not attend the party because you will be out of town. The rule of Relevance is important here because otherwise such a statement would change the subject. In a different context, someone could ask you where you will be on a certain day, and then this statement would simply be an answer to their question.

Exercise VIII (page 37)

1. Metaphor. He did not come close to catching the ball.
2. Simile. He was acting in a destructive manner.
3. Metaphor. The exam was very difficult.
4. Metaphor. He was proven wrong.
5. Irony. The whole team disappointed me with their poor performance.
6. Metaphor. They got rid of the good parts along with the bad parts of the thing they were trying to improve.
7. Metaphor. The least important part of a situation has control over everything.
8. Metaphor. Religion is what is keeping the people in check, what is giving them a false sense of happiness, and what is keeping them from moving forward.

Exercise IX (page 37)

1. We don't want to have a President who spends the first few months of his term figuring out how to do the job correctly. We need someone who can lead immediately.
2. People who have been receiving welfare should get jobs and contribute taxes back into the welfare system.
3. If the situation is too intense for you, you should not be involved.
4. We need to help those who are disadvantaged in order to make competition fair.
5. He is too influenced by the desires of groups that do not reflect what most people want.
6. While he is still technically in office, he no longer has much power or influence.

Discussion Questions (page 38)

Describing Iraq as another Vietnam was a metaphor used by opponents of the war. You can tell because the metaphor works by comparing the current war to a war previously fought by the U.S. which should have been simple, but turned out to be disastrous. The metaphor of Saddam Hussein as another Hitler was used by supporters of the war because it likens the President of Iran to one of the most evil and vicious men in history, and implies that, like in WWII, the U.S. has a responsibility to remove him from power.

Exercise X (page 38)

1. The linguistic act *A* is performing is the act of saying something meaningful in the English language; more specifically, the linguistic act here is uttering the sentence. The speech act is the actual act of asking when dinner will be ready. We could rephrase this so that *A* says, "I ask you when will dinner be ready," which would turn the verb into an explicit performative. There are a few different conversational acts that *A* could be attempting to perform, including getting *B* to answer, motivating *B* to speed up making dinner, informing *B* that *A* is very hungry, or maybe all three at once.
2. The linguistic act is uttering the meaningful phrase, "Begin by putting four balls in each pan." The speech act is the act of telling the person what to do to start solving the problem. Finally, the conversational act is enlightening the person on how to start solving the problem.

Chapter 3: The Language of Argument

Exercise I (page 45)

1. conclusion marker
2. conclusion marker
3. reason marker
4. reason marker
5. reason marker
6. conclusion marker
7. reason marker
8. conclusion marker
9. neither
10. conclusion marker
11. reason marker
12. conclusion marker

Exercise II (page 45)

1. Not an argument
2. Argument
3. Argument
4. Not an argument
5. Not an argument
6. Argument

Exercise III (page 46)

1. (1) Chicago is north of Boston
   (2) Boston in north of Charleston
   ———————————————
   ∴ (3) Chicago is north of Charleston

Argument markers: "since" is a reason marker

2. No argument
3. (1) Texas has a greater area than Topeka
   (2) Topeka has a greater area than the Bronx Zoo
   ———————————————
   ∴ (3)Texas has a greater area than the Bronx Zoo

Argument markers: "so" is a conclusion marker

4. No argument
5. (1) United Airlines is on strike
   ———————————————
   ∴ (2) Other airlines will carry more passengers

Argument markers: "because" is a reason marker

6. (1) Jesse James Left town, taking his gang with him
   ———————————————
   ∴ (2) Things have been a lot quieter.

Argument markers: "since" is a reason marker

*Note: This might also be interpreted as saying only, "Since the time when Jesse James left town…," in which case it would not be an argument. However, it seems that you could replace "Since" with "Because" at the beginning of the sentence without changing its meaning, in which case it is an argument (as well as a temporal observation).

7. (1) Jesse James Left town, taking his gang with him
   ———————————————
   ∴ (2) Things have been a lot quieter.

Argument markers: "because" is a reason marker

8. (1) Witches are made of wood
(2) Wood floats

∴ (3) Witches float

Argument markers: "because" is a reason marker

(Note: see Chapter 5, Exercise XI, p. 104.)

9. (1) The hour is up

∴ (2) You must hand in your exams

Argument markers: "so" is a conclusion marker

10. (1) Joe's boss was giving him so much grief

∴ (2) Joe quit

Argument markers: "because" is a reason marker

Exercise IV (page 53)

1. [1] Discounting (criticism—no mechanism has been discovered; response—most researchers in the field agree); [2] Guarding; [3] Assuring; [4] Guarding ("chances") and assuring ("greatly")
2. [5] Argument (reason) marker (conclusion—inflation will return; reasons—historically public debt leads to inflation); [6] Assuring (if history shows what will happen now) or Guarding (if this weakens the claim so that it is not about all time but only some times, namely, past history); [7] None; [8] Discounting (criticism—recent trends; response—historically public debt leads to inflation)
3. [9] Assuring; [10] None
4. [11] Discounting (criticism—what other people may say; response—there is little to the rumor); [12] Guarding; [13] None
5. [14] Argument (conclusion) marker (conclusion—drugs are dangerous; reasons—early deaths of Janis Joplin and Jimi Hendrix); [15] Assuring (if opposed to "only apparently")
6. [16] Guarding
7. [17] None; [18] Argument marker (conclusion—I am; reason—I think)
8. [19] None; [20] Assuring; [20] Discounting (criticism—the evidence is hopelessly weak; response—he is guilty)
9. [22] None; [23] None
10. [24] Argument marker (conclusion—snow is likely; reason—wind has shifted to the northeast); [25] Guarding

Exercise V (page 53)

1. (a) Scientists agree that vitamin C is essential to a healthy immune system.
(b) I am confident that I will get an A on this next test.
(c) It has been shown time and again that both studying and sleep are necessary for success in school.
2. (a) Vitamin C is probably important for a healthy immune system.
(b) I will do pretty well on this next text.
(c) Studying and sleep somewhat contribute to success in school.

3. (a) Although I don't get much vitamin C, I still have a healthy immune system. (The statement about vitamin C is being discounted.)
(b) Even though I didn't study, I will do well on the next test. (The statement about studying is being discounted).
(c) Studying is important, but sleep is too (the suggestion that studying is enough is being discounted.)

4. (a) Because I want a healthy immune system, I will take plenty of vitamin C. (Wanting a healthy immune system is the reason.)
(b) I will work hard since I need to do well on the next test. (Needing to do well is the reason.)
(c) Sleeping and studying are both important for success; thus I will schedule my time to include both. (Sleeping and studying being important are the reasons.)

Exercise VI (page 56)

1. E+	2. D	3. E-	4. E-
5. D	6. D	7. D	8. E-
9. E-	10. E-	11. D	12. E-
13. E-	14. D	15. E-	16. E-

Exercise VII (page 57)

The trick here, which is sometimes difficult, is to keep the factual content as constant as possible. Thus, to reverse the evaluative force of "Merle is a wimp," you want something specific like "Mere is a quiet presence" instead of something too general like "Merle is a great guy." Here are examples of the kind of translations we have in mind:

1. – Larry is a lazy lout.
0 Larry does little work.
+ Larry is cool and laid back.
2. – Brenda is foolhardy.
0 Brenda does not show fear in most situations.
+ Brenda is brave.
3. – Sally is a snob.
0 Sally tends to judge things to a higher standard than most others.
+ Sally has fine and discriminating tastes.
4. – Bartlett parties too much.
0 Bartlett is able to have a fun time in most situations.
+ Bartlett is a blast.
5. – George is a goody-goody.
0 George does not indulge in excess very often.
+ George has a strong moral character.
6. – Walter is a weenie.
0 Walter is a shy and timid person.
+ Walter is thoughtful and reserved.
7. – Carol is nosy and suffocating.
0 Carol is concerned with the well-being of others.
+ Carol is caring.

8. – Bill is bossy.
   0 Bill often takes charge.
   + Bill is a natural leader.
9. – Oprah is opinionated.
   0 Oprah often speaks openly about her opinions on topics.
   + Oprah is strong-willed and outspoken for what she believes in.
10. – This is a Mickey Mouse exercise.
   0 This exercise involves repetition of the same general concept.
   + This exercise solidifies students' understanding of the concept.

Chapter 4: The Art of Close Analysis

Exercise I (page 72)

1. Yes, this is an explicit performative, since, if I say "I pose an answer…," I thereby pose an answer, whether or not it is a good answer.
2. Typically, one asks "Why should the system change?" when one thinks that it should remain the same unless there are strong reasons to change, whereas one asks "Why not?" when one thinks that it should change unless there are strong reasons to remain the same. Shifting the question, thus, shifts the burden of proof.
3. Since the author will later emphasize educational benefits of co-ed living, the author needs to clear away the potential objection that learning takes place only in classrooms.
4. A
5. G (Notice the author drops this guard and goes on to talk as if what "some say" is true.)
6. G
7. E+
8. A
9. E+
10. A
11. D
12. E+
13. The expected answer is "No, that is not fair."
14. This is a metaphor. The point seems to be that, just as ripe fruit should be picked and eaten soon, before it rots, so the Greek system should go co-ed soon, before the opportunity is lost. (Maybe this is reading too much in. It is possible that all that is meant by the metaphor is that now is an opportune or, perhaps, the best time to go co-ed).
15. E+
16. G
17. A (= "clearly false") or E-
18. D
19. The opponents to his argument are supposed to be asking this question, since it raises an objection to his position.
20. M
21. E- or R (this is a metaphor comparing the prevalence of gender-based prejudice to an infectious and sweeping disease)
22. M
23. This persuasive definition hides a claim about the causes a prejudice. It also suggests a solution: that prejudice can be overcome by ending ignorance.
24. M (The previous sentence gives the reason why the new question arises.)
25. E-
26. G
27. M (Campus experience provides premises in an argument for the conclusion that we have a long way to go.)
28. G
29. D
30. D

31. A
32. E+
33. E+
34. The author seems to be responding to an objection that the argument for co-ed living depends on an assumption that fraternities cause and are to blame for the problems listed at the start of this paragraph. The author's response is that his proposal does not depend on this assumption, because co-ed living is the solution regardless of what caused the problem or who is to blame.
35. G
36. G
37. G
38. A
39. D
40. This question implies that the previously mentioned "logistical changes" are not legitimate problems, or that they should not be considered "real" problems since the beneficial consequences outweigh these negative ones.
41. G
42. G
43. E+
44. G
45. E+
46. E-
47. G
48. E+
49. A
50. D
51. G
52. E+
53. M (The argument suggested by this argument marker seems to run something like this: If we separate ourselves from each other, then we cannot expand our knowledge about each other. If we cannot expand our knowledge about each other, then we cannot get a holistic education. Holistic education is good. Hence, we should not separate ourselves from one another.)
54. G
55. M
56. M (The point is that certain houses see being female as a reason for refusing to admit an applicant, so they would argue like this: You are female, so we will not admit you. The author is asking why this should be so.)
57. M (As in [56], the point is that certain houses see being male as a reason or argument for refusing to admit someone, and the author is asking why this should be so.)
58. A
59. The author seems to be assuming that the audience will not be able to come up with any good answer (that is, anything important to be afraid of), and this reflection will make them think that they should not be afraid of anything, so they should support fraternities going co-ed. In other words, the expected answer would be something like "We realize we aren't afraid of anything, and that you [the author] are right."

Exercise II (page 74)

1. M (What follows the "to", that is, the protection of Utah's red rock canyon country, provides the reason for the creation of Grand Staircase-Escalante National Monument.)
2. E+
3. G
4. M (Again, this phrase marks that what follows is a reason for the action.)
5. Either assurance or a Rhetorical device (overstatement) or both.
6. R (metaphor)
7. E-
8. E+, also possibly R
9. N
10. E-
11. R
12. G
13. R (rhetorical question, intended to point out that the author believes you *should* be asking this question)
14. E+
15. E+
16. R (personification/metaphor)
17. M (Here the author is giving the BLM's reasons for saying its hands are tied)
18. A
19. A
20. D
21. M (Here the author is marking that what follows will be a conclusion based on the reasons given in the preceding sentence.)
22. M (This functions like "furthermore" indicating that more reasons will follow.)
23. D
24. Guarding (if he is not going so far as to saying that it is double speak) or Rhetorical (if understatement because he really thinks that it is double-speak)
25. R
26. A
27. M
28. A
29. E-
30. D
31. A (The author is appealing to authorities, the U.S. Fish & Wildlife Service and the EPA.)
32. E-
33. M (marks that what follows is a reason why the BLM would have been urged to refuse to allow drilling)
34. G
35. E-
36. G
37. E+
38. D
39. G
40. E+

41. N
42. D
43. R or N
44. G
45. N
46. E+
47. N (Notice that this isn't an argument marker but, instead, is part of a conditional. Restated, it would read: If a pattern of exploitation is allowed to continue, then the monument's designation means little.)
48. D
49. E-
50. G

Exercise III (page 76)

1. G
2. D
3. N (This is introducing a conditional and not making an argument *per se*.)
4. N (This term suggests a negative evaluation, especially with the tone of the paragraph, but the term "large corporations" in itself is not essentially evaluative, even if this author does not like large corporations.)
5. E-
6. N
7. R
8. M (This is part of a reason for the ultimate conclusion to choose Equal Exchange coffee. It is offered as a premise that one who chooses such a brand can make a difference, and you can choose such a brand, therefore you can make a difference.)
9. G
10. N
11. This could be rephrased in this context to read "if" and thus the whole sentence (along with [10] could be rewritten "If the coffee market declines, then the farmers are still guaranteed a fair price." Thus, again it is a conditional and not an explicit argument, but the implication is that such a conditional provides a good reason for you to buy the coffee because the farmers get a fair price either way.
12. E+
13. M (This is marking what the conclusion of all the reasons above is. In other words, it could read "Therefore, you should buy Equal Exchange Coffee)
14. E+
15. A
16. M
17. E+
18. N
19. E+
20. N

The central conclusion of the argument is that you should buy Equal Exchange Coffee and the central premises are (a) that you would be helping out coffee farmers, (b) that you should not contribute to rich corporations who have no social conscience, and (c) you would be getting a good coffee product by buying Equal Exchange Coffee.

Exercise IV (page 77)

The rhetorical question assumes that there are several reasons when it asks which one will be your reason. The phrase "… is the result" is an argument marker. The term "demonstrated by" is assuring as well as an argument marker. The term "can" is guarding. "… you thought it could not get any better…" is assuring insofar as it suggests you already agree with the preceding reasons. Various terms can be seen as evaluative.

Exercise V (page 78)

You can learn a lot by practicing close analysis on a friend's paper, as suggested in (5), and your friend will benefit as well. Try it!

Discussion Questions (page 78)

It is always worthwhile to think about the value of what you are learning.

Chapter 5: Deep Analysis

Exercise I (page 82)

1. (1) Philadelphia is not now the capital of the United States.
(2) The United States Congress meets at the capital of the United States.

∴ (3) The United States Congress must meet somewhere else.
(Notice that the fact that Philadelphia is rich in history has nothing to do with the argument, so it is dropped from the premises. Also, notice the *suppressed premise* that is explicitly stated as premise (2). You will learn more about these in the coming section.)

2. (1) Not everybody whom you invited is going to come to your party.

∴ (2) This room should be big enough.
(The phrase "Some of them won't come" simply restates what the first premise says, so it can be dropped)

3. (1) I just called my wife at home and spoke to her.

∴ (2) My wife is at home.
(The fact that the husband and wife talked about dinner plans is irrelevant to the argument, so it can be dropped. Furthermore, it is possible that the argument was intended to establish the husband's knowledge of his wife being at home, in which case the "I know that…" could not be dropped, but it is more likely that it is intended to establish where the wife is and the "I know that…" is simply an assuring term, which in this case can be dropped.)

4. (1) Joseph is probably Jewish.

∴ (2) If Joseph is a member of the clergy, then he is a rabbi.
(The guarding term "probably" cannot be dropped in this case because the speaker is unsure about Joseph's religion, but the phrase "I'm not sure" should be dropped since it only repeats the guarding term.)

5. (1) Some students did not eat lunch before class.

∴ (2) Those students could not concentrate on the lecture.
(The guarding term "some" cannot be dropped in this case because it is an essential part of the argument and the speaker is not asserting that "all" or "most" of the students could not concentrate. Furthermore, the "although I did" adds nothing to the argument and so it is dropped.)

6. (1) Johnson thought his opponent was better qualified than he was for the office.

∴ (2) Johnson dropped out of the race.
(Whether or not such news is surprising does not change the truth of the premises or the force of the argument, and thus it can be dropped.)

7. (1) More women support the Democrat.

∴ (2) The Democrat is likely to win.

(The assuring term that "experts agree" can be dropped because it is not their agreement that makes the Democrat likely to win, but instead the support of the women. However, this assurance might be used as a premise in a backup argument which establishes the truth of premise (1) in this argument. Finally, the guarding term "likely" cannot be dropped since it is needed to be as charitable as possible to the argument)

8. (1) Married people are happier.

∴ (2) Marriage must be a good thing.

(The guarding phrases can be dropped, because what makes marriage good is that it makes people happy, not that it seems to the speaker as though it makes people happy.)

Discussion Question (page 82)

"I think" could be seen as an assuring term, meant to show supporters of the candidate why they should also believe in his platform. Or it could function as a guarding term that separates the candidate's personal points of view from those of his or her party or makes it harder for opponents to deny what he says (since he does *think* what he says he thinks, even if it is false). Finally, it could just be considered extra verbiage and totally useless to the argument. After all, it is already assumed that during a presidential debate the candidate is only saying things that he or she believes in and thinks to be true, so is it even necessary to put "I think" before any statement?

Exercise II (page 89)

1. (1) Pat is not male.

∴ (2) Pat can't be a father.

∴ (3) Pat can't be a grandfather.

2. (1) Mary ended up with all of Jack's money.

∴ (2) Either Jack is a fool or Mary is a crook.

(The or-sentence cannot be broken up.)

3. This is really two separate arguments that should not be put in a chain.

First:

(1) Our team is not going to play this Saturday.

∴ (2) Our team cannot win this Saturday.

Second:

(3) Our team is no good.

∴ (4) Our Team wouldn't win this Saturday even if they did play.

∴ (5) Our team cannot win this Saturday.

4. Again, this should probably be reconstructed as two separate arguments rather than a chain, since the liquidity of mercury in this room is not necessary to reach the last conclusion about *some* liquids. Still, a chain could be constructed if the final conclusion is taken to be "Some [things that are] liquids [in this room] conduct electricity."
First:

(1) Mercury is a liquid at room temperature.
(2) This room is at room temperature. (Note: not a tautology)

∴ (3) A pound of mercury would be liquid in this room.

Second:

(4) All metals conduct electricity.
(5) Mercury is a metal.
(6) Mercury is a liquid at room temperature.

∴ (7) Some liquids conduct electricity.

5. (1) He won the lottery.

∴ (2) He's rich and lucky.

∴ (3) He'll probably do well in the stock market, too, unless his luck runs out.
(The guarding term "probably" should not be dropped, and the conclusion can't be broken down without assuming that his luck will not run out.)

6. This straightforward argument illustrates "process of elimination".
STEP A:

(1) Joe lives in a fraternity.
(2) Freshmen are not allowed to live in fraternities.

∴ (3) Joe is not a freshman.

STEP B:

(4) Joes has not declared a major.
(5) All seniors have declared a major

∴ (6) Joe is not a senior

STEP C:

(7) I never met Joe before today
(8) If Joe were a junior, I would have met him before today

∴ (9) Joe is not a junior

STEP D:

(3) Joe is not a freshman (From STEP A)
(6) Joe is not a senior (From STEP B)
(9) Joe is not a junior (From STEP C)

∴ (10) Joe is a sophomore

(Of course, the last step assumes the suppressed premise that Joe is either a freshman, a sophomore, a junior, or a senior.)

7. (1) Adequate capital resources are necessary for sustained growth.
(2) Many newly emerging nations do not have adequate capital resources.
∴ (3) Many newly emerging nations will continue to need help from industrial nations to avoid mass starvation.

(This premise can't be broken up without adding "adequate" or a similar word.)

Exercise III (page 89)

Robert Redford, "A Piece of 'God's Handiwork'" (see context on 74-75):

STEP 1 = DO A CLOSE ANALYSIS

The BLM [=Bureau of Land Management] says its hands are tied.[R] Why? [M] Because [M] these lands were set aside [R] subject to "valid [N] existing rights [N]," and Conoco has a lease that gives [M] it the right to drill. Sure [A] Conoco has a lease—more than one, in fact [A]—but [D] those leases were originally [G?] issued without sufficient environmental study or public input. As a result [M], none of them conveyed a valid right to drill. What's more [M], in deciding to issue a permit to drill now, the BLM did not conduct a full analysis of the environmental impacts [N] of drilling in these incomparable [N] lands, but [D] instead determined there would be no significant environmental harm [E-] on the basis of [M] an abbreviated review that didn't even [D] look at drilling on the other federal leases. Sounds like [G] Washington doublespeak [R, E-] to me [G].

STEP 2 = REMOVE EXCESS VERBIAGE (by crossing it out)

~~The BLM says~~ its hands are tied. ~~Why? Because~~ these lands were set aside subject to "valid existing rights," ~~and~~ Conoco has a lease that gives it the right to drill. ~~Sure Conoco has a lease—more than one, in fact—but~~ those leases were originally issued without sufficient environmental study or public input. ~~As a result,~~ none of them conveyed a valid right to drill. ~~What's more,~~ in deciding to issue a permit to drill now, the BLM did not conduct a full analysis of the environmental impacts of drilling in these ~~incomparable~~ lands, ~~but instead~~ determined there would be no significant environmental harm ~~on the basis of~~ an abbreviated review that didn't ~~even~~ look at drilling on the other federal leases. ~~Sounds like Washington doublespeak to me.~~

STEP 3 = PUT REMAINING TEXT IN STANDARD FORM

BLM'S Argument

(1) Conoco has a lease that gives it the right to drill.
(2) These lands were set aside subject to "valid existing rights."

∴ (3) Its hands are tied (from 1-2).

Redford's Argument

(1) Those leases were originally issued without sufficient environmental study or public input.
(2) In deciding to issue a permit to drill now, the BLM did not conduct a full analysis of the environmental impacts of drilling in these lands, but instead determined there would be no significant environmental harm on the basis of an abbreviated review that didn't even look at drilling on the other federal leases.

∴ (3) None of them conveyed a valid right to drill. (from 1-2)
(4) These lands were set aside subject to "valid existing rights."

∴ (5) Conclusion = "Washington doublespeak?" (from ???)

FINISHING BLM'S ARGUMENT

STEPS 4-6 = CLARIFY, BREAK UP, AND ARRANGE
- Clarify (3): "its hands are tied" means BLM can't do anything, so BLM must allow Conoco to drill.
- Clarify (2): "These lands were set aside *subject to* 'valid existing rights.'" means a conditional: if someone has a valid existing right to drill, the lands are not set aside (or protected) against drilling by them, so the BLM must allow them to drill.
- Break up (1): "Conoco has a lease that gives it the right to drill." has an argument marker "gives it", so it can be broken into: Conoco has a lease, so it has the right.

(1) Conoco has a lease.

∴ (2) Conoco has a valid right to drill. (from (1)
(3) If Conoco has a valid right to drill, the BLM must allow Conoco to drill.

∴ (4) The BLM must allow Conoco to drill (from 2-3).

STEPS 7-11 = FILL IN SUPPRESSED PREMISES
- The argument from (2-3) to (4) *is* valid, so it does *not* need a suppressed premise.
- The argument from (1) to (2) is *not* valid, so it *does* need a suppressed premise.
- The suppressed premise should the argument valid, but it can take various forms, such as "If Conoco has a lease, then Conoco has a valid right to drill" or (2):

(1) Conoco has a lease.
(2) Suppressed Premise: All companies with leases have a valid right to drill.

∴ (3) Conoco has a valid right to drill. (from 1-2)

(4) If Conoco has a valid right to drill, the BLM must allow Conoco to drill.

∴ (5) The BLM must allow Conoco to drill (from 3-4).

FINISHING REDFORD'S ARGUMENT

STEPS 4-6 = CLARIFY, BREAK UP, AND ARRANGE
- CLARIFY conclusion: "Washington doublespeak" denies "its hands are tied", so Redford is trying to show the opposite of BLM's conclusion:
    BLM must allow Conoco to drill. (or only BLM does not have to allow …)
- CLARIFY (4) above: We already saw "These lands were set aside subject to 'valid existing rights'" signals a conditional, but Redford uses the opposite direction: if someone does *not* have a valid existing right, the lands *are* set aside (or protected) against them, so the BLM must *not* allow them to drill.
- So far, we get:
    (7) Conoco does not have a valid right to drill.
    (8) If Conoco does not have a valid right to drill, then the BLM must not allow Conoco to drill.
    ———————————————
    ∴ (9) The BLM must not allow Conoco to drill. (from 7-8)

- NEXT we need an argument for (7) Conoco does not have a valid right to drill.
- Redford actually gives 2 arguments: one about the lease and one about the permit
- Usually both are needed, so either argument is supposed to be enough by itself

- STEP 6 = ARRANGE SUB-ARGUMENTS
    (1) those leases were originally issued without sufficient environmental study …
    ———————————————
    ∴ (2) none of the leases conveyed a valid right to drill. (from 1)

    (3) in deciding to issue a permit to drill now, the BLM did not conduct a full analysis of the environmental impacts of drilling in these lands, but instead determined there would be no significant environmental harm on the basis of an abbreviated review that didn't even look at drilling on the other federal leases.
    ———————————————
    ∴ (4) none of the permits conveyed a valid right to drill. (from 3)

- STEP 3 = CLARIFY "those" & "the" in (1-2) by saying both refer to Conoco's leases.

- STEP 5 = BREAK UP premise (3) as indicated by argument markers:
    (3*) the BLM did not conduct a full analysis of the environmental impacts of drilling in these incomparable lands
    (3**) the BLM determined there would be no significant environmental harm
    (3***) the BLM conducted only an abbreviated review
    (3****) the BLM didn't even look at drilling on the other federal leases.
- STEP 2 = REMOVE EXCESS: Redford does not need (3**), so we can drop it.
- THEN STEP 6 = ARRANGE so (3****) is reason for (3***) which is reason for (3*)

REDFORD'S ARGUMENT SO FAR

(1) All of Conoco's leases were originally issued without sufficient environmental study or public input.

∴ (2) None of Conoco's leases gives it a valid right to drill. (from 1)

(3) The BLM didn't look at drilling on lands under the other federal leases.

∴ (4) The BLM conducted only an abbreviated review. (from 3)

∴ (5) The BLM did not conduct a full analysis of the environmental impacts of drilling in these lands. (from 4)

∴ (6) Its permit does not give Conoco a valid right to drill. (from 5)

∴ (7) Conoco does not have a valid right to drill. (from 2 and 6)
(8) If Conoco does not have a valid right to drill, then the BLM must not allow Conoco to drill.

∴ (9) The BLM must not allow Conoco to drill. (from 7-8)

STEPS 7-11 = FILL IN WITH APPROPRIATE SUPPRESSED PREMISES
- Is the first step (1 to 2) valid? NO, so what do we need? See (2) as SP below
- Is the second step (3 to 4) valid? NO, so what do we need? See (5) as SP below
- Is the third step (4 to 5) valid? NO, so what do we need? See (7) as SP below
- Is the fourth step (5 to 6) valid? NO, so what do we need? See (9) as SP below
- Is the fifth step (2 & 6 to 7) valid? NO, so what do we need? See (11) as SP below
- Is the final step (7- 8 to 9) valid? YES - Do we need a suppressed premise? NO

FINAL RECONSTRUCTION OF REDFORD'S ARGUMENT

(1) All of Conoco's leases were originally issued without sufficient environmental study or public input.
(2) Suppressed Premise: No leases that were originally issued without sufficient environmental study or public input give the leaseholder a valid right to drill.

∴ (3) None of Conoco's leases gives it a valid right to drill. (from 1-2)

(4) The BLM didn't look at drilling on lands under the other federal leases.
(5) Suppressed Premise: Any review that does not look at drilling on lands under the other federal leases is an abbreviated review.

∴ (6) The BLM determined there would be no significant environmental harm on the basis of only an abbreviated review. (from 4-5)

(7) Suppressed Premise: If the BLM conducts only an abbreviated review of something, then it does not conduct a full analysis of that thing.

(7*) Suppressed Premise: An abbreviated review is not a full analysis.

∴ (8) The BLM did not conduct a full analysis of the environmental impacts of drilling in these incomparable lands. (from 6-7)

(9) Suppressed Premise: If the BLM did not conduct a full analysis before issuing a permit, then that permit does not give the permit holder a valid right to drill.

∴ (10) Conoco's permit does not give Conoco a valid right to drill. (from 8-9)

(11) Suppressed Premise: If none of Conoco's leases gives it a valid right to drill and Conoco's permit does not give Conoco a valid right to drill, then Conoco does not have a valid right to drill.

∴ (12) Conoco does not have a valid right to drill. (from 3, 10, and 11)

(13) If Conoco does not have a valid right to drill, then the BLM must not allow Conoco to drill.

∴ (14) The BLM must not allow Conoco to drill. (from 12-13)

Exercise IV (page 90)

(1) When one is inaugurated as President of the United States of America, one takes an oath to ensure the security of the U.S.
(2) Some situations might require immediate action to ensure the security of the U.S.

∴ (3) Suppressed Conclusion: In some situations, in order to uphold his oath, the President of the U.S. may have to take immediate action.
(4) Some situations may involve a long series of build-ups, where the threat becomes greater and greater.
(5) Suppressed Premise: In situations that involve a long series of build-ups, a President would always want to go to Congress and get approval for any action.

∴ (6) In some situations, a President will want to go to Congress and get approval for his actions.
(3) Suppressed Conclusion: In some situations, in order to uphold his oath, the President of the U.S. may have to take immediate action.
(6) In some situations, a President will want to go to Congress and get approval for his actions.
(7) Suppressed Premise: If a President should take immediate action in some situations and seek Congressional approval in others, then whether the President should seek Congressional approval in a given situation depends on the scenario.

∴ (8) Whether a President should seek Congressional approval in a given situation depends on the scenario.

(9) There may come a time when a President needs the approval of Congress.
(10) Suppressed Premise: One is more likely to get the approval of Congress later on if one consults with the leaders of Congress on all issues, regardless of the scenario.

∴ (11) One should, at minimum, consult with the leaders of Congress on all issues.

Exercise V (page 94)

1. Not valid, not sound
2. Valid, sound
3. Valid, not sound (because everyone can do something right)
4. Valid, soundness is hard to determine and would depend on who you ask. While it may be possible to independently verify intelligence, the truth of Obama being "good-looking" would be hard to prove one way or the other.
5. Not valid, not sound
6. Not valid, not sound (it is possible that a person could have been appointed to the position of Vice President after the current Vice President resigned or died, and then become President after the death/resignation of the current President. Thus, there *is* a way for a person to be President, i.e. for the premise to be true, without being elected, i.e. for the conclusion to be false)
7. Not valid, not sound (the above explanation is exactly what happened in Ford's case).
8. Valid, sound (This is sound because we were told that the conclusion is true, which means that the premise "Pat is either a mother or a father" must also be true. However, notice that without assuming the conclusion to be true, we would not necessarily know the truth of the first premise, and thus the argument would be valid but not sound.)
9. Valid, sound
10. Valid, sound
11. Valid, sound (assuming George is George W. Bush, who lives in Crawford, Texas.)
12. Not valid, not sound.

Exercise VI (pages 95)

1. (a) valid (b) sound
2. (a) invalid (b) unsound
3. (a) valid (b) unsound
4. (a) valid (b) sound

*Note that 4. is valid in a trivial way, and that the first premise "All teenagers are students" is unnecessary, since the conclusion is just a repetition of one of the premises. In such a situation, the argument will always be valid (since it would be impossible to have a false conclusion with all true premises), but it doesn't tell us much.

Exercise VII (page 96-96)

1. False. For example, consider this argument: Sam is a mother. All mothers are females. Therefore, Sam is a female. Even if this conclusion is false because Sam is male, this argument is still valid, because its conclusion could not be false *if* all of its premises were true.
2. False. Consider the above example again. The premise "Sam is a mother" is false, but the argument is still valid.
3. False. Again, the above example will show this.
4. False. Consider the argument: If I can fly, then the sky is blue. I can fly. Therefore, the sky is blue. This argument has a false, but its conclusion is true. Again, the actual truth of both the premises and conclusion does not affect the argument's validity, which depends only on what is possible. Since this argument's conclusion could not be true *if* both the premises were true, the argument remains valid.
5. True. The definition of invalid is that it is *impossible* to have true premises and a false conclusion.
6. False. Consider the sky being blue argument above. For an argument to be sound, the conclusion (and premises) must be true, but the argument must also be valid.
7. True. For an argument to be sound it must be valid and have all true premises. These two conditions together mean that a sound argument must always also have a true conclusion.

Exercise VIII (page 99)

(5) Schwarzenegger is not a natural-born United States citizen.
(5*) Schwarzenegger was not born before the adoption of the U.S. Constitution.
(6*) Only a natural-born United States citizen or a United States citizen who was born before the adoption of the U.S. Constitution may become president of the United States.

∴ (7) Schwarzenegger cannot become president of the United States (From 5, 5*, and 6*)

Exercise IX (page 101-102)

1. Suppressed premise: One must be at least thirty-five to run for president of the United States.
2. Suppressed premise: One cannot be both president and in the Senate at the same time.
3. Suppressed premises: The definition of a prime number is a number that is evenly divisible only by 1 and itself. 3 is neither 1 nor 81.
4. Suppressed premise: Rupert is a name given only to males.
5. Suppressed premise: In order to be considered the discoverer of a location, one must be the first to explore it.
6. Suppressed premise: No survivors have been found by now.
7. Suppressed premise: One cannot meet someone who is dead or who is not yet born.

8. Suppressed premise: Two teams in the National League cannot play each other in the World Series.
9. Suppressed premise: A woman cannot have a daughter when she is 7 years old or younger.
10. Suppressed premises: In order to be a grandfather, one must first be a father. In order to be a father, one must have children.
11. Suppressed premise: You cannot understand modern poetry.
12. Suppressed premises: The Super Bowl is a football game. One cannot play a football game with a broken leg.
13. Suppressed premise: All very tall people play basketball.
14. Suppressed premise: Dan is not very cunning.
15. Suppressed premise: Anyone who refuses to work on Sundays is both lazy and inflexible
16. Suppressed premise: People who already have degrees cannot be students
17. Suppressed premise: We can't count on a burglar alarm that won't work unless we are lucky or the burglar uses the front door.
18. Suppressed premise: People lose when they do not practice sufficiently.

Exercise X (page 103)

Practice, Practice, Practice!!!

Exercise XI (page 104)

(1) One burns witches.
(2) One also burns wood.
(3) SP: If one burns two things, then they must be made of the same stuff.
———————————————
∴ (4) Witches are made of wood.
(5) Wood floats in water.
(6) Ducks float in water.
(7) SP: If two things float in water, they weigh the same.
———————————————
∴ (8) Wood weighs the same as a duck.
———————————————
∴ (9) Witches weigh the same as a duck. (from 8 and 4)

Exercise XII (page 108)

The answer to this exercise will be controversial.

Exercise XIII (pages 108-110)

These mysteries require you to construct and reconstruct your *own* reasoning instead of just interpreting other people's arguments. Some of them are complicated.

MYSTERY 1: A MERE MATTER OF DEDUCTION

(1) "Addington never works alone."

∴ (2) If Addington was involved, then somebody else was involved. (from (1))

(3) "We have narrowed it down to three suspects: Addington, Burke, and Chatham."

∴ (4) Nobody other than Addington or Burke or Chatham was involved. (from (3))

∴ (5) If Addington was involved, then either Burke or Chatham was involved. (from (2) and (4))

(6) Chatham "refuses to work with Addington."

∴ (7) If Addington was involved, Chatham was not involved. (from (6))

∴ (8) If Addington was involved, then Burke was involved. (from (5) and (7))

(9) "Chatham always uses an accomplice."

∴ (10) If Chatham was involved, then somebody else was involved. (from (9))

∴ (11) If Chatham was involved, then either Addington or Burke was involved. (from (4) and (10))

∴ (12) If Chatham was involved, then Addington was not involved. (from (6))

∴ (13) If Chatham was involved, then Burke was involved. (from (11) and (12))

(14) If Burke was involved, then Burke was involved. (suppressed premise)

∴ (15) If either Addington or Burke or Chatham was involved, then Burke was involved. (from (8), (13), and (14))

(16) "at least one of them [Addington, Burke, or Chatham] was involved."

∴ (17) Burke was involved. (from (15) and (16))

(1) “everyone at Royston North High wears monogrammed jackets.”
(2) “The Hawks all go to Royston North High.”

∴ (3) All Hawks wear monogrammed jackets.

(4) “No one who eats at Joe's wears a monogrammed jacket.”

∴ (5) No Hawk eats at Joe’s. (from (3)-(4))

(6) “only those who eat at Joe's collect green matchbooks."

∴ (7) No Hawk collects green matchbooks. (from (5)-(6))

(8) “everyone who hangs out on Laraby Street collects green matchbooks.”

∴ (9) No Hawk hangs out on Laraby Street. (from (7)-(8))

(10) “Only kids who hang out on Laraby Street fight on weekdays.”

∴ (11) No Hawk fights on weekdays. (from (9)-(10))

(12) Every day before Saturday is a weekday. (suppressed premise)

∴ (13) Anyone who fights before Saturday fights on a weekday.

∴ (14) No Hawk fights before Saturday. (from (11)-(12))

(15) If no Hawk fights before Saturday, then those gangs won't get together to fight until at least Saturday. (suppressed premise)

∴ (16) “Those gangs won't get together to fight until at least Saturday." (from (14)-(15))

PART II —
HOW TO EVALUATE ARGUMENTS:
DEDUCTIVE STANDARDS

Chapter 6: Propositional Logic

Exercise I (page 118)

The statement "The night is young, and you're so beautiful" is a substitution instance for (1)-(4) but not (5)-(7).

Exercise II (page 118)

(2) and (3) are substitution instances of "p & q & q", but (1) is not.

Exercise III (page 118)

1. This proposition is a substitution instance of:
   a) p & q & r b) p & q c) p
2. This proposition is a substitution instance of:
   a) p & q & r b) p & q & q c) p & q

Exercise IV (page 118-119)

1. non-propositional (There is currently no context in which you could rewrite this sentence to read "A Catholic priest got married to John, and a Catholic priest got married to Mary" since Catholic priests cannot get married to anyone. It is perhaps possible to interpret this sentence as "A Catholic priest married John to Amy, and a Catholic priest got married to Mary to Peter." However, the most natural reading is "A Catholic priest married John and Mary to each other." That is non-propositional.)
2. propositional (If Fred had pie with ice cream on top or on the side, he still had pie, and he also had ice cream, so the propositional conjunction is true.)
3. non-propositional (this sentence means that the winning presidential candidate rarely loses *both* states; it's not saying that the winning candidate rarely loses New York, and rarely loses California.)
4. propositional
5. propositional
6. non-propositional (We cannot infer that someone who speaks French is bilingual and someone who speaks English is bilingual.)
7. non-propositional (Although you could say, "Ken is my best friend, and Naomi is my best friend," this is not what the sentence is saying. You would have to rewrite the sentence here as "Ken is two of my best friends, and Naomi is two of my best friends," which does not make sense.)
8. If the claim is that Miranda and Nick cooked dinner together, then it would be non-propositional. However, if the sentence means that *both* Miranda and Nick cooked dinner, so they ended up with two separate dinners, then it would be propositional.

9. non-propositional (We cannot infer that I doubt John is poor and I doubt John is happy, because I doubt that John is poor and happy if I doubt that he is happy, but I do not doubt that he is poor.)

Exercise V (page 121)

1. Valid by virtue of propositional form
2. Not valid by virtue of propositional form (One could imagine a law requiring that in order to own a house one must also own a piece of land, but then the argument would be valid by virtue of that law instead of being valid by virtue of its form.)
3. Valid by virtue of propositional form
4. Valid by virtue of propositional form
5. Valid by virtue of propositional form
6. Valid by virtue of propositional form (The premise might seem to suggest that Bess tied with Katie, but it might mean that each tied with a different person in a different league. Either way, the argument is valid if the conclusion implies that Bess tied with someone.)

Exercise VI (page 121)

1. True, because of the principle in the preceding section.
2. False, because every argument can be a substitution instance of an invalid argument form. (If the argument has one premise, it is a substitution instance of *p, ∴ q;* if it has two premises, it is a substitution instance of *p, q, ∴ r;* and so on.)
3. True, because every argument, valid or not, can be a substitution instance of an invalid argument form.

Discussion Question (page 121)

To answer this question, you need to think about the kinds of valid arguments that are not substitutions of valid argument forms.

Exercise VII (page 124)

1. "Not everyone loves running" means that it is not the case that everyone loves running, or that there are people who do not love running. This sentence is a negation of "Everyone loves running" because its truth values are the exact opposite of those for "Everyone loves running."
2. "Everyone does not love running" might seem to mean the same as "Not everyone loves running." However, it literally means "Everyone is such that they do not love running" which is equivalent to "nobody loves running." Compare "Everyone does not want cake" when a cook asked whether anyone wants cake and everyone declined.
3. "Everyone loves not running" means that it is the case that all people love to not run—that is, they love to walk or to lie on a couch. This is not a negation since it does not necessarily mean that not everyone loves running, but instead just states that everyone loves to not run.

4. "Everyone loves running – not!" is a sarcastic way of saying that it is not the case that everyone loves running. The final "not" acts as a negation of the sentence, so it is an instance of ~*A* if *A* stands for "everyone loves running."

Exercise VIII (page 124)

1. This can mean that you are forbidden from going to the meeting, if it is said in response to your question of whether you are permitted to attend the meeting. It could also mean that it is possible that you will not go to the meeting, if said in response to the question or whether you will skip the meeting.
2. This could either be an extremely high recommendation, if said in such a way as to mean "No matter how highly I recommend him, it will not be too high." However, it can also be a very low recommendation, if said in such a way as to mean "I am unable to recommend him very highly."
3. This could mean that the person is astounded at his being in the Himalayas because he thought that he would never get there, though he wanted to go; or it could mean that he never thought about it at all.
4. This could be asked somewhat rhetorically, meaning that it is clear that the person has not done all his homework, or it could mean something more like "why have you not done all of your homework?" It could also be a legitimate question about the state of the student's homework. (In general, "Have you not …?" can mean either "Is it the case that you have not …" or "Isn't it the case that you have …?")
5. This could either imply "Not all of his friends are students", meaning that some are not students, or it could mean "None of his friends are students."
6. This could mean that there will be some football games that I will not attend next season, or it could mean that I will not go to any football games.
7. This either means that there is not a smoking section available, or that there is a non-smoking section available.
8. This could be interpreted to mean that the lock was able to be unlocked or that it was not able to be locked.

Exercise IX (page 124-5)

1. ~R where R = It will rain tomorrow
2. M where M = It might not rain tomorrow (This could not be written as ~R where R = It might rain tomorrow because this would mean "It is not the case that it might rain tomorrow.)
3. ~C where C = There is a chance that it will rain tomorrow. (It is important to see that (3) is a propositional negation but (2) is not the negation of C or of anything else. Instead, (2) means that there is a chance that it will not rain tomorrow.)
4. B where B = I believe that it won't rain tomorrow. (This should not be confused with the propositional negation "I do not believe that it will rain tomorrow," which might be true even if I do not have any belief one way or the other.)
5. ~S ∨ C where S = Joe is too smart, and C = Joe is very clever
6. (a) ~S ∨ R or (b) ~(S ∨ R) where S = Kristen is smart, and R = Kristen is rich. (The tone of voice or timing can affect the interpretation of such a sentence when it is spoken.)

7. F & D where F = sometimes you feel like a nut, and D = sometimes you don't feel like a nut. (It is common but mistaken to try to symbolize the sentence as F & ~F. Since this is a contradiction, it cannot be an accurate interpretation of the ad containing the sentence.)

Exercise X (page 126)

1. If one of two alternatives is true, and you can eliminate the first, then the second must be true.
2. If one of two alternatives is true, and you can eliminate the second, then the first must be true.

Exercise XI (page 126)

Neither of these argument forms is valid, because the premise claims only that one of two propositions is true, so it does not exclude the possibility that both propositions are true.

1. For (3):

(1) He could have either cake or ice cream for dessert.
(2) He had cake.
———————————————
∴ (3) He did not have ice cream.

The premises are true and the conclusion is false, so the argument is not valid if he is in a restaurant where he could have cake with ice cream on top.

2. For (4):

(1) He owns either a car or a truck.
(2) He owns a truck.
———————————————
∴ (3) He does not own a car.

The premises are true and the conclusion is false, so the argument is not valid if he owns both a car and a truck.

Exercise XII (page 128)

1. T	2. T	3. T	4. F
5. T	6. T	7. T	8. F
9. F	10. F	11. T	12. T
13. T	14. T	15. T	16. T

Exercise XIII (page 131)

Parentheses after the word "Invalid" indicate a row where an invalid argument has true premises but a false conclusion.

(1) Valid

		Pr.	Pr.	Conc.	
p	*q*	(*p* ∨ q)	~*p*	*q*	
T	T	T	F	T	
T	F	T	F	F	
F	T	T	T	T	OK
F	F	F	T	F	

(2) Valid

		Pr.	Pr.	Conc.	
p	*q*	(*p* ∨ *q*)	~*q*	*p*	
T	T	T	F	T	
T	F	T	T	T	OK
F	T	T	F	F	
F	F	F	T	F	

(3) Invalid (TT)

		Pr.	Pr.	Conc.	
p	*q*	(*p* ∨ *q*)	*p*	~*q*	
T	T	T	T	F	Invalid
T	F	T	T	T	OK
F	T	T	F	F	
F	F	F	F	T	

(4) Invalid (TT)

		Pr.	Pr.	Conc.	
p	*q*	(*p* ∨ *q*)	*q*	~*p*	
T	T	T	T	F	Invalid
T	F	T	F	F	
F	T	T	T	T	OK
F	F	F	F	T	

Exercise XIV (page 131)

		Pr.	Pr.	Conc.
p	*q*	*p*	~*p*	*q*
T	T	T	F	T
T	F	T	F	F
F	T	F	T	T
F	F	F	T	F

Since there is no instance where all the premises are true, there is no instance where all the premises are true and the conclusion is false, so we have no "Invalid" line, and thus the argument is valid. However, the argument cannot be sound since it is not possible for both premises to be true.

Exercise XV (page 131-132)
Again, parentheses after the word "Invalid" indicate a row where an invalid argument has true premises but a false conclusion.

(1) Invalid (TT)

		Pr.	Pr.	Conc.	
p	*q*	(~*p* ∨ q)	*p*	~*q*	
T	T	T	T	F	Invalid
T	F	F	T	T	
F	T	T	F	F	
F	F	T	F	T	

(2) Valid

		Pr.	Conc.	
p	*q*	~(*p* ∨ *q*)	~*q*	
T	T	F	F	
T	F	F	T	
F	T	F	F	
F	F	T	T	OK

(3) Valid (Surprisingly, because the premises are never both true.)

		Pr.	Pr.	Conc.
p	*q*	~(*p* ∨ *q*)	*p*	*q*
T	T	F	T	T
T	F	F	T	F
F	T	F	F	T
F	F	T	F	F

(4) Valid (for the same reason as (3))

			Pr.	Pr.	Conc.
p	*q*	*r*	~(*p* ∨ *q*)	*p*	*r*
T	T	T	F	T	T
T	T	F	F	T	F
T	F	T	F	T	T
T	F	F	F	T	F
F	T	T	F	F	T
F	T	F	F	F	F
F	F	T	T	F	T
F	F	F	T	F	F

(5) Valid

		Pr.	Pr.	Conc.	
p	*q*	~(*p* & *q*)	*q*	~*p*	
T	T	F	T	F	
T	F	T	F	F	
F	T	T	T	T	OK
F	F	T	F	T	

(6) Invalid (FF)

		Pr.	Pr.	Conc.	
p	*q*	~(*p* & *q*)	~*q*	*p*	
T	T	F	F	T	
T	F	T	T	T	OK
F	T	T	F	F	
F	F	T	T	F	Invalid

(7) Valid

			Pr.	Conc.	
p	*q*	*r*	(*p* & *q*) ∨ (*p* & *r*)	*p* & (*q* ∨ *r*)	
T	T	T	T	T	OK
T	T	F	T	T	OK
T	F	T	T	T	OK
T	F	F	F	F	
F	T	T	F	F	
F	T	F	F	F	
F	F	T	F	F	
F	F	F	F	F	

(8) Invalid (TFF, FTT)

			Pr.	Conc.	
p	*q*	*r*	(*p*∨*q*) & (*p*∨*r*)	p & (*q* ∨ *r*)	
T	T	T	T	T	OK
T	T	F	T	T	OK
T	F	T	T	T	OK
T	F	F	T	F	Invalid
F	T	T	T	F	Invalid
F	T	F	F	F	
F	F	T	F	F	
F	F	F	F	F	

(9) Valid

			Pr.	Conc.	
p	*q*	*r*	*p* & *q*	(*p* ∨ *r*) & (*q* ∨ *r*)	
T	T	T	T	T	OK
T	T	F	T	T	OK
T	F	T	F	T	
T	F	F	F	F	
F	T	T	F	T	
F	T	F	F	F	
F	F	T	F	T	
F	F	F	F	F	

(10) Invalid (TTF, TFF, FTF)

			Pr.	Conc.	
p	q	r	$p \vee q$	$(p \,\&\, r) \vee (q \,\&\, r)$	
T	T	T	T	T	OK
T	T	F	T	F	Invalid
T	F	T	T	T	OK
T	F	F	T	F	Invalid
F	T	T	T	T	OK
F	T	F	T	F	Invalid
F	F	T	F	F	
F	F	F	F	F	

Exercise XVI (page 133)

The truth table shows that the two expressions are truth-functionally equivalent.

p	q	$(p \vee q) \,\&\, \sim(p \,\&\, q)$	$p \veebar q$
T	T	F	F
T	F	T	T
F	T	T	T
F	F	F	F

Exercise XVII (page 133)

Parentheses after the word "Invalid" indicate a row where an invalid argument has true premises but a false conclusion.

1. Invalid (TT)
2. Valid
3. Valid
4. Invalid (FF)
5. Valid
6. Invalid (TT)

Exercise XVIII (page 134)

(1) and (3) are truth-functionally equivalent, as are (2) and (4)

Exercise XIX (page 134)

Parentheses indicate a row where the non-equivalent expressions differ in truth value.

1. Equivalent
2. Equivalent
3. Equivalent
4. Equivalent
5. Not equivalent (TT, TF)
6. Equivalent
7. Not equivalent (TFF, FTT)
8. Equivalent
9. Not equivalent (FT)
10. Equivalent
11. Not equivalent (TF, FT)
12. Not equivalent (TT, TF)
13. Not equivalent (TF, FT)
14. Equivalent
15. Equivalent
16. Equivalent

Exercise XX (page 138)

The following table shows that *modus tollens* is valid.

p	q	$p \supset q$	$\sim q$	$\sim p$	
T	T	T	F	F	
T	F	F	T	F	
F	T	T	F	T	
F	F	T	T	T	OK

Exercise XXI (page 139)

Line (F, T) shows affirming the consequent is invalid.

p	q	$p \supset q$	q	p	
T	T	T	T	T	OK
T	F	F	F	T	
F	T	T	T	F	Invalid
F	F	T	F	F	

Exercise XXII (page 139)

(1) If Soviet negotiators would make unilateral concessions, we could have significant and verifiable reductions of arms on both sides.
(2) If we could have significant and verifiable reductions of arms on both sides, we could restore the balance of power with the Soviet Union without increasing our military power.
(3) But Soviet negotiators will not make unilateral concessions

---

∴ (4) We cannot restore the balance of power with the Soviet Union without increasing our military power.

Symbolization:

(1) $p \supset q$
(2) $q \supset r$
(3) $\sim p$

∴ (4) $\sim r$

This argument seems to commit a variation on denying the antecedent (although Reagan might intend to conversationally imply the converses of (1)-(2)).

Exercise XXIII (page 141)

			Pr.	Pr.	Pr.	Conc.	
p	q	r	$(p \vee q)$	$p \supset r$	$q \supset r$	r	
T	T	T	T	T	T	T	OK
T	T	F	T	F	F	F	
T	F	T	T	T	T	T	OK
T	F	F	T	F	T	F	
F	T	T	T	T	T	T	OK
F	T	F	T	T	F	F	
F	F	T	F	T	T	T	
F	F	F	F	T	T	F	

			Pr.	Pr.	Pr.	Conc.	
P	*q*	*r*	$\sim p \vee \sim q$	$r \supset p$	$r \supset q$	$\sim r$	
T	T	T	F	T	T	F	
T	T	F	F	T	T	T	
T	F	T	T	T	F	F	
T	F	F	T	T	T	T	
F	T	T	T	F	T	F	
F	T	F	T	T	T	T	OK
F	F	T	T	F	F	F	
F	F	F	T	T	T	T	OK

Exercise XXIV (page 141-2)

1. Invalid (FT)
2. Valid
3. Valid
4. Valid
5. Valid
6. Valid
7. Valid
8. Valid
9. Valid
10. Invalid (TFF)
11. Valid
12. Valid
13. Valid
14. Invalid (FTF, FFF)
15. Invalid (TTF)
16. Valid
17. Invalid (TT)
18. Valid
19. Valid
20. Valid (surprisingly, for the conclusion can't be false)

Exercise XXV (page 143)

(1)

		Pr.	Conc.	
p	*q*	*p*	$q \supset p$	
T	T	T	T	OK
T	F	T	T	OK
F	T	F	F	
F	F	F	T	

(2)

		Pr.	Conc.	
p	*q*	$\sim p$	$p \supset q$	
T	T	F	T	
T	F	F	F	
F	T	T	T	OK
F	F	T	T	OK

Exercise XXVI (page 147)

1. "Only I hit him in the eye" means that I am the only person or thing who hit him in the eye. Nobody else did.
2. "I only hit him in the eye" means that I did not do anything else to his eye. I did not poke him in the eye.
3. "I hit only him in the eye" means that I did not hit anyone else in the eye.
4. "I hit him only in the eye" means that I hit him in the eye but not around the eye or outside the eye.
5. "I hit him in only the eye" implies that I didn't hit him in something else. For example, he could claim that I hit him in the eye and also in the mouth, but I could say "I hit him in only the eye."
6. "I hit him in the only eye" implies that he only has one eye and that that is where I hit him.
7. "I hit him in the eye only" again implies that I did not hit him in any other location or perhaps that I did not do anything else bad to him. That was all I did.

Exercise XXVII (page 148-9)

1. R ⊃ D
2. D ⊃ S
3. (R ∨ S) ⊃ O
4. (T & P) ⊃ W
5. S ⊃ (D & C)
6. (S ⊃ D) & [(S ∨ ~S) ⊃ C]
7. S ⊃ (M ⊃ B) or (S & M) ⊃ B
8. D ⊃ (W ⊃ L) or (D & W) ⊃ L
9. T ⊃ S
10. S ⊃ T or ~T ⊃ ~S
11. S ⊃ T or ~T ⊃ ~S
12. O ⊃ S
13. ~P ⊃ R or P v R
14. ~Y ⊃ ~I or I ⊃ Y
15. E ⊃ B
16. ~F ⊃ ~H
17. ~D ⊃ ~W
18. (P ⊃ T) & (T ⊃ P)
19. ~R ⊃ D
20. R ⊃ ~D
21. ~~R ⊃ ~D or ~R ∨ ~D

Exercise XXVIII (page 149-50)

Where an argument is invalid, a row where all premises are true and the conclusion is false is given in parentheses.

(1)	J		*p*	
	∴ J ∨ J	∴	*p* ∨ *p*	Valid

Since the conclusion is unnecessarily prolix, this argument violates at least the rule of Manner.

(2)	N ∨ A A		*p* ∨ *q* *q*	
	∴ ~N	∴	~*p*	Invalid (TT)
(3)	(I ⊃ D) & (~I ⊃ D)		(*p* ⊃ *q*) & (~*p* ⊃ *q*)	
	∴ D	∴	*q*	Valid
(4)	D		*p*	
	∴ (I ⊃ D) & (~I ⊃ D)	∴	(*q* ⊃ *p*) & (~*q* ⊃ *p*)	Valid
(5)	D		*p*	
	∴ (M ⊃ D) & (~M ⊃ D)	∴	(*q* ⊃ *p*) & (~*q* ⊃ *p*)	Valid

Because "I" in (4) and "M" in (5) occur *vacuously* in the conclusion, (4) and (5) violate the rule of Relevance.

(6) $M \supset L$ $\quad$ $p \supset q$
$\sim L$ $\quad$ $\sim q$
$\therefore \sim M$ $\quad$ $\therefore \sim p$ $\quad$ Valid

(7) $P \supset H$ $\quad$ $p \supset q$
H $\quad$ q
$\therefore P$ $\quad$ $\therefore p$ $\quad$ Invalid (F, T)

This argument might seem valid if we imagine contexts where it is conversationally implied that John will play *if* the situation is hopeless.

(8) $B \,\&\, L$ $\quad$ $p \,\&\, q$
$L \supset F$ $\quad$ $q \supset r$
$\therefore F$ $\quad$ $\therefore r$ $\quad$ Valid

(9) $\sim R \supset A$ $\quad$ $\sim p \supset q$
$\sim E \supset R$ $\quad$ $\sim r \supset p$
$\therefore \sim E \supset A$ $\quad$ $\therefore \sim r \supset q$ $\quad$ Invalid (TFF)

(10) $D \supset O$ $\quad$ $p \supset q$
$\therefore (D \,\&\, \sim O) \supset W$ $\quad$ $\therefore (p \,\&\, \sim q) \supset r$ $\quad$ Valid

Though not obvious at first sight, this argument violates the rule of Relevance, since W can be replaced by any proposition whatsoever. For example, the argument would still be valid if it went as follows:

> If you dial O, you will get the operator, so if you dial O and do not get the operator, then nothing is wrong with the telephone.

(11) $J \vee B$ $\quad$ $p \vee q$
$B \supset S$ $\quad$ $p \supset r$
$J \supset N$ $\quad$ $q \supset s$
$\therefore N \vee S$ $\quad$ $\therefore r \vee s$ $\quad$ Valid

(12) $F \vee M$ $\quad$ $p \vee q$
$(F \vee M) \supset S$ $\quad$ $(p \vee q) \supset r$
$\therefore S$ $\quad$ $\therefore r$ $\quad$ Valid

(13)

(M ∨ ~E) ⊃ D		$(p \vee \sim q) \supset r$	
~E ⊃ ~M		$\sim q \supset \sim p$	
M ⊃ ~~E		$p \supset \sim\sim q$	
∴ D	∴	r	Invalid (FTF)

(14)

F ⊃ L		$p \supset q$	
L ⊃ G		$q \supset r$	
∴ F ⊃ G	∴	$p \supset r$	Valid

This is a perplexing example. There seems to be a clash of levels here, since the generator's working is a *causal condition* for the light going on when the switch is flipped, while the light going on is *evidence* for the generator's working.

Chapter 7: Categorical Logic

Exercise I (page 156)

Since immediate inference has not yet been discussed, some redundant answers are likely—for example, putting down both "No *S* is *P*" and "No *P* is *S*." There is no harm in this, but there is also no need to put down both answers. We have put equivalent answers in parentheses just after the answers to which they are equivalent. In any case, the important task is to extract all the information in the diagram.

1. All *P* is *S*. Some *S* is not *P*.
2. All *S* is *P*. Some *S* is *P*. (Some *P* is *S*.) Some *P* is not *S*.
3. Some *S* is not *P*. Some *P* is not *S*.
4. Some *S* is not *P*. Some *P* is not *S*. Some *S* is *P*. (Some *P* is *S*.)
5. No *S* is *P*. (No *P* is *S*.)
6. All *S* is *P*. Some *P* is not *S*.
7. All *S* is *P*. All *P* is *S*.
8. All *P* is *S*. Some *S* is *P*. (Some *P* is *S*.)

Exercise II (pages 158-9)

1. All real men are ant-eaters (or eater of ants).
2. No bat is a bird.
3. Some hippo is charging.
4. All hippos are noble beasts.
5. Some crabs are not water dwellers.
6. Some crabs are not water dwellers. (Same as 5)
7. All movie starts are rich people.
8. All people who hit me are people whom I will hate.
9. All things that are broken are things that do not work.
10. Some people are you-lovers (or lovers of you).
11. Some people are not you-lovers.
12. No people who aren't my mother are me-lovers (or lovers of me).
13. All Mormons are believers in God.
14. No people who aren't my friends are people who care.
15. All students who may take this course are seniors (or No non-seniors are students who may take this course).
16. Some pit bulls that we own are good pets.
17. All cheap things are no-good things (Or No cheap things are good things).
18. Some expensive things are no-good things.
19. Some cheap things are good things.
20. Some not cheap things are good things.
21. Some cheap things are no-good things.
22. Some not cheap things are no-good things.
23. Some cars are not four-wheeled things.
24. Some couples are childless.
25. No people are chocolate-haters.
26. Some people are chocolate-haters.
27. No purple thing is an apple.
28. No non-white thing is snow (or All snow is a white thing).

29. No runner is a slow thing.
30. No flamingo is a friendly thing.

Exercise III (page 160)

1. No, because they are both false when some *S* are *P* and some *S* are not *P*.
2. No, because they are both true when some *S* are *P* and some *S* are not *P*.
3. Yes: If X cannot be true when Y is true and cannot be false when Y is false, then Y cannot be true when X is true and cannot be false when X is false.

Exercise IV (page 162)

Once they get the idea, students are good at coming up with new examples of these kinds.
1. All unicorns have horns.
2. All X-Men are superhuman mutants.
3. No vampires are sun-bathers.
4. No human is an immortal being.

Exercise V (page 166)

1. Invalid
2. Valid
3. Invalid
4. Valid
5. Invalid
6. Invalid
7. Invalid (Only invalid if using modern logic without existential commitment, which we are in this section)
8. Invalid (Same as 7)

Exercise VI (page 168)

(a) subject or minor term = circles
predicate major term = things with sides
middle term = ellipses
major premise = No ellipses are things with sides.
minor premise = All circles are ellipses.
form of syllogism = No *M* are *P*; All *S* are *M*; □ No *S* are *P*.
valid

(b) subject or minor term = rectangles
predicate or major term = things with equal sides
middle term = squares
major premise = All squares are things with equal sides.
minor premise = Some squares are rectangles.
form of syllogism = All *M* are *P*; Some *M* are *S*; □ Some *S* are *P*.
valid

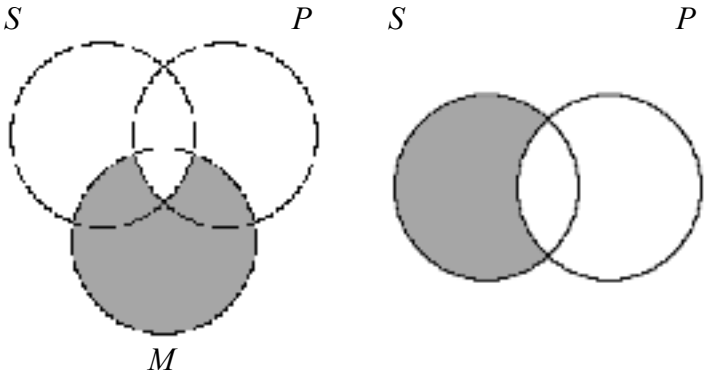
Honors Exercise (page 168)

There are four possible locations for the middle term (called the four figures) and four possible categorical propositional forms in each of three places (two premises and one conclusion) for sixty-four possible combinations of categorical propositions (called the sixty-four moods). $4 \times 64 = 256$.

Exercise VII (page 172-3)

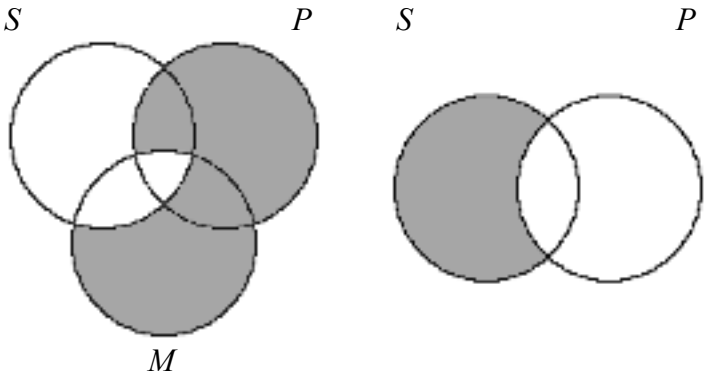
INVALID

1. All *M* is *P*.
   All *M* is *S*.
   ———————
   ∴ All *S* is *P*.



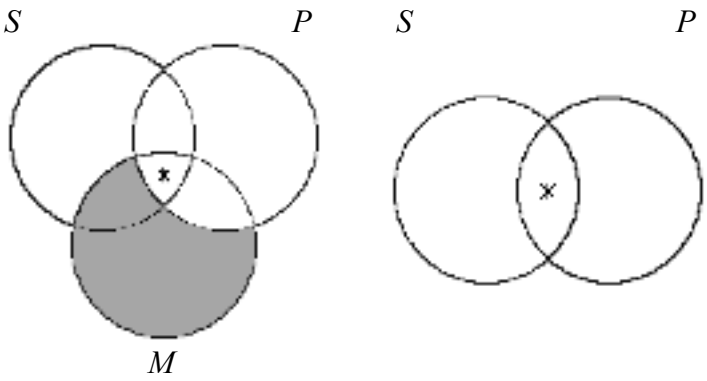
INVALID

2. All *P* is *M*.
   All *M* is *S*.
   ———————
   ∴ All *S* is *P*.



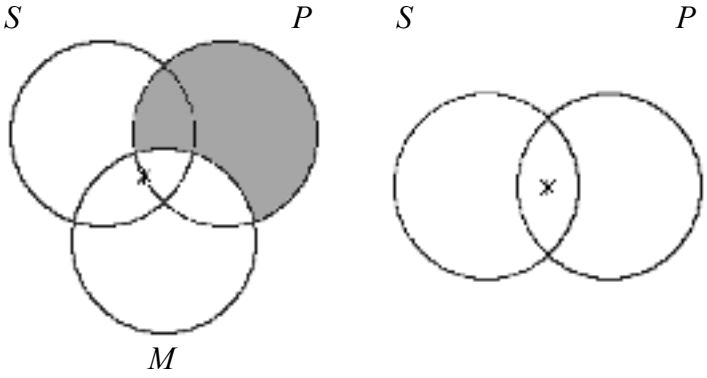
VALID

3. All *M* is *P*.
   Some *M* is *S*.
   ———————
   ∴ Some *S* is *P*.



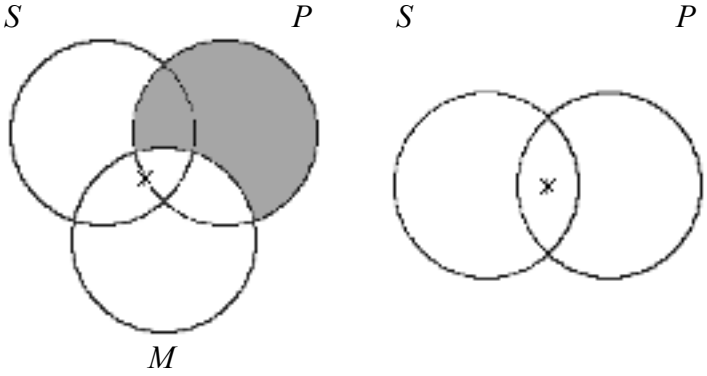
4. All *P* is *M*.
   Some *M* is *S*.
   ———————
   ∴ Some *S* is *P*.

INVALID



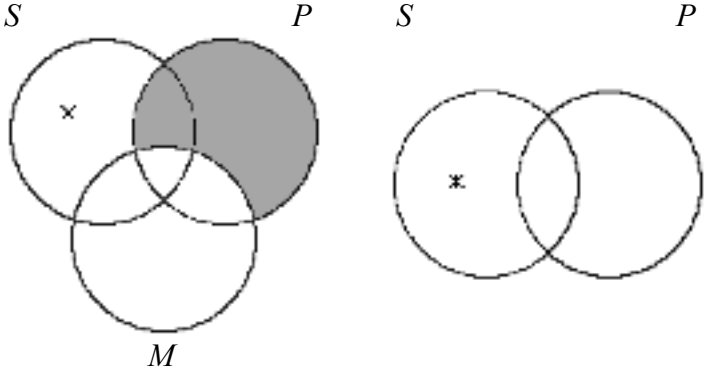
5. All *P* is *M*.
   Some *S* is *M*.
   ———————
   ∴ Some *S* is *P*.

INVALID



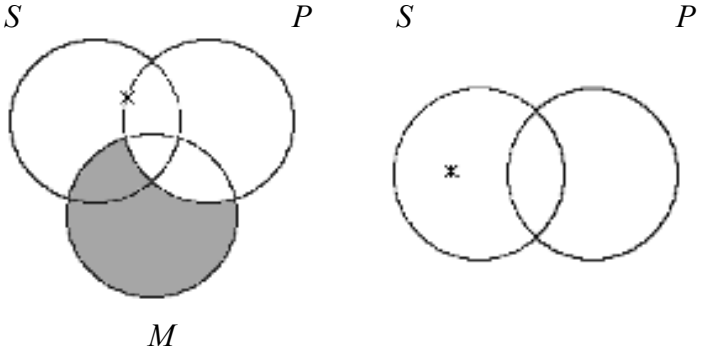
6. All *P* is *M*.
   Some *S* is not *M*.
   ———————
   ∴ Some *S* is not *P*.

VALID



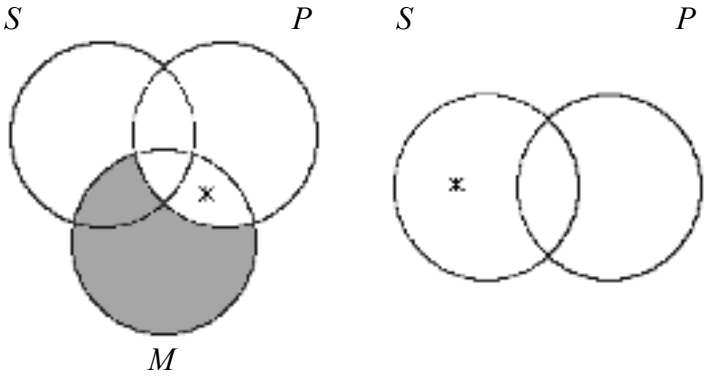
7. All *M* is *P*.
   Some *S* is not *M*.
   ———————
   ∴ Some *S* is not *P*.

INVALID



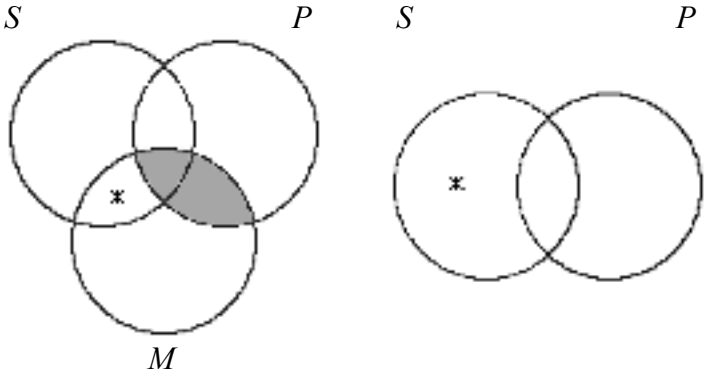
8. All *M* is *P*.
   Some *M* is not *S*.
   ———————
∴ Some *S* is not *P*.

INVALID



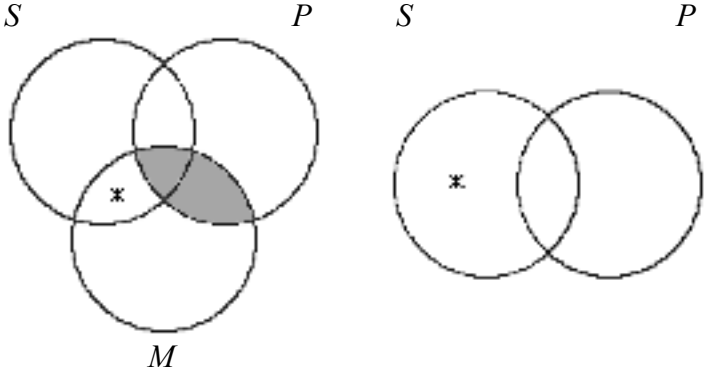
9. No *M* is *P*.
   Some *S* is *M*.
   ———————
∴ Some *S* is not *P*.

VALID



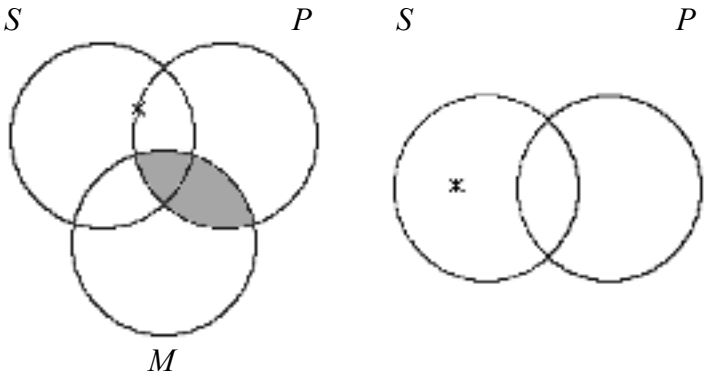
10. No *P* is *M*.
    Some *S* is *M*.
    ———————
∴ Some *S* is not *P*.

VALID



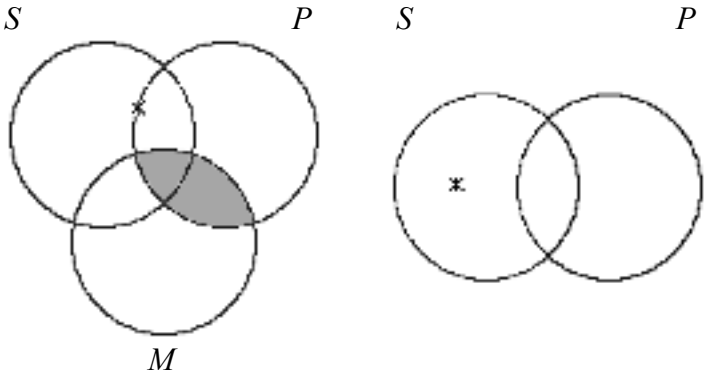
11. No *P* is *M*.
Some *S* is not *M*.
———
∴ Some *S* is not *P*.

INVALID



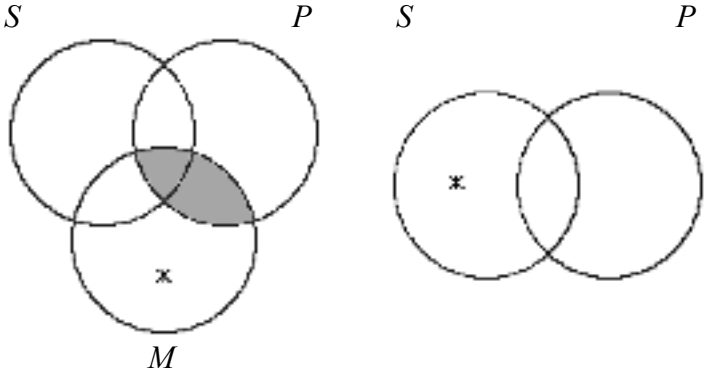
12. No *M* is *P*.
Some *S* is not *M*.
———
∴ Some *S* is not *P*.

INVALID



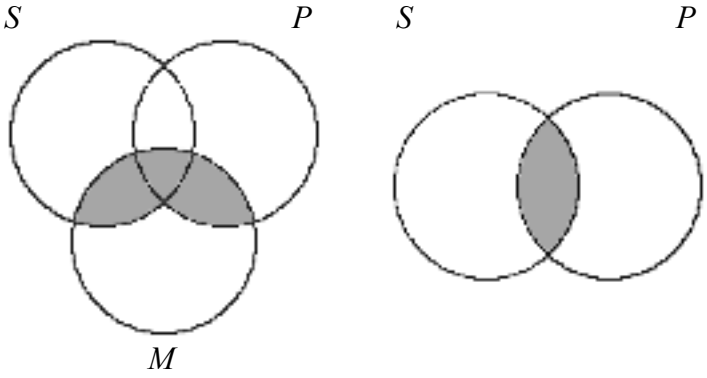
13. No *P* is *M*.
Some *M* is not *S*.
———
∴ Some *S* is not *P*.

INVALID



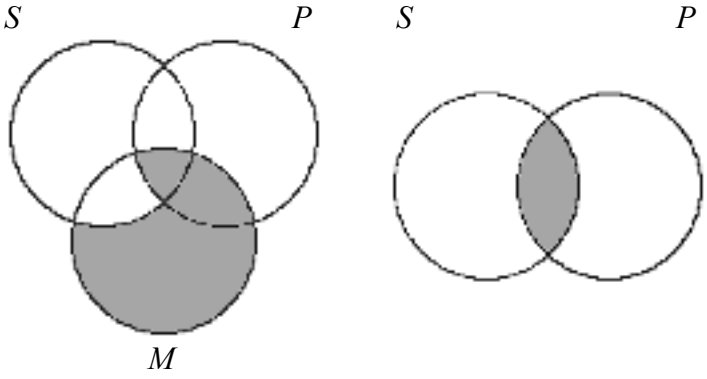
14. No *P* is *M*.
No *M* is *S*.
———
∴ No *S* is *P*.

INVALID



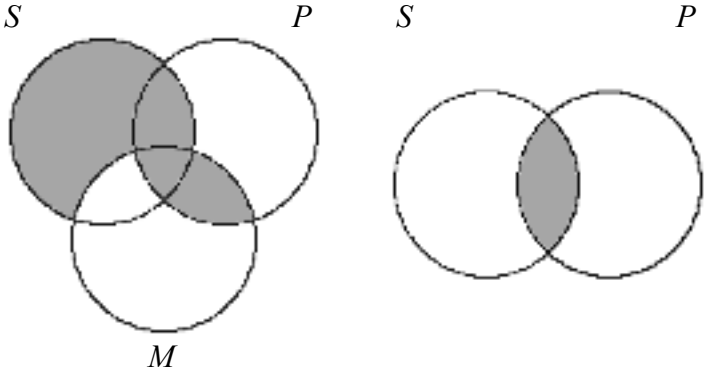
15. No *P* is *M*.
All *M* is *S*.
———
∴ No *S* is *P*.

INVALID



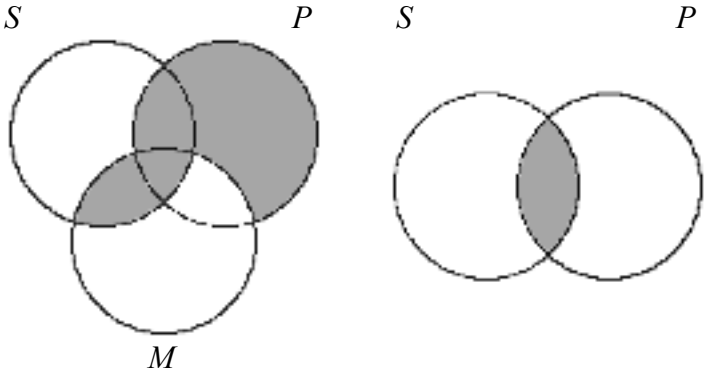
16. No *P* is *M*.
All *S* is *M*.
———
∴ No *S* is *P*.

VALID



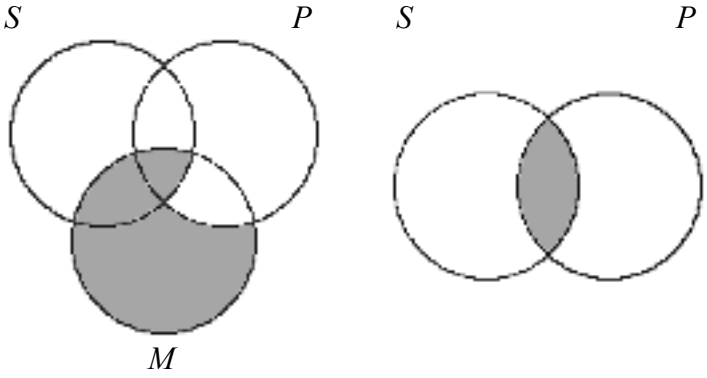
17. All *P* is *M*.
No *S* is *M*.
———
∴ No *S* is *P*.

VALID



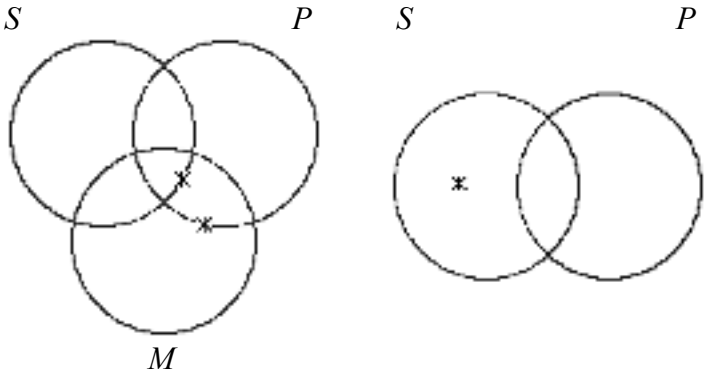
18. All *M* is *P*.
No *S* is *M*.
———
∴ No *S* is *P*.

INVALID



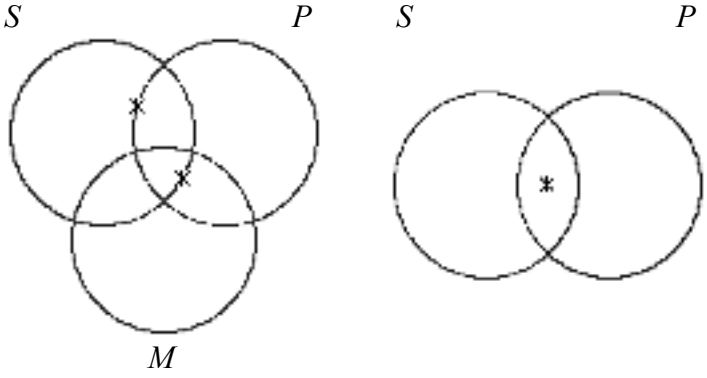
19. Some *M* is *P*.
Some *M* is not *S*.
———
∴ Some *S* is not *P*.

INVALID



20. Some *P* is *M*.
Some *S* is not *M*.
———
∴ Some *S* is *P*.

INVALID



Exercise VIII (page 173)

Because the shading used in diagramming the universal premise sometimes forces the asterisk used in diagramming the particular premise into a specific area, whereas otherwise the asterisk would be put on a line between two areas.

PART III —
HOW TO EVALUATE ARGUMENTS:
INDUCTIVE STANDARDS

Chapter 8: Arguments to and from Generalizations

Exercise 1 (pages 182-3)

1. Inductive, since the word "probably" suggests that the argument is not intended as a valid proof of its conclusion.
2. Deductive, since it is deductively valid; that is, the conclusion can never be false if the premise is true.
3. Inductive, because this is invalid and has the form of a statistical generalization from a sample of past presidents.
4. Inductive, because this is a statistical generalization from a single case.
5. Inductive, because this is an inference to the best explanation.
6. Deductive, since it is deductively valid.
7. Inductive, this is an inference to the best explanation or disjunction of explanations.
8. Inductive, because this is an argument from analogy.
9. Inductive, as "most likely" suggests. This is a statistical application.
10. Deductive. This last example is tricky, since it relies on a suppressed premise that 1 is smaller than 2. Still, assuming this suppressed premise, it is deductively valid.

Exercise II (page 188)

1. The sample size is too small
2. The sample is biased since students who choose to go to college in the Rocky Mountains are more likely to like to ski in general.
3. This sample is biased since it is a poll of only K-Mart customers, rather than shoppers in general.
4. The sample is both too small (and thus commits the fallacy of a hasty generalization) and seems to be prejudiced.
5. The sample size is only one instance; however, given the background knowledge that fruits of the same kind tend to have similar densities, this does not necessarily commit the fallacy of a hasty generalization.
6. This is a biased and prejudiced sample since it is made up only of my friends, who are more likely to like me. The sample is probably also too small, because most people do not have a enough friends for a poll.
7. This sample is biased because many people will lie or misreport whom they voted for when asked by one of the candidates.
8. One problem here is that sample size is too small, but another issue is that the premise might be unreliable. Most mothers will think the best of their children, and thus we need to ask if the premise that Mary's children are all geniuses is acceptable.
9. This shows a bias in that the question is asked in such a way as to skew the responses in one direction.
10. These results cannot be trusted because, regardless of the truth, convicted murderers have motives to say that they would not have murdered, since this shifts some responsibility way from them and on to the government.

Exercise III (page 191)

The statistical application could be reversed back to favoring Marvin's not voting for Romney if it is revealed that two weeks before the election, Marvin quit campaigning for Romney. In this situation, we would have to discover the percentage of people who were Republicans from California, relatives of Obama, actively campaigned for Romney, but then quit two weeks before the election. It is likely that *anyone* who campaigns for a candidate but then quits has been somehow disheartened by the process and is likely to vote for the other candidate. However, this strength could be reversed yet again if it were revealed that Marvin quit the campaign because he wanted to be appointed for a certain position in Romney's next cabinet, and wanted to avoid any apparent favoritism or conflicts of interest. In this situation, a person who is likely to receive a cabinet appointment from a candidate is almost always going to vote for that candidate.

Exercise IV (pages 192)

1. Reference Class: People in the world. This is a weak argument because the reference class is far too large to be relevant to the argument.
2. Reference Class: Super Bowl champions. The proportion given in the argument is very vague, and thus does not provide very strong support for its conclusion. Furthermore, although the reference class is clearly relevant, it is less clear whether other factors, such as players, coaches, injuries, etc., play a larger role. Thus, the argument has some, but little, strength.
3. Reference Class: People in the Senate. The reference class is relevant, but the argument overlooks a stronger conflicting reference class (that Hillary's first name is almost always associated with a woman) and thus is weak.
4. Reference Class: Socialists with blue eyes. Although the socialist aspect of the reference class may be relevant, the blue eyes part is not. However, due to the relevance of just part of the argument, it is strong.
5. Reference Class: What John says. Here the reference class is far too large to be relevant, since most things people say are true. The argument is still strong, however, if we assume that John knows and has no reason to lie about his father's name.
6. Reference Class: What John says. As in (5) the reference class is too large to be relevant. However, this case is different because it involves a certain subset of beliefs (namely who will win a baseball game) that more people tend to have false beliefs about than what they say in general. Thus, the argument is weak.
7. Reference Class: The time or instances. The reference class is too vague to be relevant and the proportion is too weak to support the conclusion. Also, most people know when they are eating lunch.
8. Reference Class: People. This argument overlooks a more relevant reference class, that of physics professors (many of whom probably understand quantum mechanics), so it is weak.
9. Reference Class: Birds. The argument does not consider that penguins are atypical birds.
10. Reference Class: People who claim to be psychic. This is actually a fairly strong argument. The reference class has a good degree of specificity and the proportion is high.

Discussion Question (page 193)

Another way to look at this problem involves the following: Say I make a statement like "I believe that the sun will rise tomorrow because it has risen every other day." You could then ask me "Why do you believe that the sun's rising on other days affects its rising in the future?" To which I could reply "Because the future mimics the past." You could then (rightly, according to Hume) ask "What proof do you have of this?" To this, I would be forced to reply "In the past, the future has mimicked the past, thus I can only assume that in the future, the future will mimic the past." Why? "Because the future mimics the past." This seems viciously circular, but what is the alternative? Thinking about this problem can get you hooked on philosophy.

Chapter 9: Inference to the Best Explanation and from Analogy

Exercise I (page 202)

1. Power—good explanations ought to be widely applicable, not so ad hoc that they explain only one particular case.
2. Conservativeness—accepting the explanation will force us to give up all of our beliefs about modern biology, which are well established.
3. Modesty—the fewer claims an explanation needs, the better.
4. Depth—a deep explanation will not simply substitute one set of questions for another.
5. Explanatoriness—if an explanation doesn't explain all of a phenomenon, or at least suggest other explanations that do, it isn't very good.
6. Falsifiability—if the explanation is compatible with any event, including the phenomenon not occurring, then it cannot explain why the phenomenon occurred instead of not occurring. (See pages 328-331.)

Exercise II (page 202)

1. This explanation is not conservative, presuming you don't believe in wicked witches. Even if you do, the explanation is not deep, because it only raises the question of why a witch would want to make them invisible. It could also be accused of not being falsifiable if it's assumed that they could not be seen, heard, or felt.
2. This explanation lacks depth, because it raises new questions, such as why everyone skipped class today. It also fails to explain the whole situation: Why, for instance, is the professor not in class? Why weren't you told?
3. This explanation seems adequate, since Columbus Day is a holiday on which classes often do not meet.
4. The color of your house is normally irrelevant to its collapse, so this explanation lacks explanatoriness.
5. This explanation postulates a novel kind of earthquake that would violate many of our well-established beliefs about plate tectonics and seismology, so it lacks conservativeness. Furthermore, this explanation is not powerful because it only applies to one specific case.
6. Simplicity is the primary concern here. Though the new subatomic particles may not force us to give up any of our previous beliefs about particle physics, it is implausible to assume that a previously unobserved type of particle has suddenly appeared in a form specifically destructive to the boards in a single abode. Surely some other explanation is simpler.
7. This explanation is immodest. While it might be plausible that the segment of river you fished had a lack (or more likely, paucity) of fish, we assume too much in claiming that the entire river is devoid of fish.
8. The explanation is not simple since it postulates the existence of river gods. And while some may hold this belief, it is not commonly accepted. Furthermore, the explanation is not conservative if, as seems likely, it conflicts with other beliefs you hold. This explanation is also not falsifiable, if "the will of the river gods" is highly inscrutable and could have been invoked to explain just about any outcome.
9. If being unlucky can explain not catching fish, then being lucky can explain catching fish, so explanations by luck are unfalsifiable and never really explain why

something happens rather than its opposite. It is also not very deep since it seems to raise more questions about why you were unlucky.
10. It is not likely that you can tell which airline is flying overhead or where it is headed, so it is immodest to assume it's United to LA.
11. This explanation is not simple if the postulation of aliens is more complicated than other available explanations, such as an airplane. It is also not deep if we need an explanation of why the aliens are here.
12. This is not a very deep explanation, because it doesn't not explain why your eye affliction produces only this one distortion.

Exercise III (page 203)

It is great fun to think up farfetched explanations of these phenomena, but here are some mundane suggestions:
1. The recipe was missing an essential ingredient (such as yeast). Alternatively, the yeast that you added was not alive. The latter is a better explanation if you remember adding old yeast.
2. An earthquake is occurring. Alternatively, a large explosion went off nearby. The former explanation is better if you do not detect other effects of a large explosion, such as a loud noise.
3. Someone changed the lock. Alternatively, you are using the wrong key. The latter explanation is better if you can't think of any reason why anyone would change the lock.
4. The man is delivering to you a prize in a sweepstakes. Alternatively, the man is coming to tell you that your family was in a horrible car accident. The former explanation is better, because the man is smiling.
5. Many people are stocking up on food because they believe that a storm is coming. Alternatively, the road is out, so no new deliveries have arrived. The former explanation is better if the trucks could have used other routes.
6. You put the shirt on backwards. Alternatively, someone stole your pockets. The former explanation is better because pocket thieves are rare.
7. The prehistoric humans were killed by the predators. Alternatively, the predator bones were already there when the humans moved into the cave. The latter explanation is better if the predators are known to have been extinct before the humans lived.
8. The herbivorous animals were killed by the humans. Alternatively, the bones were there when the humans moved into the cave. The former explanation is better if other humans are known to have eaten herbivores of this kind.
9. The lobbyists gave or promised something to the senator in return for his vote. Alternatively, the lobbyists convinced the senator that cigarettes are not really dangerous. The former explanation is better if there is no way to convince the senator that cigarettes are safe.
10. Some joker flattened them. Alternatively, a space ship from another planet landed there. The former explanation is better, because space ships would leave other evidence (or they would have no reason to come here just to flatten fields).
11. Wonderful things happen eventually to most people, and the palm reader knew that. (Compare a prediction that you will receive a bill soon.) Alternatively, the palm reader really can foretell the future. The former explanation is better if the palm reader cannot make more specific predictions that regularly come true.

12. Tigers don't live in the area (so the purple powder has no real effect). Alternatively, tigers are scared of the color purple. The former explanation is better, since other predators are not scared of colored powders.

Discussion Questions (page 203-4)

Scientific arguments often take the form of inferences to the best explanation, as illustrated by the examples in Discussion Questions 3 and 4. Additionally, in debates intended to convince the audience of one's position, especially political debates, inferences to the best explanation are used regularly. Examples of this can be seen through Discussion Question 2. Without hard evidence, Colin Powell must convince the UN that all of the "suspect events" that are taking place can best be explained by the pursuit of nuclear weapons. (It is also worth noting that this kind of reasoning is particularly well-suited to the style and rules governing a body like the UN Security Council or General Assembly).

Exercise IV (page 208-9)

1. a. The difference between the kinds of movies is relevant, since we might share a taste for comedies but not for other kinds of movies. Thus, this difference weakens the argument.
b. This makes the argument strong, since the number and variety of movies that my friend and I agree on makes it more likely that some of these movies share relevant features (whatever they are) with *The Lord of the Rings*.
c. The day of the week is irrelevant, so it does not affect the strength of the argument, except possibly in special circumstances.
d. This stronger conclusion makes the argument weaker, since it is less likely to be true than the original conclusion.
e. This weaker conclusion makes the argument stronger, since it is more likely to be true than the original conclusion.

2. a. If Joe's laziness continues, he will not get as good grades in college, where more work is usually required. The other students' better work habits will help them in college. Thus, this difference seems relevant and will make the argument weaker than if Joe worked as hard as the others. (It is possible that someone who is smart enough to get good grades in high school without working hard will do better in college if they start to work hard, but (a) suggests that Joe is lazy, and such a character trait will presumably continue into college.)
b. This difference weakens the argument, since Joe's college might have lower average grades than the colleges of the other students. (If we added a premise that Joe's college has higher average grades, then this would strengthen the argument that Joe will do well. However, the argument without this premise provides less reason to believe its conclusion because of the differences between the colleges.)
c. Since grades in pre-med courses are usually lower than in physical education courses, this difference strengthens the argument.
d. Since the use of drugs will likely negatively impact Joe's study habits and grades, this difference weakens the argument.
e. Joe's full-time job leaves him less time to study and makes it less likely that he will do as well. The argument is, thus, weakened.

3. a. This makes the similarities relevant and the argument stronger than if the disease affected an organ that was different in rats than in humans.
b. This weakens the argument because cats are like humans in many respects. To determine how much this affects the argument, we need more specific knowledge, such as which organ is affected and whether that organ in humans is more like the corresponding organ in rats or cats.
c. This difference weakens the argument, since humans have no tails.
d. The evidence for the conclusion would be stronger if the drug had been tested on humans.
e. Since humans eat many cooked foods, but rats usually do not, this difference strengthens the argument.

Exercise V (page 209-10)

These questions are intended to display the variety of contexts in which arguments from analogy are used. Complete answers to these questions would be complex and often controversial. Here are a few brief suggestions:
1. Given the background information that Cézanne often painted series of landscapes in similar styles, and that artists are often consistent within a period, this argument is pretty strong, even though it is based on only one other painting. The analogy is based on artist, time, and subject matter.
2. Siamese cats have a bad reputation in some circles, and that background belief might seem to make this argument strong. However, my aunt's cat was raised differently than this one, my aunt's cat bit me only once, and only after I did something to provoke it. These differences make this argument weak.
3. The background information in this case—study habits, intelligence, content of the course—seems relevant and shows a high degree of similarity. Assuming your self-analysis is fair, the argument is strong.
4. Since there is a significant difference between cheating in the context of marriage and cheating in the political realm, the argument that the politician will display similar moral turpitude in both cases is fairly weak. This analogy is not completely irrelevant, however.
5. Economies are complex, and it is not clear which factors affect the impact of a high minimum wage. This makes it hard to say what impact a high minimum wage will have in different countries. Thus, to make this argument stronger, more detail is necessary. Still, in the absence of any relevant difference, the argument does have significant force.
6. To some, this argument will seem quite strong since it seems as though the properties on which the analogy is based are all relevant (presumably nerve endings on the head, a functioning pain receptor in the brain, etc.). However, to others, this will force them to wonder how similar their bodies are to other bodies, and beyond that, how similar their minds are to other minds (notice this is *minds* not *brains)*.
7. This fairly strong argument often convinces doctors to be less paternalistic.
8. Although both companies caused damages through product defects, liability depends on factors (such as whether they had any way of knowing about the defects) that are not mentioned. Hence, the argument is weak.

Discussion Questions (pages 210-3)

1. This argument shows that scientists use analogies effectively.
2. An important, simple, and classic example of an argument from analogy. For commentary, see Philip Kitcher, *Living With Darwin* (New York; Oxford University Press, 2008)(excerpted on pages 440-447).

Chapter 10: Causal Reasoning

Exercise I (page 218-9)

1. T	2. F	3. F	4. T	5. F
6. T	7. T	8. T	9. T	10. T
11. T	12. T	13. T	14. T	15. F
16. T	17. F	18. T		

Exercise II (page 219)

The use of symbolic logic might be helpful in this exercise. For the simpler exercises, so is referencing the circle diagram on p. 233.
1. True—if everything with F has G, then everything without G must lack F.
2. True—if everything with F has G, then everything that does not lack F does not lack G.
3. True—if everything without F has G, then everything that does not have F does not lack G.
4. False.
5. True—if something has F, then it has F or G.
6. True—same reason as (6).
7. True
8. True
9. True
10. True

Exercise III (pages 222-3)

1. a. B and D are eliminated by SCT in Case 2. A and C are not eliminated by SCT.
   b. B and D are eliminated by NCT in Case 3, but A and C are not eliminated by NCT.
   c. A and C are not eliminated by either test.

2. a. No candidate is eliminated by the SCT.
   b. A, B, and D are eliminated by NCT in Cases 2, 3, and 1+3, respectively, but C is not eliminated by NCT.
   c. Only C is not eliminated by either test.

3. a. A, B, C, and D are all eliminated by SCT in Case 1.
   b. A, B, and D are eliminated by NCT in Cases 2-3, but C is not eliminated by NCT.
   c. Nothing passes both tests.

4. a. A and B are eliminated by SCT in Case 3. C and D are not eliminated by SCT.
   b. A, B, and C, are eliminated by NCT in Cases 2, 2, and 1, but D is not eliminated by NCT.
   c. Only D passes both tests.

5. a. A, B, C, and D are all eliminated by the SCT in cases 1, 2, 1+2, and 1, respectively.
   b. B and C are eliminated NCT in Case 3. A and D are not eliminated by NCT.
   c. Nothing passes both tests.

6. a. A, C, and D are eliminated by SCT in Cases 3, 2+3, and 2, respectively, so only B is not eliminated by SCT.
   b. C is eliminated by NCT in Case 1. A, B, and D are not eliminated by NCT.
   c. B passes both tests.

7. a. A, B, and D are eliminated by SCT in Case 1, so only C is not eliminated by SCT.
   b. None of the candidates is eliminated by NCT.
   c. Only C passes both tests.

8. a. A, B, C, and D are all eliminated by the SCT in Case 1.
   b. A and B are eliminated by NCT in Case 2. C and D are not eliminated by NCT.
   c. Nothing passes both tests.

Exercise IV (pages 223-4)

Which case(s) rule the candidate out as (a) a sufficient condition of *failure* or (b) a necessary condition of *failure*:

Candidates		(a) Sufficient Condition	(b) Necessary Condition
Plug	In	Cases 1, 2, 4-6, 8, 10, 12	None
	Out	None	Cases 3, 7, 9, 11
CPU	Old	Cases 1, 2, 4-6, 8	Case 9, 11
	New	Cases 10, 12	Cases 3, 7
Monitor	Old	Cases 1, 2, 5, 6, 10	Cases 3, 7, 11
	New	Cases 4, 8, 12	Case 9
Software	Old	Case 1, 5	None
	New	Cases 2, 4, 6, 8, 10, 12	Cases 3, 7, 9, 11

The only candidate that is not eliminated as a sufficient condition of failure is the plug being out. (That cannot be eliminated because the plug is never out.) The only candidates that are not eliminated as necessary conditions of failure are the old software and the plug being in. (The latter cannot be eliminated because the plug is always in.) It does not follow that any of these candidates is necessary or sufficient, since the plug positions are not tested rigorously, and the claim that the old software is necessary for failure might be refuted by further cases, such as when the computer fails after taking the plug out.

One condition that might be both necessary and sufficient is: Old Software and (either New Monitor or New CPU), so the problem might be some incompatibility between the Old Software and the New Equipment. I would advise updating the software to solve the problem, but there is no guarantee that this will work.

(**Note**: Many more exercises can be constructed on this model simply by changing the results in the right-hand column of the table in the exercise.)

Exercise V (page 224)

Which diners rule the candidate out as (a) a sufficient condition of death or (b) a necessary condition of death:

Candidates		(a) Sufficient Condition	(b) Necessary Condition
Soup	Tomato	A, B, D, E, F, H, L	J
	Leek	G, I, K	C
Entrée	Chicken	A, K, L	C, J
	Beef	D, H, J	None
	Fish	B, E, F, G, I	C, J
Wine	White	A, G, H, L	C, J
	Red	B, D, E, F, I, K	None
Dessert	Cake	B, D, F, H, L	C, J
	Pie	A, E, G, I	C, J
	Ice Cream	K	None

All of the single candidates are ruled out by the SCT as a sufficient condition of death, so no single food could have been sufficient for death. However, beef, red wine, and ice cream are all not ruled out by the NCT as a necessary condition of death, so each of these three might be necessary for death. Moreover, the conjunction of these three —eating beef, drinking red wine, and also eating ice cream—passes both the SCT and the NCT. In other words, every person who ate beef and ice cream and drank red wine died, and every person who died ate beef and ice cream and drank red wine.

Notice, however, that the same holds for the conjunction of just these two: beef and ice cream. Every person who ate beef and ice cream died, and every person who died ate beef and ice cream. In other words, this double conjunction—eating beef and ice cream together—also might be a necessary and sufficient condition for death. In contrast, the conjunction of beef and red wine is not sufficient for death because of Doug, and the conjunction of red wine and ice cream is not sufficient for death because of Ken.

Thus, the conjunction of beef and ice cream is the simplest conjunctive condition that might be both necessary and sufficient for death in light of the evidence that we currently have (although, of course, this candidate still might be defeated by future evidence).

Discussion Questions (page 234)

Any answer to these questions will be controversial. These debates are still live in philosophy.

Exercise VI (pages 237-8)

1. The passage of time is a common cause insofar as China's population will grow over time and the president's hair will fall out more over time. It is possible that the growing population in China could be worrisome to the president and thus be the cause of the shrinking number of hairs on his head, but that seems unlikely.
2. Both of these are caused by a change in time (if that can be a cause).
3. There are several possible explanations for this. First, it is possible that those with venereal diseases are more likely to seek out sex education (or schools provide more

sex ed when veneral disease becomes widespread), and thus *B* would cause *A*. Additionally, it could be the case that those with more sex education are more likely to have sex which increases the chances of venereal disease, and thus *A* would cause *B*. Finally, a third factor, like a society's acceptance of sexual intercourse, could cause both.
4. This correlation could be caused by a third factor: the economy of the state. An agricultural state is more likely to both have more mules and less funds to pay their professors. Maybe also agricultural states don't need to pay professors as much because the cost of living there is lower.
5. Again, this could be caused by a few things. First, it could be that because there are so many fires, more fire trucks are needed, and thus *B* would cause *A*. Additionally, a third variable, like borough size, could contribute to increases in both.
6. This correlation is likely caused by a third factor, such a living in a crime-ridden area that contributes to both more locked doors and more thefts.
7. *A* would have to cause *B* since the speed of the shadow has no impact on the car.
8. Both of these are caused by a third factor, namely hormones in the womb.

Discussion Questions (page 238)

1. This debate is central to many recent laws and to the Supreme Court case of *Helling v. McKinney* 113 S. Ct. 2475 (1993), where a prisoner claimed that it was cruel and unusual punishment to be put in a cell with another inmate who smoked five packs of cigarettes a day.
2. The "hockey stick" diagram can be found in the IPCC report on the internet. Skeptics could respond that correlation does not imply causation, since higher temperatures might cause biological changes that give off more CO_2, or there might be some common cause of higher temperatures and increases in CO_2.

Chapter 11: Chances

Discussion Question (page 242)

The mistake to avoid is ranking "Linda is a feminist bank teller" as more probable than "Linda is a bank teller." The former cannot be more probable because Linda is a bank teller in every case where she is a feminist bank teller. It is enlightening to discuss not just what you think these probabilities are, but *why*.

Discussion Question (page 242)

This exercise demonstrates the availability heuristic. People who do not read ahead often give a first number that is significantly lower than their second number. This is because most people can think of verbs whose gerund form is 7 letters, but cannot easily think of 7 letter words with an "n" in the 6^{th} spot.

Discussion Question (pages 243)

Try arguing about this issue with a member or coach of a basketball team.

Exercise I (page 246)

1. There are four ways of throwing a five, so the probability is 4/36 = 1/9.
2. One can throw a seven in six different ways, the probability is 1/6.
3. The probability of throwing an eleven is 2/36 = 1/18.
4. There are six to throw a seven and two ways to throw an eleven, so the chance of throwing either is (6+2)/36 = 8/36 = 2/9.
5. It is more likely to throw an eight than a five.
6. Since there are four ways of throwing a five and five ways of throwing an eight, the probability of throwing either a five or an eight is (4+5)/36 = 9/36 = 1/4. Since there is one way of throwing a two and six ways of throwing a seven, the chances of throwing either one or the other is (6+1)/36 = 7/36. Hence, it is more likely to throw either a five or an eight.
7. 6/36 or 1/6
8. 1/2
9. 1/2
10. 12/36 or 1/3
11. 2/36 or 1/18
12. 36/36 = 1

Exercise II (page 251)

1. 1/6
2. 5/6
3. 1/6
4. 1/6 X 1/6= 1/36
5. 1/6 + 1/6 – (1/6 X 1/6) = 11/36
6. 6/36 + 6/36 – (1/6 X 1/6) – (1/6 X 1/6) = 1/6 + 1/6 – 1/36 – 1/36 = 10/36

7. 1– (5/6 X 5/6) = 11/36 (Using Rule 4. Compare #5.)
8. 1 – (1/6 X 1/6) = 35/36 (Compare #4.)
9. 1– (5/6 X 5/6 X 5/6 X 5/6 X 5/6 X 5/6) = 1 – 15625/46656 = 31031/46656
10. 1– (1/6 X 1/6 X 1/6 X 1/6 X 1/6 X 1/6) = 46655/46656

Exercise III (page 252)

1. 2/13
2. 11/13
3. 1/13 X 4/51
4. 1/13 X 1/13
5. First we calculate the chances of *not* getting a spade in three consecutive draws. That's 39/52 X 38/51 X 37/50 = 54834/132600 = 0.4135. We then subtract this probability (that a spade will not be drawn) from 1, and so the probability of getting a spade is about 1 – 0.4135 = 0.5865.
6. Again we first calculate the chances of *not* drawing a spade on four consecutive draws. That's 39/52 X 38/51 X 37/50 X 36/49, which comes out to a probability of about 0.3038 that a spade will not be drawn. Thus, the probability that it *will* be drawn is about 1 – 0.3038 = 0.6962.
7. Again we start by computing the probability that a spade will *not* be drawn, but, since the card is always returned, that just comes to 3/4 X 3/4 X 3/4 X 3/4 or about 0.3164. Thus, the probability that a spade *will* be drawn is 1 – 0.3164 = 0.6836. The probability that a spade will be drawn is a little lower in this case than in (6) because here drawing a non-spade does not lower the probability of drawing a non-spade again.
8. 1/4 X 1/4 = 1/16
9. In this case, the first draw can be satisfied by either a heart or a diamond; the second draw needs to produce whichever suit the first did not. Thus, the probability is 1/2 X 1/4 = 1/8 = 0.125.
10. 1/2 X 13/51= 13/102 = 0.1274

Exercise IV (page 252)

1. 1/100 + 1/100 = 2/100 = 1/50
2. 1/100 + 1/100 – (1/100 X 1/100) = 199/10,000 (Alternatively: 1 - (99/100 X 99/100) = 0.0199)
3. 1/100 X 1/100 = 1/10,000
4. 2/100 + 2/100 – (2/100 X 2/100) = 396/10,000 (Alternatively: 1 – (49/50 X 49/50) = 0.0396)
5. 2/100 X 1/99 = 2/9900 = 1/4950
6. 2/100 + 2/100 – (2/100 X 1/99) = (4/100) – (2/9900) = 394/9900 = 0.0398 (Alternatively: 1– (98/100 X 97/99) = 0.0398)

Exercise V (page 253)

1. Many people suppose that the chances must be 50/50 that the remaining sandwich is a ham sandwich, because that was the probability of picking the bag containing two ham sandwiches to begin with. But don't forget that drawing out a

ham sandwich gives you some evidence concerning which bag was selected. Because the chances are *twice* as good for drawing a ham sandwich out of the bag containing two ham sandwiches than they are for drawing it from the bag with only one ham sandwich, the chances are two in three that you are in the bag that started with two ham sandwiches. Thus, the probability that the remaining sandwich is a ham sandwich is actually 2/3.

2. Again, the most common reaction to this puzzle is wrong. It seems obvious that the original probability of selecting the cheese sandwich (one in three) will not be affected by anything that happens after the selection is made. But don't forget that new information is provided after the initial choice, which makes a difference. In fact, the chances of getting the cheese sandwich are 2/3 if you switch. To see this, first notice that it will be a *bad* idea to switch only if you have started by selecting the bag with the cheese sandwich in it. The probability of starting with the bag with the cheese sandwich in it is, of course, 1/3. On the other hand, 2/3 of the time you will have started with a bag with a chicken-fat sandwich in it, and switching will get you the bag containing the cheese. So it is a *good* idea to switch after one of the bags containing a chicken-fat sandwich is removed, because two out of three times you will get the bag containing the cheese sandwich by doing so. This is also known as the Monte Carlo problem or the "Let's Make a Deal" problem.

Exercise VI (page 258)

	Colon Cancer	**Not Colon Cancer**	**Total**
Test Positive	2,700	2,910	5,610
Do Not Test Positive	300	94,090	94,390
Total	3,000	97,000	100,000

2,700/5,600=48.1%

	Colon Cancer	**Not Colon Cancer**	**Total**
Test Positive	27,000	2,100	29,100
Do Not Test Positive	3,000	67,900	70,900
Total	30,000	70,000	100,000

27,000/29,100=92.7%

Exercise VII (page 259)

	Colon Cancer	**Not Colon Cancer**	**Total**
Test Positive	7,470	2,751	10,221
Do Not Test Positive	830	88,949	89,779
Total	8,300	91,700	100,000

7,470/10,221=73.1%

	Colon Cancer	**Not Colon Cancer**	**Total**
Test Positive	65,790	807	66,597
Do Not Test Positive	7310	26,093	33,403
Total	73,100	26,900	100,000

65,790/66,597=98.8%

Exercise VIII (pages 259-61)

1. Let h = Wendy has colon cancer
Let e = The test comes out positively
Pr (h) = 0.001, so Pr (~h) 0.999. Pr (e | h) = 0.9, and Pr (e | ~h) =0.03
So: Pr (h | e) = $\frac{(0.001 \times 0.9)}{(0.001 \times 0.9) + (0.999 \times 0.03)} = \frac{0.0009}{0.03087} = 0.0292$

	Colon Cancer	Not Colon Cancer	Total
Tests Positive	90	2,997	3,087
Do Not Test Positive	10	96,903	96,913
Total	100	99,900	100,000

2. Let h = Wendy has colon cancer.
Let e = The test comes out positive.
Pr (h) = 0.01, so Pr (~h) 0.99. Pr (e | h) = 0.9, and Pr (e | ~h) =0.03
So: Pr (h | e) = $\frac{(0.01 \times 0.9)}{(0.01 \times 0.9) + (0.99 \times 0.03)} = \frac{0.009}{0.0387} = 0.2325$

	Colon Cancer	Not Colon Cancer	Total
Tests Positive	900	2,970	3,870
Do Not Test Positive	100	96,030	96,130
Total	1000	99,000	100,000

3. Let h = Wendy has colon cancer.
Let e = The test comes out positive.
Pr (h) = 0.003, so Pr (~h) 0.997. Pr (e | h) = 0.5, and Pr (e | ~h) =0.03
So: Pr (h | e) = $\frac{(0.003 \times 0.5)}{(0.003 \times 0.5) + (0.997 \times 0.03)} = \frac{0.0015}{0.03141} = 0.0476$

	Colon Cancer	Not Colon Cancer	Total
Tests Positive	150	2,991	3,141
Do Not Test Positive	150	96,709	96,859
Total	300	99,700	100,000

4. Let h = Wendy has colon cancer.
Let e = The test comes out positive.
Pr (h) = 0.003, so Pr (~h) 0.997. Pr (e | h) = 0.99, and Pr (e | ~h) =0.03
So: Pr (h | e) = $\frac{(0.003 \times 0.99)}{(0.003 \times 0.99) + (0.997 \times 0.03)} = \frac{0.00297}{0.03288} = 0.0903$

	Colon Cancer	Not Colon Cancer	Total
Tests Positive	297	2,991	3,288
Do Not Test Positive	3	96,709	96,712
Total	300	99,700	100,000

5. Let h = Wendy has colon cancer.
Let e = The test comes out positive.
Pr (h) = 0.003, so Pr (~h) 0.997. Pr (e | h) = 0.9, and Pr (e | ~h) =0.01

So: $\Pr(h \mid e) = \frac{(0.003 \times 0.9)}{(0.003 \times 0.9) + (0.997 \times 0.01)} = \frac{0.0027}{0.01267} = 0.2131$

	Colon Cancer	Not Colon Cancer	Total
Tests Positive	270	997	1267
Do Not Test Positive	30	98,703	98,733
Total	300	99,700	100,000

6. Let h = Wendy has colon cancer.
Let e = The test comes out positive.
Pr (h) = 0.003, so Pr (~h) 0.997. Pr (e | h) = 0.9, and Pr (e | ~h) =0.1

So: $\Pr(h \mid e) = \frac{(0.003 \times 0.9)}{(0.003 \times 0.9) + (0.997 \times 0.1)} = \frac{0.0027}{0.1024} = 0.0264$

	Colon Cancer	Not Colon Cancer	Total
Tests Positive	270	9970	10,240
Do Not Test Positive	30	89,730	89,760
Total	300	99,700	100,000

7. Let h = Chris did use cocaine
Let e = The test comes out positive
Pr (h) = 0.2, so Pr (~h) = 0.8. Pr (e | h) = 0.95, and Pr (e | ~h) = 0.05.

So: $\Pr(h \mid e) = \frac{(0.2 \times 0.95)}{(0.2 \times 0.95)+(0.8 \times 0.05)} = \frac{0.19}{0.19+0.04} = 0.8261$

	Cocaine User	Not Cocaine User	Total
Test Positive	1,900	400	2,300
Do Not Test Positive	100	7,600	7,700
Total	2,000	8,000	10,000

8. The first part of this problem is exactly the same as in problem (7). However, for the second part, we take the probability that Chris really did use cocaine that we found from the first test (Pr[h | e]=0.8261) and use it as the base-rate for the new test. Thus, we get the following:

Let h = Chris did use cocaine
Let e = The test comes out positive
Pr (h) = 0.8261, so Pr (~h) = 0.1739. Pr (e | h) = 0.95, and Pr (e | ~h) = 0.05.

So: $\Pr(h \mid e) = \frac{(0.8261 \times 0.95)}{(0.8261 \times 0.95)+(0.1739 \times 0.05)} = \frac{0.7848}{0.7848+0.008695} = 0.9890$

	Cocaine User	Not Cocaine User	Total
Test Positive	7,848	87	7,935
Do Not Test Positive	413	1,652	2,065
Total	8,261	1,739	10,000

9. Let h = there is a high level of radon in your basement.
Let e = the inexpensive test comes out positive.
Pr (h) = 0.2, so Pr (~h) = 0.8. Pr (e | h) = 0.8, and Pr (e | ~h) = 0.1.

So: $\Pr(h \mid e) = \frac{(0.2 \times 0.8)}{(0.2 \times 0.8)+(0.8 \times 0.1)} = \frac{0.16}{0.16+0.08} = \frac{2}{3} = 0.666$

	High Radon	Not High Radon	Total
Tests Positive	160	80	240
Do Not Test Positive	40	720	760
Total	200	800	1000

10. Let h = there is a high level of radon in your basement.
Let e = the inexpensive test comes out positive.
Pr (h) = 0.2, so Pr (~h) = 0.8. Pr (e | h) = 0.99, and Pr (e | ~h) = 0.02.

So: $\Pr(h \mid e) = \frac{(0.2 \times 0.99)}{(0.2 \times 0.99)+(0.8 \times 0.02)} = \frac{0.198}{0.198+0.016} = \frac{0.198}{0.214} = 0.9252$

	High Radon	Not High Radon	Total
Tests Positive	198	16	214
Do Not Test Positive	2	784	786
Total	200	800	1000

11. Let h = the car who hit your neighbor was a Porsche.
Let e = the witness identifies the car who bit your neighbor as a Porsche.
Pr (h) = 0.02, so Pr (~h) = 0.98. Pr (e | h) = 0.8, and Pr (e | ~h) = 0.1.

So: $\Pr(h \mid e) = \frac{(0.02 \times 0.8)}{(0.02 \times 0.8)+(0.98 \times 0.1)} = \frac{0.016}{0.114} = 0.1404$

	Porsche	Not Porsche	Total
Classified as Porsche	8	49	57
Not Classified as Porsche	2	441	443
Total	10	490	500

12. Let h = the dog who bit your neighbor is a pit bull.
Let e = the witness identifies the dog who bit your neighbor as a pit bull.
Pr (h) = 0.05, so Pr (~h) = 0.95. Pr (e | h) = 0.9, and Pr (e | ~h) = 0.02.

So: $\Pr(h \mid e) = \frac{(0.05 \times 0.9)}{(0.05 \times 0.9)+(0.95 \times 0.02)} = \frac{0.045}{0.045+0.019} = 0.7031$

	Pit Bull	Not Pit Bull	Total
Classified as Pit Bull	180	76	256
Not Classified as Pit Bull	20	3724	3744
Total	200	3800	4000

13. (a) Let h = the student did the reading in advance.
Let e = the student understood the lecture.
Pr (h) = 0.8, so Pr (~h) = 0.2. Pr (e | h) = 0.9, and Pr (e | ~h) = 0.1.

So: Pr (h | e) = $\frac{(0.8 \times 0.9)}{(0.8 \times 0.9)+(0.2 \times 0.1)} = \frac{0.72}{0.74} = 0.9730$

(b) Let h = the student did not do the reading in advance.
Let e = the student did not understand the lecture.
Pr (h) = 0.2, so Pr (~h) = 0.8. Pr (e | h) = 0.9, and Pr (p | ~h) = 0.1.

So: Pr (h / e) = $\frac{(0.2 \times 0.9)}{(0.2 \times 0.9)+(0.8 \times 0.1)} = \frac{0.18}{0.26} = 0.6923$

	Did Reading	Did Not Do Reading	Total
Understood	72	2	74
Did Not Understand	8	18	26
Total	80	20	100

14. (a) Let h = the student did the reading in advance.
Let e = the student told the professor she did the reading.
Pr (h) = 0.6, so Pr (~h) = 0.4. Pr (e | h) = 1, and Pr (e | ~h) = 0.7.

So: Pr (q | e) = $\frac{(0.6 \times 1)}{(0.6 \times 1)+(0.4 \times 0.7)} = \frac{0.6}{0.88} = 0.6818$

(b) Let h = the student did not do the reading in advance.
Let e = the student did not tell the professor she did the reading.
Pr (h) = 0.4, so Pr (~q) = 0.6. Pr (e | h) = 0.3, and Pr (e | ~h) = 0.

So: Pr (h | e) = $\frac{(0.4 \times 0.3)}{(0.4 \times 0.3) + (0.6 \times 0)} = \frac{0.12}{0.12} = 1$

	Did Reading	Did Not Do Reading	Total
Did Tell Professor	60	28	88
Did Not Tell Professor	0	12	12
Total	60	40	100

Chapter 12: Choices

Exercise I (page 265)

1. ((1/52 + 1/52) X $25) – (50/52 X $1) = $0.00
2. (4/52 X $25) – (48/52 X $1) = $ 1.00
3. (12/52 X $3) – (40/52 X $1) = –$4/52 = about $0.08
4. (40/52 X $1) – (12/52 X $1) = $28/52 = about $0.54
5. ((1/52 X 1/51) X $1988) – ((1 – (1/52 X 1/51)) X $1) = (1988/2652) – (2651/2652) = –663/2652 = –$0.25
6. ((1/52 X 1/52) X $1988) – ((1 – (1/52 X 1/52)) X $1) = (1988/2704) – (2703/2704) = –715/2704 = –$0.26
7. ((39/52 X 38/51) X $0.78) – ((1 – (39/52 X 38/51)) X $1) = ((1482/2652) X $0.78) – ((1170/2652) X $1) = about –14/2652 = –$0.005
8. ((39/52 X 39/52) X $0.78) – ((1 – (39/52 X 39/52)) X $1) = ((1521/2704) X $0.78) – (1183/2704) = about 3.4/2704 = about +$0.001

(Note: Examples 7-8 show how a bad bet can be changed into a good one by returning the cards to the deck after each draw.)

9. [(1/52 X 1/51 X 1/50 X 1/49) X $1,000,000] – [(1–(1/52 X 1/51 X 1/50 X 1/49)) X $1] = about –$0.84
10. [(4/52 X 3/51 X 2/50 X 1/49) X $1,000,0000] – [(1–(4/52 X 3/51 X 2/50 X 1/49)) X $1] = about $2.69

(Note: Examples 9-10 show how a bad bet can be changed into a good bet by not requiring a specific order.)

Exercise II (pages 265-6)

To get a handle on the puzzle of Fogelin's Palace, we can consider a simpler case where the bet only has to be made twice. Now, once more, if you win one and lose one (in whatever order), you come out behind:

	Win	Lose
Total	$150	$90

	Lose	Win
Total	$60	$90

So, again, it might seem a bad idea to gamble at Fogelin's Palace.

The flaw in this reasoning is that not all possible cases have been considered. The following chart shows the results of all possible combinations of wins and losses for two $100 bets:

First Bet	Second Bet	Winnings
Win	Win	$225
Win	Lose	$90
Lose	Win	$90
Lose	Lose	$36

It is easy to see that the total winnings with two wins outweighs the losses in the other three cases. More exactly, the expected monetary value can be calculated by subtracting the total lost in the three losing sequences from the amount gained in the winning sequence, and then dividing by four (the total number of equally likely outcomes):

Expected Monetary Value = ((225-100)-((100-90)+(100-90)+(100-36)))/4 = $10.25

Since this is positive, it is favorable. The same line of reasoning will show that four-bet sequences have a favorable expected monetary value as well. You will, in fact, have more losing sequences than winning sequences, but, as in the examples above, winning sequences pay off enough to outweigh the more frequent losing sequences.

Exercise III (page 268)

1. Expected payoff = (0.9 X $10) – (0.1 X $10) = $8, but the bet is not reasonable, since the overall value of losing is death to a friend.
2. It is easy to construct examples of this phenomenon by thinking about all of the values other than money.

Discussion Question (page 268)

The expected monetary value of this game is infinite, but you would not and should not, of course, pay as much money as you have to play it. It is interesting to consider how much you would pay, and why.

Discussion Questions (pages 272)

1. You would bet that the card will be a spade if you followed the maximax rule or the rule of insufficient reason. The maximin and disaster avoidance rules do not favor either bet. None of these rules favors betting that the card will not be a spade, even though that bet is the one that most people would make.
2. This is very controversial, although one plausible set of conditions is laid out by Kavka in the work cited on the preceding page.
3. If we apply the rule of insufficient reason, the expected value of switching is (1/2 X $100 gain) – (1/2 X $50 loss) = $25, so you should switch. (In this way, the grass *is* always greener on the other side!) This result seems implausible to critics of the rule of insufficient reason.

PART IV: FALLACIES

Chapter 13: Fallacies of Vagueness

Exercise I (page 277)

1. This term clearly applies to elephants.
   It clearly does not apply to shrimp.
   Dogs are borderline cases.
2. This term clearly applies to California.
   It clearly does not apply to Vermont.
   Kansas is a borderline case.
3. This term clearly applies to *War and Peace*.
   It clearly does not apply to *A Christmas Carol*.
   Madame Bovary is a borderline case.
4. This term clearly applies to an 80-year-old professor.
   It clearly does not apply to a 30-year-old professor.
   A 50-year-old professor is a borderline case.
5. This term clearly applies to Britney Spears.
   It clearly does not apply to me.
   Many singers in night clubs are borderline cases.
6. This term clearly applies to the President of the United States.
   It clearly does not apply to the President's baby.
   Local school board members are borderline cases.
7. This term clearly applies to quantum mechanics.
   It clearly does not apply to physical education.
   History is a borderline case.
8. This term clearly applies to a meeting at midnight.
   It clearly does not apply to a meeting at 6 a.m.
   Afternoon meetings can be borderline cases.
9. This term clearly applies when one arrives an hour late.
   It clearly does not apply when one arrives a second late.
   Arriving a minute or two late is a borderline case.

Exercise II (pages 277-8)

1. Context: If a bank officer must approve Ross's application for a home mortgage, it might matter precisely how large Ross's income is.
   Replacement: Ross is a billionaire.
2. Context: If cocaine might be used in a medical procedure, then it might matter precisely how dangerous it is.
   Replacement: An overdose of cocaine can kill you.
3. Context: Ruth applied for a job in your law firm.
   Replacement: Ruth graduated first in her law school class.
4. Context:You have a chance to bet that Andre will win the United States Open tennis tournament this year.
   Replacement: Andre won the United States Open and other major tournaments recently.

5. Context: A doctor needs to decide whether to perform a second operation on Mark now.
   Replacement: Mark is still in critical condition.
6. Context: We are picking a center for our basketball team.
   Replacement: Shaq is 7′1″ and weighs 350 pounds.
7. Context: Dan has to decide whether to hire a tutor.
   Replacement: Dan is about to flunk out of school.
8. Context: Walter is applying for a training program to become a bus driver or a sharpshooter.
   Replacement: Walter can't see a hand in front of his face.
9. Context: A committee is distributing a limited amount of disaster relief.
   Replacement: The earthquake caused thousands of deaths and billions of dollars in damage.
10. Context: A set of twins are waiting to hear back from colleges they applied to, and their mother informs them of the news.
    Replacement: The news was that both siblings got into their top choices.

Discussion Question (page 280)

Answers to this question are still controversial. For discussions of several alternatives, see http://plato.stanford.edu/entries/vagueness/ and
http://plato.stanford.edu/entries/sorites-paradox/

Exercise III (page 281-2)

Once you get the pattern for arguments from the heap, this exercise should be simple.

1. a. A single grain of sand is not a heap.
   Adding one grain of sand cannot make a heap out of what is not a heap.
   ———————————————
   ∴ No number of grains of sand makes a heap.
   ———————————————
   ∴ There are no heaps.

   b. There is no significant difference between a collection of grains of sand and another collection with just one more grain of sand.
   If one collection of grains is not significantly different from a second collection of grains, and the second collection is not significantly different from a third collection, then the first collection is not significantly different from the third collection.
   ———————————————
   ∴ There is no significant difference between a heap and a single grain of sand.

2. Same pattern but add one inch at a time starting at four feet.

3. Same pattern but add one page at a time starting with a ten-page pamphlet.

4. Same pattern but add one degree at a time starting at absolute zero.

5. Same pattern but add one percent at a time starting with no taxes at all.

6. Same pattern but add a little evidence at a time starting with none.

Discussion Questions (page 282)

These questions stimulate lively debates.

Discussion Question (page 284)

These questions might arise again during examination periods!

Exercise IV (page 286-7)

1. S = causal slippery-slope argument. The thrust of this argument is that since there is little difference between students who are only one year apart in school, then allowing sex education in 8th grade will *cause* us to eventually offer sex education to kindergarteners. This effect seems unlikely because it is easy to draw a line between high school and middle school or between middle school and elementary school.
2. F = a fairness slippery-slope argument. (Norval Morris argues this way in *Madness and the Criminal Law*.) This argument is a fairness slippery-slope because it concludes that it is unfair or "unjust" to treat one group of people differently from another group, when there seems to be no significant reason as to why.
3. C = conceptual slippery-slope argument. The argument claims that there *is no real difference* between insanity and eccentricity, revealing that it is conceptual.
4. S = causal slippery-slope argument. The argument claims that smoking one cigarette a day will eventually cause you to smoke many more.
5. C = conceptual slippery-slope argument. Again, here the conclusion is about an apparent difference not actually existing, and thus it is conceptual.
6. F = a fairness slippery-slope argument. The argument claims that it is unfair to give certain rights to a being, and deny those same rights to an extremely similar being.
7. S = causal slippery-slope argument. Here, the argument states that by allowing euthanasia in some cases, we will be causing widespread patient-killing.

Exercise V (page 287)

Answers to these questions will not be simple and will be controversial, but here are some basic ideas:
1. The reason not to set the minimum driving age lower than 16 is to reduce the number of accidents, because drivers under age 16 are often more likely to have accidents. The reason not to set the minimum driving age higher than 16 is to increase the freedom of the 16 year-olds who drive safely.
2. The reason set the minimum voting age at 18 is to ensure an adequate level of intelligence and information to make a reasonable choice among political candidates. (This age was lowered from 21 to 18 by the 26th Amendment to the United States Constitution in 1971, partially because it seemed unfair to draft people before they could vote.)

3. The reason to set the minimum draft age at 18 is to ensure adequate strength and judgment among military personnel, since others depend on them. Another possible reason is to avoid interfering with draftees' education, which would affect their life prospects after leaving the military.
4. The reason to draw this line at 21 is to reduce the consumption of alcohol by teenagers and, thereby, to reduce alcohol-related problems, such as drunk driving. (Note: It is not clear why the age in (2) and (3) is higher than the age in (1) or lower than the age in (4). This is worth considering.)
5. The reason to draw a line at a certain age is to ensure an adequate ability, experience, and maturity in the President. A younger President also might not get the respect that Presidents need. In the United States the minimum age is 35. Although, it is not clear why the age of 35 was chosen instead of 40 or 30.
6. This might be instituted in order to make room in the job market for younger workers and/or to prevent incompetence due to age.

Exercise VI (page 287-8)

Below are just a few reasons why these arguments can be seen as either weak or strong.
1. This is not a very good argument because it fails to acknowledge that the driver was warned about the speed limit.
2. This is clearly a bad argument, although it's not exactly clear what makes it so terrible. Common sense tells us that student questions do not follow this pattern, although there is no logical reason as to why they couldn't.
3-8. These are all controversial arguments and there are reasons both for and against accepting them. Try to identify what type of slippery slope arguments they are before evaluating them.

Discussion Questions (page 288-9)

These questions represent just a few of the many important cases where slippery-slope arguments are given on both sides of an issue, and what the implications of such scenarios might be. In dealing with such problems, we need to evaluate the conflicting arguments separately and then, if both arguments seem equally strong, ask whether this shows that neither argument is really strong.

Chapter 14: Fallacies of Ambiguity

Exercise I (page 294)

Many answers are possible, but here are a few.

1. Rewriting: Barry Bonds was safe in his house.
   Barry Bonds was safe at home plate.
   Expanding: Barry Bonds was safe at home when I telephoned him.
   Barry Bonds was safe at home, tying the score.

2. Rewriting: I don't know what mental condition Meredith is in.
   I don't know which state of the United States Meredith is in.
   Expanding: I don't know what state Meredith is in, but I hope she got over her depression.
   I don't know what state Meredith is in, Kentucky or Tennessee.

3. Rewriting: On which part of your body were you bitten?
   In which location were you when you were bitten?
   Expanding: Where did you get bitten, on your legs or on your arms?
   Where did you get bitten, on the deck or in the yard?

4. Rewriting: The President herself sent congratulations.
   The President sent congratulations to her.
   Expanding: The President herself sent her congratulations for his new appointment.
   The President himself sent her congratulations for her new appointment.

5. Rewriting: It can be boring to visit professors at home.
   Professors visiting your college can be boring.
   Expanding: Visiting professors can be boring, so it is better not to visit them.
   Visiting professors can be boring, so it is better to take courses from regular professors.

6. Rewriting: Wendy ran in the marathon.
   Wendy organized the marathon.
   Expanding: Wendy ran in the marathon, but she did not win.
   Wendy ran the marathon, but she was not a runner herself.

7. Rewriting: The words "altering" and "changing" have the same meaning.
   The word "altering" is changing its meaning.
   Expanding: The meaning of the term "altering" is changing—they are almost perfect synonyms.
   The meaning of the term "altering" is changing, which is just another example of meaning shift.

8. Rewriting: I do not want to stand too near to him.
   I do not want to get too attached to him.

Expanding: I do not want to get too physically close to him.
I do not want to get too emotionally close to him. (This shows how adverbs can create or remove ambiguity.)

9. Rewriting: I often invite my friends for dinner.
I often eat my friends for dinner.
Expanding: I often have my friends to my house for dinner.
I often have my friends done medium rare for dinner.

10. Rewriting: Drive slowly because children often play here.
Children who are slow (mentally?) often play here.
Expanding: Drive slow because children are playing here.
Slow children are playing here.

11. Rewriting: Save as much waste paper and soap as you can.
Waste paper and save soap.
Expanding: Save both soap and waste paper.
Save soap and then waste paper. (This shows how word order can create or remove ambiguity.)

12. Rewriting: In his will, he left $1,000 to his son Jim and $1,000 to his son John.
In his will, he left $500 to his son Jim and $500 to his son John.
Expanding: In his will, he left $1,000 to each of his two sons, Jim and John.
In his will, he left $1,000 to be divided between his two sons, Jim and John.

13. Rewriting: Everything can be explained.
Some one explanation accounts for everything.
Expanding: There is some explanation or other for everything.
There is some single explanation for everything.

14. Rewriting: She is a historian that studies Asia.
She is a historian of Asian descent.
Expanding: She is an Asian historian, specializing in post-WWII Japan.
She is an Asian historian, originally from Korea.

15. Rewriting: Nobody is permitted to be in the lounge this evening.
It is possible that nobody is in the lounge this evening.
Expanding: Because the rules forbid it, nobody may be in the lounge this evening.
Because everybody is out of town, nobody may be in the lounge this evening.

16. Rewriting: There was no audience at the 8 p.m. concert.
Everyone came after 8 p.m. when the concert was to begin.
Expanding: Nobody came to the concert at 8 p.m., so it was cancelled.
Nobody came to the concert on time at 8 p.m., so it started late.

Exercise II (page 294-5)

1. Milk drinkers switch to milk powder.
   Milk drinkers turn into powder.
2. An anti-busing amendment is rejected by senate.
   An anti-busing protester is murdered by senate.
3. Mrs. Gandhi is attacked with stones in rally in India.
   Mrs. Gandhi got high on drugs in rally in India.
4. College grants degree to blind senior citizen.
   College graduating class blinds senior citizen.
5. Rising prices of beans affect the poor.
   Price of jumping beans affects the poor.
6. Tuna are being caught off Washington coast.
   Tuna are biting off hunks of Washington coast.
7. It is time to watch football and eat meatball stew.
   It is time to eat stew made of footballs and meatballs.
8. Police kill man wielding an ax.
   Police use ax to kill man.
9. Squad assists victim of dog bite.
   Squad assists dog in biting victim.
10. Expert on child teaching will speak.
    Child is teaching an expert to speak.
11. Prostitutes petition pope.
    Prostitutes are attractive to pope.
12. Legalized outhouses are discussed by legislature.
    Legislature lets fresh air into legalized outhouses.
13. Police can't stop other people from gambling.
    Police can't stop themselves from gambling.
14. Judge permits club to continue excluding customers on the basis of sex.
    Judge permits club to continue running a bar where sex is sold.
15. Greeks impose fines on hookers.
    Greeks make good hookers.
16. Survivor of Siamese twins returns to parents.
    Survivor of Siamese twins joins parents at the hip.
17. Politics of Caribbean islands become more radical.
    Location of Caribbean islands moves to the west.
18. Teenage prostitution problem is becoming more serious.
    Teenage prostitutes have problems mounting their clients.
19. Miners are refusing to work after they have died.
    Miners are refusing to work after a death has occurred in the mine in which they work.
20. Police begin a campaign to find and ticket jaywalkers.
    Police begin a campaign to hit jaywalkers with their cars.
21. Bureaucratic rules and regulations prevent the construction of new bridges.
    New bridges are held together by red-colored tape.
22. Juvenile court is going to try the case of a defendant accused of shooting.
    Juvenile court is going to attempt to shoot the defendant.
23. Kids prepare nutritious snacks.
    Kids are nutritious snacks.

24. Study of obesity looks for a test group that is larger in number.
    Study of obesity looks for a test group that is larger in size.
25. Hospitals sued by seven doctors whose specialty is feet.
    Hospitals sued by doctors who are seven feet tall.
26. The number of dropouts from local high schools has been cut in half.
    Local students who have dropped out of high school have been cut in half.
27. An Iraqi leader is seeking weapons.
    A head of an Iraqi person is seeking arms.
28. Drunk gets sentenced to spend nine months in a case for a violin.
    Drunk gets nine months in a case involving a violin.
29. Teachers' strike causes kids to become idle.
    Teacher hits kids who are idle.
30. The more liberal politicians of Britain vacillate on the issue of Falkland Islands.
    British people left a breakfast food on the Falkland Islands.
31. Stolen painting found close to tree.
    Tree found stolen painting.
32. New vaccine may prevent rabies from spreading.
    New vaccine may have rabies in it.

Exercise III (page 295)

In such cases, it is hard to tell which meaning, if any, was intended; but this is not a basis for criticism, for the double meaning was intended.

Exercise IV (page 297-8)

1. The policy against hiring drug users might be interpreted to refer to narcotics or illegal drugs, in which case aspirin is not a drug. However, the person giving this argument takes the policy to refer to a larger class of drugs, including aspirin.
2. This argument depends on using "man" in the first premise to refer to all humans, and in the second premise to refer only to male humans.
3. This argument depends on using "practicing medicine" in the first premise to refer to performing medical procedures, whereas practice in the second premise refers to doing something over and over in order to get better at it.
4. "All natural" is opposed to artificial (ingredients), not to supernatural.
5. Ice cream is all natural if it is made out of ingredients that occur in nature, even if these ingredients are not combined in this way in nature.
6. This argument rests on an ambiguity in the word "right." First it means (at least) that one is *permitted* to do something, and then it means that it is *correct* to do it.
7. This argument relies upon an analogy with the following argument: You passed John on the road, therefore you walk faster than John. (Here "passed" is used in the sense of "overtook.") Of course, the phrase "no one" does not function like a proper name. This can be seen by restating the argument like so: There was no person whom you passed on the road. Therefore, everyone walks as fast or faster than you do. This argument is no good, since, first, maybe no one was on the road at all and, second, even if you walked faster than someone on the road they may have been too far ahead to overtake.

8. From the fact that each thing must individually have a cause of its own, it does not follow that everything has the same cause. Compare: every child must have a parent, so one person must be the parent of every child.
9. "The apostles were twelve" means they were twelve in number, not that they were twelve years old.
10. This argument rests upon the ambiguity introduced by the idiomatic expression "any number of."
11. The fiber that people want in bread is not wood fiber.
12. The first premise might hold for criminal laws, but scientific laws, like the law of gravity, are very different.

Discussion Questions (pages 298-9)

1. The main argument in this passage seems to run like this:

Newspapers should print stories that are in the public interest.
Rumors about sex scandals are in the public interest.
∴ Newspapers should print rumors about sex scandals.

The problem is that it is not clear what these premises mean. It is natural to read the first premise as saying that papers should print stories that benefit the public. In contrast, the second premise is supported by claims about circulation and letters, so the second premise seems to use the phrase "in the public interest" to refer to what the public takes an interest in. This is a separate issue, since people can be interested in things that it does not benefit them to know. Thus, the two premises seem to use the phrase "in the public interest" with different meanings. If so, the argument seems to commit a fallacy of equivocation.

To check this out, try substituting a single meaning throughout. First, suppose that "in the public interest" means "benefits the public" in both premises. The argument might then be valid, but its second premise is questionable, because it says that rumors about sex scandals benefit the public. This cannot be shown by increases in circulation and letters. Moreover, the very opponents who deny the conclusion would also deny this second premise, so nobody should be convinced by the argument. (This is an example of the fallacy of begging the question, which will be discussed in the next chapter.)

The second premise is less dubious if the phrase "in the public interest" refers to what the public is interested in. The second premise then says that rumors about sex scandals are stories that the public takes an interest in, and this claim *is* supported by newspaper circulation and letters. However, the *first* premise is now questionable, since it claims that newspapers should print all stories that the public takes an interest in. Even if the public does take a great interest in battle plans during a war, printing stories about such topics might endanger military personnel.

In response, defenders of the argument might insist that newspapers *should* print stories that the public is interested in, because the job of newspapers is not to do what is good for society but only to provide as much information as possible about what the public wants to know. However, this premise (that the only job of newspapers is to satisfy curiosity) is exactly what is denied by opponents who deny the conclusion (that newspapers should print rumors about sex scandals). Consequently, the argument makes no progress in resolving the issue.

2. This argument is relevant to the parts of Chapter 18 on affirmative action.
3. This argument against the morality of homosexuality is surprisingly common.

Exercise V (page 304)

1. jejune = 1. lacking nutritive value, 2. lacking interest or significance, 3. lacking maturity, puerile
2. ketone = an organic compound with a carbonyl group attached to two carbon atoms or in a bivalent radical
3. fluvial = of, related to, or living in streams
4. xebec = a small, three-masted Mediterranean vessel (great for scrabble!)
5. plangent = 1. resonant, 2. loud and mournful

Exercise VI (page 304)

1-2. "klurg" = "the chunks of ice that form under car fenders in winter"
3. "Lacecaps" could refer to the plastic covers that protect the ends of shoelaces.

Exercise VII (page 304)

1. We might need a precising definition of a book as having more than 50 pages to know whether certain items should be filed with pamphlets or books in a library. Children's books might be an exception.
2. We might need to specify what counts as an alcoholic beverage in order to determine whether using certain cough medicines violates a law against minors consuming alcoholic beverages.
3. We might need to specify what counts as a crime when asking on a visa application whether the applicant has ever been found guilty of a crime.
4. We might need to specify a temperature when water counts as warm for the purpose of mixing with yeast to make bread.
5. We might need a speed limit to tell us when someone is driving fast. (Notice that "fast" can also be ambiguous. See (5) in Exercise VIII.)

Exercise VIII (page 304)

1. Calm down. When I said that there was a run on the bank, all I meant was that people were jogging on the roof.
2. When I said that I have a pen in my office, I meant the kind of pen that you write with, not the kind that you keep pigs in.
3. When I asked you what kind of game you like, I meant to ask what kind of game you like to play, not what kind of wild animals you like to eat. (And I did not mean Russian roulette!)
4. His job is painting houses, not canvasses.
5. When I asked you to shut the door fast, I wanted you to shut it tightly, not quickly. (Or: When I told you to go fast, I meant for you to hurry up, not to go away and stop eating food.)

Exercise IX (page 305)

1. "*A* and *B* are sisters" = "*A* and *B* are female and have the same parents."
2. "*A* and *B* are siblings" = "*A* and *B* have the same parents."
3. "*A* is *B*'s half-brother" = "*A* is male and *A* and *B* have only one parent in common."
4. "*A* is *B*'s niece" = "A is female and a parent of *A* has parents in common with *B*." (NB: this is the best we can do without "spouse" or "married" as a primitive, but it is not quite right if a person's spouse's sibling's daughter is his or her niece.)
5. "*A* is *B*'s cousin" = "*A* and *B* share no parents, but one of *A*'s parents and one of *B*'s parents have a parent in common (first cousins), or else one of the parents of a parent of A and one of the parents of a parent of B have a parent in common (second cousins), etc." (Some dictionaries define a cousin as the child of someone's aunt or uncle, but that's not quite right because an aunt by marriage could have a child by another marriage and that child would not be a cousin.)

Discussion Questions (pages 348-51)

This is an example of a precising definition. The question of whether this definition is justified must take into consideration the socio-political events surrounding the time when the precising definition was released. Clearly the controversial nature of this definition (as well as the related events that preceded it) show how important it is in some cases to be extremely precise with our use of language.

Chapter 15: Fallacies of Relevance

Exercise I (page 312)

1. This is a dismissal, because it says why Sadie's vision is untrustworthy. "So she must have seen something else" infers that what Sadie said is false, so this is also a denier.
2. This is also a dismissal, because it claims that Sam's motives make him untrustworthy. It does not deny that what Sam said is true.
3. This is a silencer, because it denies Steve's right to make accusations (even correct ones).
4. This is not an ad hominem argument at all, because the argument says nothing about Sybill, even if it suggests that Sybill is not truthful.
5. This is a denier, because it claims, "she is wrong".

Exercise II (pages 313)

It is necessary to determine the conclusion of an argument in order to decide whether the argument is an ad hominem denier, silencer, or dismisser. Unfortunately, the conclusion is often unclear in realistic examples. It is also often controversial whether the arguments in this exercise provide adequate justification. Still, we can give answers for each example on one plausible interpretation.

1. This ad hominem argument is a dismisser, because its conclusion is, "I can't trust it," and its premises charge unreliability. It seems justified, given the now-admitted history of distortion by tobacco companies.
2. This ad hominem argument is partly a dismisser insofar as it questions the reliability of the Joint Chiefs. However, it is mainly a denier, because its final conclusion is "they probably don't need it", which is the opposite of what they say. Whether it is justified is probably controversial.
3. This ad hominem argument is a denier, since it concludes "we must not really need a draft," which denies what Congress said. It is not a dismisser, because, even if Congress *would not* vote for a draft if they were eligible for the draft, this does not suggest that they *would* vote for a draft if a draft were not needed. Hence, it does not suggest that Congress is unreliable in claiming that a draft is needed. It might still be partly a silencer insofar as it suggests that it is unfair to impose risks on others that one is not willing to impose on oneself.
4. This ad hominem argument dismisses the party in power as untrustworthy because its motives make it unreliable. It could be applied as well to the party out of power, which suggests that it is unjustified. It might also be interpreted as a silencer if the point is that the party has no right to make comments due to a conflict of interests, but it is not clear who else could decide the issue of term limits.
5. This ad hominem argument is a silencer, denying the right of those who receive tax revenues to speak about tax cuts. Notice that, if everyone either pays taxes or receives benefits from tax revenues, then nobody is totally impartial, so this requirement of impartiality denies everyone's right to speak. That makes it seem unjustified.
6. This ad hominem argument is similar to (5), but it is a dismisser instead of a silencer, because it denies reliability instead of a right to speak. It still seems unjustified because so many smart and unselfish people pay taxes.

7. This ad hominem argument is a dismisser insofar as it claims that people do not know enough to be reliable or trustworthy in predicting impacts of tax policies. This argument seems justified to some extent, partly because the dismissed claim is so strong—that the tax policies will "destroy" the economy.
8. This ad hominem argument is a dismisser, because it suggests that the economist is unreliable, since, if he could reliably predict the economy, then he would be richer than he is. It does not claim that his current prediction is false, so it is not a denier.
9. This ad hominem argument seems to be a silencer, because it suggests either that pro-choice activists are not impartial, so they have no right to make moral judgments about abortion; or that they are hypocritical, since they benefit from a prohibition on abortion that they reject.
10. This ad hominem argument is probably a silencer if the point is that male opponents of abortion do not have the experience of pregnancy and do not face the same social expectations of child-rearing and, thus, cannot have the right to speak on abortion.
11. This *tu quoque* argument is a silencer, since it denies the speaker's right to criticize. It suggests hypocrisy. (This quotation is from a response to the article by Beebe in an exercise in Chapter X.)
12. This ad hominem argument dismisses Fred as unreliable on the basis of his inconsistency over time. Although only one of Fred's positions (last year's or this year's) can be true, that by itself is no reason to deny his reliability this year, when he has had more time to think about the issue, and the circumstances might have changed.
13. This classic ad hominem argument is a silencer, claiming that those who have sinned have no right to judge others for sin (which was required before throwing stones at sinners). This argument would rule out all judgments of other people's sins by anyone who ever sinned. That includes (almost?) all humans, so this argument would rule out (almost?) all judgments that anyone has sinned, or at least all punishment (throwing of stones because of sin).

Discussion Question (page 314)

1. Many students have probably encountered this common rhetorical move.
2. This classic is usually read as a silencer, but "if you have understanding" also suggests dismissal.

Exercise III (page 318)

We will not answer all five questions about each example, but each raises one main point.
1. This appeal to authority is strong by all of our tests.
2. In contrast with (1), the surgeon general is not an expert on the morality of abortion. Moreover, this is not the kind of issue that can be settled by expert opinion. This, of course, is controversial.
3. Here, of course, one issue is whether the authority can be trusted to tell the truth when he makes so much money to say what he does. It is also interesting to ask whether Jordan is an authority. He might have tried a lot of sneakers, but a sneaker that fits his style might not work for other people, since his abilities and style are so unusual.

4. This might not seem to be the kind of question that can be settled by expert opinion. In addition, those who planned the billboard chose only praise among many comments, so, even if one critic praises the movie, there might be many more who hated it.
5. Friendship does not make someone an expert, but a friend is more likely than a stranger to agree with your taste in movies. Moreover, its conclusion is very weak, so this argument is not totally off the wall.
6. This is not the kind of question that can be settled by expert opinion. Also, the fact that Fred eats a lot of ice cream might make him fat, but it does not make him an expert. He might have tried only one kind.
7. Most scientists who look for life on other planets do not say that it is there, but only that it *might* be there, so this appeal to authority seems to cite the authority incorrectly.
8. This appeal to authority seems good unless one knows that the Cy Young award is given to the best pitcher in the National League and also to the best pitcher in the American League. There are two winners each year (since 1967). Thus, the authority is not cited correctly.
9. This is not the kind of question that can be settled by expert opinion.
10. The organizers cannot be trusted to tell the truth, since they want lots of people to show up, and organizers often bias their reporting accordingly.
11. The opponents cannot be trusted to tell the truth, since they want very few people to have shown up.
12. This raises the issue of the role of authority in religion. Another issue is whether the words of the Bible have been misinterpreted here.

Exercise IV (page 321)

1. appeal to tradition—a bad one
2. appeal to popular opinion (and to the authority of tabloids)—fallacious because popular opinion (and tabloid opinion) are not based on evidence
3. appeal to popular opinion—fallacious because most people in the United States are inundated with pro-U.S. media and have not lived in (or know much about) many other countries. The opinions of citizens in other countries are not included.
4. appeal to popular opinion—It is hard to evaluate this argument without assumptions about the truth claims of Buddhism and other religions.
5. appeal to tradition—It is hard to evaluate this argument without a lengthy debate on and assumptions about morality, but consider that this same argument could have been made to defend slavery only 200 years ago.
6. appeal to tradition—Is this better than the appeal in (6)?
7. appeal to popular opinion—a good one, because the shared opinion is based on evidence.
8. appeal to popular opinion—a weak one, because many people have xenophobic tendencies and misconceptions about immigration.

Chapter 16: Fallacies of Vacuity

Exercise I (page 327)

Much of this is controversial, but here are some ways to look at these examples:

1. The premise that no student would lie to her favorite professor implies the conclusion that this student is telling the truth to me only with the help of the suppressed premise that I am this student's favorite professor. Adding that suppressed premise would make the argument circular, and it would beg the question at issue.
2. This argument depends on a suppressed premise that beverages that make people drunk should be banned. That is equivalent to the conclusion that intoxicating beverages should be banned. Hence this argument is circular. It also begs the question in the most natural context, where one person is trying to convince another that the conclusion is true.
3. This argument is circular, because it depends on a suppressed premise that an economic system without free enterprise is not correct, which is equivalent to the conclusion. This begs the question in a context where disputants disagree about the correctness of free enterprise just as much as they disagree about the correctness of capitalism.
4. Free trade just is an unimpeded flow of goods (and services) between countries, so the premise amounts to "Free trade brings all of the advantages of free trade." Still, this is not equivalent to the claim that free trade is good for the country, since free trade might bring even more disadvantages than advantages. Thus, this argument is not circular. It also does not beg the question, since opponents of free trade could and should still admit that free trade brings all of the advantages of free trade. What they disagree about is what these advantages are and whether these advantages are greater than its disadvantages.
5. This argument depends on the suppressed premise that laws restricting guns violate the right to bear arms. This is denied by advocates of gun control who still believe in a limited right to bear arms. Thus, this argument is not circular and does not beg the question in the most natural contexts. Still, the explicit premise and the suppressed premise are questionable.
6. In this chain of arguments, no premise is equivalent to a conclusion, so neither argument is circular. Nonetheless, it begs the question, since anyone who doubts B's trustworthiness has the same reasons to doubt B's assurance that Davidson is honest, so those premises need some independent justification.
7. This argument is not circular, since neither premise is equivalent to the conclusion. It does beg the question, since the same sorts of doubts that apply to the conclusion will arise again for the premises, so those premises need some independent justification.
8. This argument is not circular, but it begs the question, for it depends on the controversial suppressed premises that we have to accept progress and also what(ever?) is necessary for progress.
9. This is circular and it begs the question, because the second premise is equivalent to the conclusion, since sin by definition is wrong, and premarital sex by definition is fornication.

10. Other factors besides maturity affect whether the drinking age should be lowered, so the premise is not equivalent to the conclusion, and this argument is not circular. Still, this argument begs the question in a context where the maturity of eighteen-year-olds is in dispute.
11. This "Catch-22" is not circular by our definition, since no premise is equivalent to the conclusion. It also does not beg the question in most contexts. The problem, instead, is that the conclusion claims that we should *never* give security clearances to homosexuals, whereas the argument is about a problem that arises only under our *present* policy.
12. This argument depends on the suppressed premise that people who want to kill themselves are insane, but people who want to kill themselves have suicidal tendencies, by definition. Thus, the suppressed premise is equivalent to the conclusion, so the argument is circular. It also begs the question in most natural contexts.
13. This "Catch-22" is a bad argument, but it is not circular, and it does not beg the question.

Discussion Questions (page 328)

1. Compare this to the discussions of explanations and the uses of arguments to explain in chapters 1 and 9.
2. Apply this argument to the syllogisms in Chapter 7.

Discussion Questions (pages 331-2)

These passages raise important issues that need careful analysis.

Chapter 17: Refutation

Discussion Question (page 334)

Refutation need not necessarily take the form of a justification that the conclusion is false. Remember that it is enough for a refutation to provide an objection to the argument that cannot be answered. Furthermore, it may not even be necessary for a refutation to claim that the argument is invalid or weak. For example, consider an argument for the existence of God.
It is possible to refute a particular argument for the existence of God without claiming that God does not exist. Conversely, it is possible to say that a certain argument for the existence of God is strong, but still deny the conclusion for some other reason (say, that in accepting the argument we commit ourselves to a ridiculous position, despite the strength of the argument).

Exercise I (page 336)

1. The number two is prime.
2. Three points in a straight line do not determine a plane.
3. Not if they are tied down.
4. Not monotremes, including the platypus and the echidna in Australia.
5. Meat protein is a good thing, but too much of it can give you gout.
6. A disease can hurt you even if you don't know you have it. Furthermore, not knowing that you have a disease can hurt you if the disease is curable but potentially fatal if untreated.
7. You are being *too* careful if you get a total health check-up every week.
8. You should look a gift horse in the mouth if the gift in question is of no use to you and might incur costs later.
9. It is not wrong to lie if you are playing a game where lying is expected, or if you must lie to save a life.
10. You might ask someone to remove your appendix even though you would not do this yourself.
11. Lots of people vote in European elections, but it would be wrong for me to do so, because I am not a European citizen.
12. It would be horrible for everyone to climb to the top of Mount Everest today at noon, but it is not wrong for one person, or even a small group, to do so.

Exercise II (page 336)

1. cannot be refuted by any counterexample, because it is not a universal claim.
2. cannot be refuted by any counterexample, because of the guarding term "usually."
3-6. do not admit of counterexamples because they seem to be necessary truths, although it is not clear why some of them are necessary. (It is worth asking whether (5) refuted by the fact that two quarts of water mixed with two quarts of alcohol makes 3.5 quarts.)

Discussion Questions (page 336-7)

1. This is not easy. R. M. Hare worked on it for decades.

2. No matter how funny, the Morgenbesser retort seems shallow, because it is not a real double affirmative, but just a repetition, since the same doubt could be expressed by a single "Yeah" in the right tone of voice.
3. This is controversial, but could depend greatly on whether the particular theologian believe that God is constrained (either willingly or not) by logic.

Exercise III (page 339)

1. The claim that even the worst enemies can *become* friends does not imply that enemies can *be* friends at the same time when they are enemies.
2. It is not obviously absurd to think that one object can reflect different wavelengths of light from its whole surface, if it reflects different wavelengths in different directions. Consider holograms that look different colors from different angles of perception.
3. It is absurd to think that most of the children in Lake Woebegone are above the median of children in Lake Woebegone, but it is not absurd to think that most are above average. To see this, suppose that there are nine children with IQs of 110, and one child with an IQ of 90. The average IQ is then 108, and nine children have IQs above 108.
4. The claim that your brain is mostly empty space does not imply that it is not solid, since all solids are mostly empty space.
5. The claim that some things are inconceivable does not imply that we can consider or conceive of anything that is inconceivable. That would be absurd, but it is not the claim to be refuted.

Exercise IV (page 340)

1. Sisters must be female, and nephews must be male, but nobody (except possibly hermaphrodites) can be both male and female.
2. If a father was never a child, he would not have been born, or be alive now, or have become a father himself, though Adam may be an exception.
3. Then the median would have been higher. (Contrast (3) in Exercise III.)
4. Everyone can be exceptional in some respect, so no reductio is possible.
5. This statement is itself a universal claim. If it were true, there would be no exception to it, so it would be false.
6. Not if I know this!
7. A morally permitted action is defined as one that is not morally wrong.
8. Someone can meet us *someday* only if they are in the same place as us on that day, but God cannot literally be in the same place as us on any day if he is outside time and does not exist on (or in?) any day.
9. If he shaves himself, then he does not shave *only* those who do not shave themselves. If he does not shave himself, then he does not shave *all* those who do not shave themselves. So there cannot be such a barber.
10. Most of them have been shown to be absurd.

Discussion Questions (page 340)

In determining whether reductios are shallow or deep, one must take multiple factors into consideration. Particularly with the controversial issues presented in these questions, some might evaluate the depth of reductios using criteria that others would reject. However, when evaluating arguments in the form of reduction ad absurdum, it is important to be objective and focus on whether the argument actually does reduce to the ridiculous scenario presented, and if such a counter-argument is appropriate in this situation.

Exercise V (page 342)

1. This attacks a straw man. People who do not want to risk American lives or who think that the war will harm Iraqis need not think that the suffering of Iraqis doesn't matter.
2. This also attacks a straw man. People who support sending American troops to Iraq might think that an American presence in Iraq is worth the cost even if it lasts a long time.
3. This attacks a straw man. Theologians who say that man is created in the image of God are not talking about physical images.
4. This attacks a straw man, because atheists need not think that everything is permitted just because no God exists.
5. This attacks a straw man. The theory of evolution does not deny that man is different from apes.
6. This clearly and humorously attacks a straw man since no evolutionary biologist believes, or would argue, that at any point we *decided* to stop being apes and turn into humans.

Discussion Question (page 343)

Five examples should not be hard to find, especially when looking into subjects where a lot of debate persists (e.g. politics, religion, etc.) Internet searches help.

Exercise VI (pages 347-8)

1. The point is that an expensive building can be made up out of inexpensive parts, just as a wealthy country can be made up of poor people, so the reasoning works. One could attempt to fix the argument by stressing that *some* citizens are wealthy as well.
2. The parallel works, but the original might be fixed up by adding the premise that it is important that someone bear children and/or by weakening the conclusion to claim only that it should be the case that some women bear children.
3. The point is that movies do not always depict reality accurately, so the parallel refutes the original. One might try to fix up the original by adding the premise that Boystown is an accurate portrayal of how orphanages work, but that would probably beg the question.
4. This parallel seems to succeed in refuting the original, and it is hard to see how to fix it.

5. This parallel seems to succeed in refuting the original, but one might fix it up by changing the premise so it claims that, if everyone were *allowed* to walk on the grass, many people would do so, and that would kill the grass, which we do not want. In contrast, most people might not go to this movie right now even if everyone were allowed to do so.
6. This parallel refutes the original, but there might be some way to fix it up.
7. This parallel refutes the original. This illustrates the fallacy of *post hoc ergo propter hoc* (or after this, therefore because of this). It is hard to see how to fix this up
8. This supposed parallel does not refute the original, because it is not obvious that high school students are going to use guns anyway. Besides, condoms are used for protection, not attack.
9. The parallel does refute the original by making the point that it is not worthwhile to bring the debate out into the public if this will cause severe harms. One might try to fix up the original by adding the premise that embryo cloning will not cause such harm, but that would beg the question against most opponents of embryo cloning.
10. This parallel works only if possessing money "precipitates" robbery in the same way in which King's peaceful actions "precipitated" violence. Critics could respond, however, that robbery is not foreseen as a likely consequence of possessing money, whereas violence could be foreseen as a likely consequence of King's actions, such as marches and boycotts. Of course, King's actions still might be defensible.
11. This parallel seems to succeed in refuting the original, but one could fix it up easily by adding the premise that red Xs are Xs.
12. This parallel seems to succeed in refuting the original, but one could fix it up by adding the premise that baby Xs are babies (or X girls are Xs).

Exercise VII (page 348-9)

There are endlessly many ways to construct parallel arguments with true premises and false conclusions for any given invalid argument. It is more persuasive if the parallel argument is close in subject matter to the invalid argument under examination.

This exercise includes examples that illustrate many of the fallacies that were discussed in earlier chapters. This shows that the method of refutation by parallel reasoning is a general procedure for identifying fallacious arguments, even those that do not fit the common patterns that get labeled as fallacies.
1. If taking one sleeping pill is dangerous, so is taking one hundred. Taking one sleeping pill isn't dangerous, so taking one hundred isn't either. (This illustrates the fallacy of denying the antecedent.)
2. If I were a grandmother, I would be a parent. I am a parent. So I am a grandmother. (This illustrates the fallacy of affirming the consequent.)
3. Kennedy had either a son or a daughter. He had a daughter. So he must not have had a son.
4. You cannot treat diseases because you draw a sharp line between being ill and being well. (This illustrates slippery slope arguments.)
5. If you have not run a four-minute mile, you are in no position to judge milers, no matter how slow. (This is an ad hominem silencer.)
6. Since I have drawn many doodles, I am in a position to know which drawings are good, so you ought to trust me when I say that this one is great. (This is a fallacious use of appeal to authority based on personal experience).

7. There is nothing wrong with skydiving without a parachute, since the longer you free fall, the longer you live.
8. If people have nothing to hide, they should not object to having their back yards dug up. So nobody should object to this.
9. Murderers should not be granted a fair trial, since they deny this right to others. (Or: children should not be fed because they do not feed others.)
10. In nature, a species is more likely to survive when it lives in its natural habitat, so we should live in our natural habitat.
11. The large economy-size container costs more money, so we cannot save money by buying the large economy-size.
12. Killing can't be very bad, since so many people like to watch it in movies.
13. Your grandmother is not ugly, since to say otherwise in public would be obnoxious.
14. If this ring is not diamond, it is cheap. You don't want cheap jewelry. So you should buy only diamonds. (The point is that "cheap" suggests jewelry that is not just inexpensive but also lower in quality. Many kinds of jewelry are not cheap in this way, even if they are not the most expensive possible. This illustrates a fallacy of equivocation.)
15. I'd rather eat ice cream than vegetables, so I should stop eating vegetables and just eat ice cream.
16. You don't want to be killed by your child when he grows up, so you had better kill him now. The point is that, even if a murderer *might* kill you, this does not show that he *will* or is likely to kill you.
17. If it were not for lands where Native Americans lived, the Pilgrims would have had nowhere to go. So the Pilgrims should have given up Christianity and adopted Native religions.
18. You can't move that stone, because, if moving it were that easy, someone would have moved it before.

PART V: AREAS OF ARGUMENTATION

Chapters 18-22: Legal, Moral, Scientific, Religious, and Philosophical Reasoning

The discussion questions in these chapters all have several acceptable answers. Even when interpreting a judicial opinion or a scientific theory, different readers often will and legitimately may formulate the main point somewhat differently. It is illuminating to consider answers by other people and also to appreciate their reactions to your answers. We encourage students to discuss their answers with other students both inside and outside of class. We should all try our best to understand our opponents and their objections to our claims before we reject their perspectives on these difficult issues.

The central theme in Part V is that different areas of reasoning have different standards. Arguments in all of these areas need to conform to the general standards that were discussed in Parts I-IV, but variations arise. For example, arguments in law and religion can sometimes start with authoritative texts, such as the constitution or a sacred book. These authorities are taken for granted in many contexts. In contrast, moral, scientific and philosophical arguments cannot appeal to any authoritative texts. Other differences are controversial. Some theorists claim that we do not need evidence for religious and moral claims in the way that we do need evidence for legal and scientific claims. This difference affects what counts as begging the question in these areas. These comparisons should be kept in mind and brought out in answering the discussion questions in Part V.

SAMPLE TEST QUESTIONS

We usually give four hour-long tests: one on Part I (Chapters 1-5), a second on Part II (Chapters 6-7), a third on Part III (Chapters 8-12), and a fourth on Part IV (Chapters 13-17). Sometimes we add an essay exam on the topics in Part V (Chapters 18-22), but we usually assign a paper on that final Part, often in two drafts, since many students have not written a philosophy paper before. It also works to insert a concrete topic from Part V at the end of each of the other four Parts, and then include an essay on that topic in the test on that part of the course. With the addition of an essay, the test might take more than an hour.

Here we include more than enough questions for an hour test on each Part, so that instructors can choose the questions that they want to ask, and also because some courses do not cover all of the topics in each Part. We include short-answer questions as well as questions that require students to write out several sentences, again so that professors can choose the kinds of questions they want. Of course, different examples could also be substituted within the general form of these questions. The questions that are not used on tests may later be used on a final examination.

We sometimes include a few examples straight out of the exercises in the book. This encourages students to do the exercises. It also provides relatively easy questions to give confidence to students who are having trouble.

PART I: How to Analyze Arguments

CHAPTER 1: Uses of Arguments

1. Give a precise definition of an argument.

2. For each of the following, is it an argument? Why or why not?

    2.1. A dictionary

    2.2. A chronological list of battles in World War II

    2.3. Two parents loudly calling each other bad names

    2.4. One person denying whatever another person says

    2.5. Citing an experiment as evidence for a scientific theory

3. What are the two kinds of premises in an argument used for an explanation?
3.1. _____
3.2. _____

4. Give an example of a justification that is not an explanation (that is, it justifies someone in believing that something happened or that something is true without explaining why it happened or why it is true). What is lacking that keeps it from being an explanation?

5. Give an example of a prediction that is not an explanation (that is, it does not explain why what it predicts happens). What is lacking that keeps it from being an explanation?

6. Indicate whether each of the following sentences is true (T) or false (F) by putting the appropriate letter in the blank.

_____ 6.1. An argument cannot justify its conclusion if it depends on premises that many people deny.

_____ 6.2. An argument that explains why something happened also justifies people in believing that it did happen.

_____ 6.3. An explanation is defective when its premises are false.

_____ 6.4. An argument that combines justification with explanation must meet the standards for both justification and explanation in order to be a good argument.

_____ 6.5. Every argument either justifies or explains its conclusion.

CHAPTER 2: The Web of Language

1. Put the appropriate letter in the blank to classify each of the following as:
E = an explicit performative
N = not an explicit performative

_____1.1. We agreed to get married.
_____1.2. I would promise to give you a ride if I had a car.
_____1.3. I deny that.
_____1.4. I feel sorry for you.
_____1.5. I order you to leave.
_____1.6. I welcome you to Albania.
_____1.7. I feel rotten today.
_____1.8. I bid five dollars. (Said about yesterday's auction.)
_____1.9. I bid five dollars. (Said during an auction.)
_____1.10. He is bidding five dollars.

(Note: we like to include examples in the wrong tense and person, a mental report, and an argumentative performative. This can all be accomplished with a single verb:
You conclude that George is not guilty.
I will conclude that George is guilty (if those turn out to be his fingerprints).
I conclude that George is guilty now that the fingerprints are identified.
I am sorry to conclude that George is guilty.
I concluded that George is guilty.

Of course, you can also vary the verb and add:

George denies that he is guilty.
I believe that George is guilty.
I am not sure whether George is guilty.

And so on.)

2. Put the appropriate letter in the blank to indicate whether each of the following verbs names a kind of:

S = a speech act
C = a conversational act
N = neither

_____ 2.1. to convince someone that ...
_____ 2.2. to take it for granted that ...
_____ 2.3. to conclude that ...
_____ 2.4. to amuse someone
_____ 2.5. to exhale vibrating air

(To make this question more difficult, you could add "L=linguistic act" to the list of possible answers.)

3. State Grice's Rule of Quality completely.

(You could replace "quality" with "quantity", but either way we require students to state both parts of the rule. As a joke and to show how simple it is, we sometimes give a point of extra credit for stating Grice's rule of relevance: "Be relevant.")

4. Put the appropriate letter in the blank to indicate which conversational rule is *most clearly* violated by the underlined sentence in each of the following exchanges. Assume a standard context.

S = the rule of quantity or strength
Q = the rule of quality
R = the rule of relevance
M = the rule of manner
N = none of the above

____ 4.1. A: What are we having for dinner tonight? B: <u>Food.</u>
____ 4.2. A: How did you like the football game? B: <u>That wasn't football.</u>
____ 4.3. A: I am appalled that such a great orator as you would end a sentence with a preposition.
B: <u>That is the type of criticism up with which I will not put.</u>
(attributed to Winston Churchill)
____ 4.4. A: How did you do on the last test?
B: <u>I didn't do as well as the time before</u>.
(when B failed the last test and got an A the time before)

____ 4.5. A: So why did you fail the test? And what are you going to tell your parents?
B: Let's go play basketball.
____ 4.6. Business is business.
____ 4.7. Life is just a bowl of cherries.
____ 4.8. Parent: Where are you going? Teenager: Out.

5. Circle the appropriate letter to indicate whether each of the following statements is true or false.

T F 5.1. Some linguistic acts are meaningless.
T F 5.2. Every explicit performative is in the present tense.
T F 5.3. Every explicit performative verb names a speech act.
T F 5.4. Whenever saying *p* conversationally implies *q*, if *q* is false, then *p* is also false.
T F 5.5. Deception always violates the rule of quality.

6. You ask a classmate, "What is the reading assignment for next Tuesday?" All she says is, "You need to read Chapter 5." Does this utterance conversationally imply that Chapter 5 is *all* you have to read for next Tuesday in this course?
Circle one: YES NO
Why or why not? Explain as fully as you can in 2-3 sentences.

7. When a sentence conversationally implies something false, does that show that the sentence is false? Why or why not? Give an example to support your answer.

8. In a few sentences, explain the differences between a speech act and a conversational act.

9. Circle the appropriate letter to indicate whether each of the following statements is true or false.
T F 9.1. Someone who asks a rhetorical question is usually seeking information.
T F 9.2. Overstatement normally violates the conversational rule of quantity.
T F 9.3. Irony normally violates the conversational rule of quality.
T F 9.4. Metaphors normally violate the conversational rule of quality.
T F 9.5. Evaluative sentences merely express personal feelings.
T F 9.6. All evaluative sentences are moral.
T F 9.7. The term "nuclear" is evaluative, because nuclear wars are bad.
T F 9.8. Adding the word "too" can turn a non-evaluative sentence into an evaluative sentence.

10. Put the appropriate letter in the blank to indicate whether each of the following questions is rhetorical (R) or non-rhetorical (N) in the given context:

____ 10.1. After your doubles partner in tennis hits a ball over the fence around the court, you ask, "Is that the best you can do?"

____ 10.2. After a friend tells you that he is tired because he just ran a mile in five minutes, you ask, "Is that the best you can do?"

____ 10.3. When it starts to rain heavily during your picnic, you ask, "Isn't this just great?"

____ 10.4. When you try the cake at a picnic, you ask, "Isn't this just great?"

____ 10.5. After seeing a really dumb movie, you ask, "Was that dumb or what?"

11. Put "+", "–", or "0" in the blank to indicate whether the following sentence is positively evaluative negatively evaluative or neutral, respectively:

____ 11.1. Joe is a glutton.

____ 11.2. Joe eats a lot.

____ 11.3. Joe has a healthy appetite.

12. Describe one context where the following sentence is used literally and another context where it is used metaphorically. Then explain how the metaphor works: We are up a creek without a paddle.

13. Which linguistic act, speech act, and conversational act are performed when a teacher tells a student, "You had better study harder for the next test," and the student does study harder for the next test.

CHAPTER 3: The Language of Argument

1. Put the appropriate letter in the blank to indicate whether each of the following series of statements is:

N	=	not an argument
A	=	an argument that is neither valid nor sound
V	=	an argument that is valid but not sound
B	=	an argument that is both valid and sound

____ 1.1. Most professors are opposed to cuts in funds to education, so it is a bad idea.

____ 1.2. Shaq is tall, and so is every other center in the National Basketball Association.

____ 1.3. Washington, D.C., is the capitol of the United States. The United States is a country in North America. Hence, Washington, D.C., is the capitol of a country in North America.

____ 1.4. Texas is larger than Alaska, because Texas is larger than any other state, and Alaska is a state.

____ 1.5. There is no last digit in pi, and pi starts with 3.14, so there is no last digit in 3.14.

2. Complete the following sentences:

2.1. An argument is <u>invalid</u> if and only if

2.2. An argument is <u>unsound</u> if and only if

3. Put the appropriate letter in the blank to indicate whether each of the following sentences is true or false.

____ 3.1. An argument with a false conclusion can still be valid.
____ 3.2. An argument with a false conclusion can still be sound.
____ 3.3. An argument with a false premise and a false conclusion can be valid.
____ 3.4. An argument with a false premise and a true conclusion must be unsound.
____ 3.5. An argument with true premises and a true conclusion can be invalid.
____ 3.6. An argument with true premises and a true conclusion can be unsound.
____ 3.7. If the conclusion of a valid argument is false, then at least one of its premises must be false.
____ 3.8. If the conclusion of a valid argument is true, then at least one of the premises must be true.
____ 3.9. If an argument has a conclusion that is the denial of one of its premises, then the argument must be invalid.
____ 3.10. If an argument has a conclusion that is the denial of one of its premises, then the argument must be unsound.

4. Put the appropriate letter in the blank to indicate whether each of the following words is normally used as:

R = reason marker
C = conclusion marker
A = assuring term
G = guarding term
D = discounting term
N = none of the above

____ 4.1. however
____ 4.2. therefore
____ 4.3. possibly
____ 4.4. certainly
____ 4.5. because

5. Using the labels given below, indicate the main role (if any) of the expressions underlined in the following text.

argument marker	M
assuring term	A
guarding term	G
discounting term	D
evaluative term	E^+, E^-
argumentative performative	P
none of the above	N

____ 5.1. While the docudrama seems accurate, it is still television.
____ 5.2. The government initiative is undoubtedly a boondoggle.
____ 5.3. I disclaim any responsibility.
____ 5.4. He weighs about 300 pounds.
____ 5.5. He says so, so it must be so.

CHAPTER 4: Close Analysis

1. Put one letter in each numbered blank to indicate the *main* function of the term or phrase underlined before that number in the following passage. More than one letter might be acceptable, but you may put only one letter in each blank, so put the one that indicates the *main* function of the term or phrase.

M = an argument marker
A = an assuring term
G = a guarding term
D = a discounting term
E- = a negative evaluative term
E+ = a positive evaluative term
R = rhetorical device
N = none of the above

____1.1.	____1.2.	____1.3.	____1.4.	____1.5.	____1.6.
____1.7.	____1.8.	____1.9.	____1.10.	____1.11.	____1.12.

From Steven Jay Gould: "The Panda's Thumb":

... The message is paradoxical but [1] profound. Orchids manufacture their intricate devices from the common components of ordinary flowers, parts usually [2] fitted for very different functions. If God had designed a beautiful [3] machine to reflect his wisdom and power, surely [4] he would not have used a collection of parts generally [5] fashioned for other purposes. Orchids were not made by an ideal engineer; they are jury-rigged from a limited set of available components. Thus [6], they must have evolved from ordinary flowers.

Thus, the paradox, and the common theme of this trilogy of essays: Our textbooks like [7] to illustrate evolution with examples of optimal design—nearly [8] perfect mimicry of a dead leaf by a butterfly or [9] of a poisonous species by a palatable relative. However [10], ideal design is a lousy [11] argument for evolution, for [12] it mimics the postulated action of an omnipotent creator. Odd arrangements and funny solutions are the proof of evolution—paths that a sensible God would never tread but that a natural process, constrained by history, follows perforce.

2. Put one letter in each numbered blank to indicate the *main* function of the term or phrase underlined before that number in the following passage. More than one letter might be acceptable, but you may put only one letter in each blank, so put the one that indicates the *main* function of the term or phrase.

M = an argument marker
A = an assuring term
G = a guarding term
D = a discounting term
E- = a negative evaluative term
E+ = a positive evaluative term
R = rhetorical device
N = none of the above

____2.1. ____2.2. ____2.3. ____2.4. ____2.5.
____2.6. ____2.7. ____2.8. ____2.9. ____2.10.
____2.11. ____2.12. ____2.13. ____2.14. ____2.15.

From Andrew Sullivan, "Dead End — Cuomo's Abortion Contortion":

Mario Cuomo's September 1984 speech on abortion at Notre Dame University is second only to his convention keynote address of the same year in the lore surrounding the philosophical prowess [1] of the governor of New York.... In fact [2], the speech is a work of evasion, and so muddled [3] on so pressing a moral matter that it casts doubt on Cuomo's seriousness both as an intellectual and as a politician.... Cuomo argues in his speech that, though [4] as a Catholic he accepts the Church's teaching that abortion is wrong, as [5] a politician in a pluralist society he upholds the right of others to abort.... The problem with the position is simple: its private-Catholic/public-pluralist position makes some sense for almost [6] any other moral issue for Catholics *except* abortion.... With abortion, however [7], this balance between public and private goes awry. To accept the Church's position on abortion is to believe that abortion is the taking of human life, a somewhat more drastic event than the breakup of a marriage.... For a Catholic holding this belief, merely enforcing the public laws as a public servant, while [8] arguing for their reversal, is hard enough. But actually favoring legal abortion, and the provision of public funds for it, must mean [9] consciously tolerating the taking of millions of human lives as a normal occurrence in American society....

A college student raised this problem in an interview in the Catholic Columbia undergraduate magazine, *Newman Journal*, in the spring of 1988. At one point in the dialogue, Cuomo claims the bishops don't mandate the same obedience to the teaching on birth control as they do on abortion, which prompts the reply:

> Newman Journal: It's not the same.
> Mario Cuomo: Well, why is it not the same?
> NJ: Well, one is murder.
> MC: No, murder is a word that doesn't count. Murder is a civil word, and the Supreme Court says it's not murder. So [10] you can't do it with the word "murder."

NJ: Well, the Church teaches that it's a taking of a life and therefore [11] the violation of the natural law.
MC: Well, that's what you teach about birth control. You don't teach that there is a different order of seriousness. Then they get all upset on that point. Now, I may [12] have my theology wrong but [13] I don't think so....

The truth is, of course [14], that Cuomo does have his theology wrong. The Church does teach that there is an order of seriousness in breaches of natural law, homicide being far graver [15] than the use of condoms....

3. Put one letter in each numbered blank to indicate the *main* function of the term or phrase underlined before that number in the following passage. More than one letter might be acceptable, but you may put only one letter in each blank, so put the one that indicates the *main* function of the term or phrase.

M = an argument marker
A = an assuring term
G = a guarding term
D = a discounting term
E- = a negative evaluative term
E+ = a positive evaluative term
R = rhetorical device
N = none of the above

____3.1. ____3.2. ____3.3. ____3.4. ____3.5.
____3.6. ____3.7. ____3.8. ____3.9. ____3.10.

Adapted From Martin Esslin, "Beyond the Wasteland: What American TV Can Learn from the BBC":

What are the advantages and disadvantages of a public TV service as compared to a completely [1] commercial system? One of the obvious [2] dangers [3] inherent in a public service system is paternalism: some authority decides what the viewers should [4] see and hear simply on the basis of [5] what it arbitrarily feels would be good for them. Yet [6] in countries where a highly developed public system exists alongside a commercial one, that danger is minimized as a result of [7] the market pressure on the commercial system to give its audience what it wants. Indeed, in a dual system the danger is often that the public service may [8] be tempted to ignore its stated [9] purpose to serve the public interest and instead pander to mass preferences because of [10] a sense of competition with the commercial networks.

(Note: Many more test questions of the same kind can be created by choosing a central paragraph from one of the readings at the end of Chapter 4. We sometimes tell students in advance that the test will include a close analysis of part of one of the passages in the Exercises of Chapter 4. This warning tells them how to study and induces them to do the exercises.

CHAPTER 5: Deep Analysis

1. The following argument is not valid as it stands:

Computers are programmed.
_____

∴ Computers cannot think.

Put an "X" next to each of the following that, when added as a suppressed premise, would make this argument valid.

____ 1.1. Everything that is programmed cannot think.
____ 1.2. Nothing that can think is programmed.
____ 1.3. Everything that cannot think must be programmed.
____ 1.4. If something can think, it must not be programmed.

2. For each of the following arguments, supply one or more suppressed premises that are as clear, as simple, and as plausible as you can make them and that make the argument **valid** and illuminating.

2.1. All desserts are fattening, so fruit must be fattening.

2.2. The murder must have been done by Miss Scarlet, because it wasn't done by Colonel Mustard.

2.3. If Joan is in a sorority, she must be either a junior or a senior. But she is not graduating in 2006, so she must be a junior.

2.4. Since Charlayne is an only child, she is not Ed's sister.

2.5. The thief must be Beverly, because it's not Charlayne.

2.6. The driver was first arrested less than two years ago, so Ed is not the driver, since Ed has a criminal record stretching back a decade or more.

3. Supply one suppressed premise that is as clear, as simple, and as plausible as you can make it and that makes the following argument **valid** and illuminating. Then put the argument with its suppressed premise into standard form:

3.1. Good weather produces bad grades, since good weather makes many students study outdoors, where they do not study well.

3.2. Trade embargoes make no sense because countries can always find ways around them.

4. Give a reconstruction of the following argument from Steven Jay Gould, "The Panda's Thumb":

> ... Orchids manufacture their intricate devices from the common components of ordinary flowers, parts usually fitted for very different functions. If God had designed a beautiful machine to reflect his wisdom and power, surely he would not have used a collection of parts generally fashioned for other purposes. Orchids were not made by an ideal engineer; they are jury-rigged from a limited set of available components. Thus, they must have evolved from ordinary flowers.

(It is useful to ask students to do a deep analysis of the same passage that they did a close analysis of. This gets them thinking about how the two levels of analysis work together.)

PART II: How to Evaluate Arguments: Deductive Standards

CHAPTER 6: Propositional Logic

1. Using the truth-functional connectives "&," "∨," "~," "⊃" and "≡," give a well-formed symbolization in propositional logic that *best* represents the literal meaning of each of the following statements. Bring out as much of the logical form as possible. Be sure to specify which proposition is represented by each propositional symbol, if the symbols are not given to you.

1.1. Neither Bush nor Nixon carried as many states as Reagan did.
B = Bush carried as many states as Reagan did.
N = Nixon carried as many states as Reagan did.

1.2. The deficit cannot be lowered unless new taxes are introduced.
D = The deficit can be lowered.
T = New taxes are introduced.

1.3. Although Reagan was well known as an actor, he became famous as president.
A = Reagan was well known as an actor.
P = He became famous as president.

1.4. Either West Virginia or Indiana or South Carolina will pass anti-handgun legislation.

1.5. Almost certainly the die will turn up either even or odd.

2. Put an "X" beside each of the following which is a substitution instance of "$\sim p \ \& \ q$."

____ 2. 1. ~A & M
____ 2. 2. ~A & ~~M
____ 2. 3. A & M
____ 2. 4. ~A & (M ⊃ B)
____ 2. 5. ~(A & M)

3. Put an "X" beside each truth-functional form that the following statement exemplifies. Remember that some statements are instances of more than one form.

You will win only if your opponent will not.

____ 3.1. p
____ 3.2. $p \,\&\, q$
____ 3.3. $p \supset q$
____ 3.4. $q \supset p$
____ 3.5. $p \supset \sim q$
____ 3.6. $\sim q \supset p$

4. Put "T" in front if and only if the statement is true, and put "F" in front if and only if the statement is false.

____ 4.1. All arguments that are substitution instances of truth-functionally valid argument forms are valid.
____ 4.2. All valid arguments are substitution instances of at least one truth-functionally valid argument form.
____ 4.3. A valid argument can be a substitution instance of an invalid argument form.
____ 4.4. If a valid argument is an instance of a certain argument form, then all other instances of that same argument form are also valid.
____ 4.5. Any argument with a premise of the form "$p \,\&\, \sim p$" is valid.
____ 4.6. Any argument with a conclusion of the form "$p \vee \sim p$" is invalid.
____ 4.7. Any argument that is a substitution instance of modus tollens is valid.

5. Using the truth-table method, determine whether each of the following is a valid argument. Explain your answer.

5.1. $\sim (A \,\&\, B)$
$\sim A$
———————
$\therefore$ B

5.2. $(C \,\&\, D) \supset E$
———————
$\therefore$ $C \supset (D \supset E)$

5.3. $(F \,\&\, G) \supset H$
$G \,\&\, \sim H$
———————
$\therefore$ $\sim F$

5.4. J ∨ (K ⊃ L)
~L & J

∴ ~K

6. Use a truth table to show that the standard connective "∨" (inclusive or) can be replaced by "~" and "&." Hint: Construct a truth table for "∨" and find a statement form using only "~," "&," and statement variables that is truth-functionally equivalent to "*p* ∨ *q*."

7. Give a formula using only "∨" and "~" together with the two variables "*p*" and "*q*" that fits into the blank at the top of the following truth table:

p	*q*	
T	T	F
T	F	F
F	T	F
F	F	T

8. If the column in a truth table for a proposition form contains only "T"s, then the proposition form is called a tautology. For example, "p ∨ ~p" is a tautology, while "~(p ∨ p)" is not a tautology. Are the following statements tautologies?

8.1. ~((P ∨ (S & ~Q)) ⊃ R) ∨ ((P ∨ (S & ~Q)) ⊃ R)

8.2. ((P ∨ (S & ~Q)) ⊃ R) ∨ ~((P ∨ (S & ~Q)) ⊃ R)

CHAPTER 7: Categorical Logic

1. Classify the following sentence forms (circle the correct answer):

1.1. Some *A* are *B*. A E I O none

1.2. All *A* are *B*. A E I O none

1.3. No *A* are *B*. A E I O none

1.4. Some *A* are not *B*. A E I O none

2. Express each of the following statements in standard categorical form:

2.1. Snakes are reptiles.

2.2. Only logicians are mathematicians.

2.3. None but crazy people are psychologists.

2.4. Every college student works.

2.5. There is no solution to those equations.

3. Assuming the modern interpretation, fill in the appropriate truth values "T" or "F" or put "U" if the truth value is undetermined.

3.1. If an O proposition is true, the corresponding I proposition is ____
3.2. If an A proposition is true, the corresponding O proposition is ____
3.3. If an A proposition is true, the corresponding I proposition is ____
3.4. If an E proposition is false, the corresponding I proposition is ____
3.5. If an A proposition is true, the corresponding E proposition is ____

4. Write out the following inferences. Using the *modern* interpretation, indicate whether each is valid or invalid.

4.1. The converse of "Some students are not swimmers" is

Is this inference valid or invalid?

4.2. The converse of "No students are swimmers" is

Is this inference valid or invalid?

5. For each of the following arguments, construct a Venn diagram of the premises. Based on your Venn diagram, indicate whether the argument is valid or invalid. Assume the modern interpretation.

5.1. All mountains are volcanoes. Valid or Invalid?
No volcanoes are hills.
———————
∴ No hills are mountains.

5.2. Some liars are not politicians. Valid or Invalid?
Some liars are not lawyers.
———————
∴ Some lawyers are not politicians.

5.3. All comets are meteors. Valid or Invalid?
All asteroids are comets.
_____

∴ Some asteroids are meteors.

5.4. Some wizards are witches. Valid or Invalid?
All wizards are warlocks.
_____

∴ Some warlocks are witches.

5.5 Some *P* are *M*. Valid or Invalid?
No *M* are *S*.
_____

∴ Some *S* are not *P*.

PART III: How to Evaluate Arguments: Inductive Standards

CHAPTER 8: To and From Generalizations

1. What are the main differences between inductive and deductive arguments?

2. Put 'T' or 'F' in the appropriate blank to indicate whether the following claims are true or false.

____ 2.1. Every deductively invalid argument is inductive.
____ 2.2. Inductive strength comes in degrees.
____ 2.3. The conclusion of a valid deductive argument is always true.
____ 2.4. The conclusion of a strong inductive argument is always true.
____ 2.5. Adding an extra premise never makes an inductive argument weaker.

3. Fill in the blanks with A, B, C, or D. Choose the one best answer.

A = Valid deductive arguments
B = Strong inductive arguments
C = Both of the above
D = Neither of the above

3.1. ____ may have false premises.
3.2. ____ may have true premises and a false conclusion.
3.3. ____ may be weakened by the addition of new premises.
3.4. ____ have conclusions that go beyond what is contained in the premises.
3.5. ____ cannot have true premises and a false conclusion.

4. The Roosevelt-Landon poll—in which the subjects polled were taken from lists of telephone subscribers—was inaccurate because

____ A. there was no control group
____ B. of insufficient statistics

____ C. of biased statistics
____ D. none of the above

5. Put the appropriate letters in the blank to identify which fallacy, if any, is committed in each of the following arguments:

HG = Hasty Generalization
BS = Biased Sample
RC = overlooking a conflicting Reference Class
N = None of the above

_____ 5.1. 90% of the diners in Pizza Hut said that they prefer Pizza Hut to its competitors, so most diners prefer Pizza Hut to its competitors.
_____ 5.2. This Californian believes in astrology, so most Californians believe in astrology.
_____ 5.3. Most people don't understand quantum mechanics, so my physics professor probably does not understand quantum mechanics.
_____ 5.4. These three nails are different kinds of nails, but none of them floats in water, so probably most nails do not float in water.
_____ 5.5. Most adults are women, and this Catholic priest is an adult, so he is probably a woman.
_____ 5.6. My friends all like me, so everyone likes me.
_____ 5.7. My teacher is mean, so most teachers are mean.

6. Put the appropriate letters in the blank to classify each of the following arguments. Assume a normal context.

D = Deductive Argument
SG = Statistical Generalization (or Inductive Generalization)
SA = Statistical Application (or Statistical Syllogism)
N = None of the above

____ 6.1. One of us has to take the dog for a walk. It's not going to be me. So you have to do it.
____ 6.2. Most college students are not seniors. John is a college student. So John is probably not a senior.
____ 6.3. Every student I know at the University of Colorado likes to ski. So probably most students at the University of Colorado like to ski.
____ 6.4. This plant is dying and so is that one.

CHAPTER 9: Inferences to the Best Explanation and From Analogy

1. Complete the following sentence: In an inference to the best explanation, an explanation lacks the virtue of CONSERVATIVENESS if:
(This question can be asked about any virtue of explanations discussed in Chap. 10.)

2. Can one relevant disanalogy completely undermine an argument from analogy? Why or why not? Give an example to support your answer.

3. Put the appropriate letters in the blank to classify each of the following arguments. Assume a normal context.

D = Deductive Argument
BE = Inference to the Best Explanation
AA = Argument from Analogy
N = None of the above

____ 3.1. Veracity has been named that since she was born.
____ 3.2. This car sounds just like it did when it needed a tune-up last month, so it probably needs a tune-up again.
____ 3.3. There's a virus in my computer. It's hard to understand how it got there unless it was in that email enclosure that I opened yesterday. So that's probably how it got there.
____ 3.4. Either John or Jim is guilty. It isn't John. So it must be Jim.

4. Put 'T' or 'F' to indicate whether the following claims are true or false.
____ 4.1. An explanation that could never be falsified by any possible discovery is a good explanation.
____ 4.2. A simpler explanation is always better.
____ 4.3. Inferences to the best explanation are defeasible.
____ 4.4. Arguments from analogy are better when their premises cite more cases that differ in more ways.
____ 4.5. Arguments from analogy are sometimes disguised versions of inferences to the best explanation.

CHAPTER 10: Causal Reasoning

1. Put the appropriate letters in the blank to classify each of the following arguments. Assume a normal context.

NS = Negative Sufficient Condition Test
NN = Negative Necessary Condition Test
PS = Positive Sufficient Condition Test
PN = Positive Necessary Condition Test
N = None of the above

____ 1.1. This plant has become unhealthy since yesterday.
____ 1.2. Every time I have watered the flowers too much, they have turned brown, so that must be what causes them to turn brown.
____ 1.3. This flower did not turn brown, even though I watered it way too much, so that cannot be what causes the flowers the turn brown.
____ 1.4. The flowers never turn brown except when I water them too much, so that must be what causes them to turn brown.
____ 1.5. This flower turned brown as well, even though I did not water it at all, so that cannot be what causes the flowers to turn brown.
____ 1.6. I've never seen a rose living except in direct sun, so I bet roses can't live without direct sun.

(Note: Since students often have trouble with the necessary and sufficient condition tests, we sometimes tell them in advance that the test will include a table like that in Exercises IV-V on pages 223-4, but with values changed. This tells them how to study, since they can practice by varying the tables themselves.)

2. Suppose your computer won't work, and you want to find out why. After making sure it is plugged in, you experiment with a new computer, a new hard disk, and new system software in the combinations on the following table.

The factors are the plug position, the computer, the hard drive, the software, and the monitor. Simple factors are factors without any propositional connective. To say that a factor "might be" a necessary or sufficient condition is to say that it is not ruled out by the information so far using the appropriate negative test.

Tests	**Plug**	**CPU**	**Monitor**	**Software**	**Result**
Case 1	In	Old CPU	Old Monitor	Old Software	Fails
Case 2	In	Old CPU	Old Monitor	New Software	Works
Case 3	In	Old CPU	New Monitor	Old Software	Works
Case 4	In	Old CPU	New Monitor	New Software	Works
Case 5	In	New CPU	Old Monitor	Old Software	Fails
Case 6	In	New CPU	Old Monitor	New Software	Works
Case 7	In	New CPU	New Monitor	Old Software	Fails
Case 8	In	New CPU	New Monitor	New Software	Works

2.1. Which, if any, simple factor or factors might be necessary conditions of failure?

____ Plug In ____ Plug Out
____ Old CPU ____ New CPU
____ Old Software ____ New Software
____ Old Monitor ____ New Monitor
____ None of the above

2.2. Which, if any, of the following factor or factors might be sufficient conditions of failure?

____ Plug In ____ Plug Out
____ Old CPU ____ New CPU
____ Old Software ____ New Software
____ Old Monitor ____ New Monitor
____ None of the above

2.3. Put the letter "S" next to any of the following complex conditions that might be sufficient for failure, and put the letter "N" next to any of the following complex conditions that might be necessary for failure.

____ The conjunction of both Old CPU and New Software
____ The conjunction of both Old CPU and Old Software
____ The conjunction of both New CPU and Old Software
____ The disjunction of either Old Monitor or Old Software
____ The disjunction of either Old CPU or Old Software

3. Imagine that several diners at a banquet get sick and die. Their meals and fates are recorded in the following table:

	Soup	**Main Course**	**Wine**	**Dessert**	**Result**
Diner #1	Tomato	Fish	Red	Cake	Alive
Diner #2	Tomato	Chicken	White	Cake	Alive
Diner #3	Tomato	Chicken	White	Pie	Alive
Diner #4	Tomato	Chicken	Red	Cake	Dead
Diner #5	Leek	Fish	Red	Cake	Alive
Diner #6	Leek	Fish	Red	Pie	Dead
Diner #7	Leek	Chicken	White	Pie	Alive
Diner #8	Leek	Fish	White	Pie	Dead

3.1. Put numbers (1-8) in the blanks to indicate which, if any, of the diners (1-8) RULES OUT each of the following candidates as a **SUFFICIENT** CONDITION OF DEATH. You will need to put more than one number in some blanks.

_____Tomato Soup _____Leek Soup
_____Fish _____Chicken
_____Red Wine _____White Wine
_____Cake _____Pie

3.2. Put numbers (1-8) in the blanks to indicate which, if any, of the diners (1-8) RULES OUT each of the following candidates as a **NECESSARY** CONDITION OF DEATH. You will need to put more than one number in some blanks.

_____Tomato Soup _____Leek Soup
_____Fish _____Chicken
_____Red Wine _____White Wine
_____Cake _____Pie

3.3. Which complex condition is not ruled out as a necessary condition of death and is also not ruled out as a sufficient condition of death?

4. In each of the following cases, put the appropriate letter in the blank to indicate whether:

A = X is the cause of Y.
B = Y is the cause of X.
C = There is a common cause of both X and Y.
D = The correlation is accidental.

____ 4.1. During the winter, ice forms on windows (X) and smoke comes out of chimneys (Y).

____ 4.2. During the summer, more people put on bathing suits (X) and more people feel hotter (Y).

____ 4.3. During the fall, more people play football (X) and more turkeys are killed (Y).

5. Put 'T' or 'F' in the appropriate blank to indicate whether the following claims are true or false.

____ 5.1. The negative sufficient condition test is deductive.
____ 5.2. The positive sufficient condition test is defeasible.
____ 5.3. If A is positively correlated with B, this shows that A causes B.
____ 5.4. If fire causes smoke, then fire never occurs without smoke, even in abnormal circumstances.
____ 5.5. The necessary and sufficient condition tests apply to moral or legal generalizations.

CHAPTER 11: Chances

1. Someone who assumes that the next card drawn will be an ace because no aces have been drawn for a long time commits which fallacy?

2. What are the odds of flipping four heads in a row?
____ A. 1/4
____ B. 1/8
____ C. 1/16
____ D. 1/32
____ E. 1/64

3. You enter two lotteries. You have a 10% chance of winning each. What is the probability that you will either win both or lose both?
____ A. 1%
____ B. 18%
____ C. 80%
____ D. 81%
____ E. 82%

4. Using the rules for probability given in the text, calculate the probabilities for each of the following. Assume an ordinary deck with 52 cards that has been well-shuffled. Show the setup for the calculation. Don't bother multiplying fractions.
4.1. What is the probability on the first draw of drawing a Jack from the deck?
4.2. What is the probability on the first draw of drawing something other than a Jack, Queen, or King from the deck?
4.3. What is the probability of drawing an eight and then drawing another eight assuming the first card is put back in the deck before the second draw?
4.4. What is the probability of drawing an eight and then drawing another eight assuming the first card is <u>not</u> put back in the deck before the second draw?

4.5. What is the probability of drawing at least one card that is not an ace in four draws assuming the cards are not put back in the deck after being drawn?

5. Use the rules of probability to compute the following probabilities. Show your work. You may leave your answer as a fraction. Dartnose College has 4000 students. 30% are first-year students, 25% are sophomores, 25% are juniors, and 20% seniors. 40% of the first-year students are women, 60% of the sophomores are women, 40% of the juniors are women, and 60% of the seniors are women. Every student is in one and only one of these classes.

5.1. What is the probability that a randomly selected student will not be a junior?

5.2. What is the probability that a randomly selected student will be either a junior or a senior?

5.3. What is the probability that a randomly selected student will be either a woman or a junior?

5.4. What is the probability that a randomly selected student will be both a senior and a man?

5.5. If we randomly select three names off the total student list (we might select the same name twice or even three times), what is the probability of picking a woman's name at least once?

5.6. If we randomly select two names off the total student list (we might select the same name twice or even three times), what is the probability of picking the name of one sophomore and one junior in any order?

6. Late last night a car ran into your neighbor and drove away. In your town there are a thousand cars. 1% are Jaguars. The only eyewitness to the hit and run says the car that hit your neighbor was a Jaguar. Tested under similar conditions, the eyewitness mistakenly classifies cars of other makes as Jaguars 10% of the time, and she correctly classifies Jaguars as such 90% of the time. What are the chances that the car that hit your neighbor was a Jaguar? You may use either Bayes' theorem or the table method.

CHAPTER 12: Choices

1. Define expected monetary value.

2. Explain how expected monetary value differs from expected overall value. Give an example where these values differ.

3. As a contestant on a game show you win the following "prize." You are allowed to blindly pick one card from a standard deck without jokers. If you pick a heart, you gain $28. Otherwise you win $12. The expected payoff of this opportunity is:

____ A. $14
____ B. $15
____ C. $16
____ D. $17
____ E. $18

4. Sam the gambler offers you an opportunity to play one of several games in which a 10 sided die is rolled. If an 8 or 9 or 10 is rolled on the die, you win money. Otherwise you pay money. Here are the gains and losses for the possible games.

Game	Win	Lose
1	$70	$30
2	$30	$70
3	$50	$20

Assuming the values in the table represent the only relevant values, calculate the Expected Value for each of the three games.

4.1. Expected Value (Game 1) =

4.2. Expected Value (Game 2) =

4.3. Expected Value (Game 3) =

4.4. Which game should you play? _____

4.5. Which game should neither you nor Sam bother playing for money? ____

5. Put a check next to each of the following rules that considers both the best outcome and the worst outcome of a choice.

____ 5.1. The Maximax Rule
____ 5.2. The Maximin Rule
____ 5.3. The Rule of Insufficient Reason
____ 5.4. The Disaster Avoidance Rule

6. State the MAXIMIN rule for decision under uncertainty. Be as clear and precise as you can.
(Note: This question can be asked about any of the rules in Chapter 11.)

PART IV: Fallacies (CHAPTERS 13-17)

Put a check next to the best answer in Questions 1-5:

1. Any argument that depends on an ambiguity commits
____ A. the fallacy of equivocation.
____ B. the fallacy of begging the question.
____ C. the fallacy of appealing to ignorance.
____ D. the gambler's fallacy.
____ E. none of the above.

2. If you are trying to refute a conceptual slippery slope argument by giving a definition, the kind of definition you should give is:
____ A. a dictionary definition.
____ B. a stipulative definition.
____ C. a precising definition.
____ D. a disambiguating definition.
____ E. none of the above.

3. Arguments that beg the question
____ A. are always invalid.
____ B. are always unsound.
____ C. are always fallacious.
____ D. always include the conclusion as one of the premises.
____ E. none of the above.

4. The technique of "That's just like arguing..." is typically used to show that
____ A. an argument is invalid.
____ B. one of the premises of an argument must be false.
____ C. an argument begs the question.
____ D. an argument is inductive.
____ E. none of the above.

5. A reductio ad absurdum argument
____ A. can only be used to refute a premise.
____ B. can only be used to refute a conclusion.
____ C. can be used to refute either a premise or a conclusion.
____ D. can be used to explain a phenomenon.
____ E. none of the above.

6. Identify the following kinds of definitions. Use each kind only once.
6.1. A _____ definition is a definition that is intended solely to describe the normal usage of a term.
6.2. _____ definitions are definitions that give a new meaning to a word.
6.3. _____ definitions are used to clear up vagueness.
6.4. A definition of gold in terms of the number of protons in its nucleus is a _____ definition.

7. Identify the fallacy, if any, in each of the following arguments:
S = Fallacious Slippery-Slope Argument
E = Equivocation
A = Fallacious Appeal to Authority
D = Ad Hominem Fallacy
B = Begging the Question
N = None of the above
____ 7.1. There is no real difference between a short song and a long song, because one more note cannot make a short song long.
____ 7.2. Atheists are wrong, because God says so.

____ 7.3. Nazis don't have a right to free speech, because they don't have the right things to say.
____ 7.4. Smith's view about taxes cannot be correct, because of his sexual misconduct.
____ 7.5. The scientific community agrees that plutonium is radioactive, so it is.

8. Put a letter in each blank to indicate whether the following statements are True (T) or False (F).
____ 8.1. A causal slippery-slope argument claims that something will have bad effects.
____ 8.2. A fairness slippery-slope argument claims that it is unfair to set up a slippery slope.
____ 8.3. Every circular argument is sound.
____ 8.4. Self-sealing positions are always false.
____ 8.5. Begging the question is a formal fallacy.
____ 8.6. Some appeals to authority are not fallacious.
____ 8.7. Some ad hominem arguments are not fallacious.
____ 8.8. An ad hominem argument that tries to show that someone lacks the right to speak is a silencer.
____ 8.9. Ad hominem deniers usually commit a kind of genetic fallacy.
____ 8.10. Authorities can be trusted to tell the truth.

9. In a few sentences, explain what is bad about self-sealing positions.

10. Put the appropriate letter in the blank to indicate whether each of the following statements is True (T) or False (F).

____ 10.1. A single contrary instance is enough to falsify a universal claim.
____ 10.2. A negative claim cannot ever be falsified by a counterexample.
____ 10.3. A claim that is true by definition cannot ever be falsified by any counterexample.
____ 10.4. A reductio ad absurdum argument shows that it is absurd to reduce any conclusion to its premises. Avoided by modifying the
____ 10.5. A reduction ad absurdum is shallow if it can be avoided by modifying the target claim in a minor way.
____ 10.6 Any argument can be refuted by showing that it is invalid.
____ 10.7. To refute an argument is to show that its conclusion is false.

11. Explain what it is to attack a straw man.

12. Explain what a false dichotomy is.

13. For each of the following claims, provide a counterexample or say why a counterexample is not possible.

13.1. If it's right for one person to do something, then it must be right for everyone to do it together.

13.2. If it's wrong to do something, it's not permissible to do it.

13.3. Killing is usually wrong.

13.4. No falsehoods are not lies.

14. For each of the following arguments, present another argument with the same basic form where the premises are clearly true and the conclusion is clearly false. Keep your parallel argument as close as you can to the original:

14.1. Arnold plays golf only if it is a nice day, and it is a nice day, so he must be playing golf.

14.2. Every member of the band is a star, so the band must be great.

14.3. The Democrats can win the next election only if they carry the South, but the Democrats will carry the South, so the Democrats will win the next election.

PART V: Areas of Argumentation (CHAPTERS 18-22)

1. Select **one** of the following questions, answer it, and present what you take to be the strongest arguments in support of your answer. Then state concisely what you take to be the weakest point of your argument. Be sure to define crucial terms.

Are explicit affirmative action quotas constitutional?
Is abortion morally permissible under any circumstances?
Is evolution by natural selection a scientifically established fact?
Does God exist?
Do humans have free will?

(Note: Which options are allowed will depend, of course, on which areas of argumentation have been covered. How long students should be allowed to spend on writing an essay in response to this question will vary.)

2. For one of the following sentences from the text, explain precisely what it means, the author's main argument for it (in its immediate context), and why it matters to the author's overall position (what difference would it make if the author gave it up?). Then say how opponents could best respond, whether you agree with this claim, and why or why not.

(Note: We sometimes distribute a selection of such sentences (say, 9-12) a few days before the test and tell students that we will arbitrarily choose a subset (say, 3) on the day of the test and ask them to explain those quotations during the test period. This prior distribution tell students exactly what to study, and they learn to analyze carefully small bits of text.)

2.1. "We are satisfied that the [Michigan] Law School adequately considered race-neutral alternatives currently capable of producing a critical mass without forcing the Law School to abandon the academic selectivity that is the cornerstone of its educational mission." (372)

2.2. "The current LSA policy does not provide such individualized consideration." (376)

2.3. "The extension of equal moral status to fetuses threatens women's most basic rights." (407)

2.4. "What makes killing us wrong, in general, is that it deprives us of a future of value." (411)

2.5. "There seems to be no non-arbitrarily determinate subject of harm in the case of successful contraception." (418)

2.6. "Since the irreducible complex cilium cannot have functional precursors, it cannot be produce by natural selection." (435)

2.7. "What Intelligent Design urgently needs if it's going to make any progress in understanding these transitions, in tackling the problems it claims to raise, is a set of coherent principles that identify the ways in which Intelligence is directed and what its powers and limitations are." (446)

2.8. "God makes sense of the origin of the universe." (451)

2.9. "God makes sense of the complex order in the universe." (452)

2.10. "… none of it seems beyond the power of omnipotence to prevent without the loss of that good." (461)

2.11. "I think Christian belief makes morality, as we normally think of it, unintelligible." (462)

2.12. "In other words, the deep-self view, supplemented by the condition of sanity, provides a satisfying conception of responsibility." (477)

2.13. "The best explanation for the intuition that Plum is not morally responsible in the first three cases is that his action is produced by a deterministic causal process that traces back to factors beyond his control." (487)

2.14. "Accepting hard incompatibilism demands giving up our ordinary view of ourselves as blameworthy for immoral actions and praiseworthy for actions that are morally exemplary." (489)

3. Put "T" or "F" in the blank to indicate whether the following statement is true or false.

____ 3.1. In a civil lawsuit, the respondent is assumed innocent until proved guilty.

____ 3.2. Strict scrutiny is strict in theory, but always fatal in fact.

____ 3.3. In *Gratz*, the Supreme Court cited *Bakke* as a precedent supporting the constitutionality of the affirmative action admissions program at Michigan Law School.

____ 3.4. A moral argument based on analogy can be refuted simply by finding a single relevant disanalogy between the cases that are supposed to be similar.

____ 3.5. Mary Anne Warren argues that abortion is morally wrong during the third trimester of pregnancy, which is still before birth.

____ 3.6. Don Marquis argues that abortion is never morally permitted at any time during pregnancy.

____ 3.7. Michael Behe denies all kinds of evolution.

____ 3.8. Philip Kitcher argues that intelligent design theory is meaningless.

____ 3.9. William Lane Craig argues that morality depends on God.

____ 3.10. Edwin Curley argues that nobody deserves infinite punishment.

____ 3.11. Susan Wolf argues that JoJo in her example is not responsible for his actions.

____ 3.12. According to Pereboom, we are never justified in putting criminals in prison.

ANSWERS TO SAMPLE TEST QUESTIONS

PART I: How to Analyze Arguments

CHAPTER 1: Uses of Arguments

1. An argument is a connected series of sentences, statements, or propositions (called "premises") that are intended to give reasons of some kind for a sentence, statement, or proposition (called the "conclusion").

2. Only 2.5 is an argument, for the others do not try to give reasons for a conclusion.

3. General principles or laws and a statement of initial conditions.

4. A reliable source told me that it is true. This justifies my belief but does not explain why it is true if the reliable source did nothing to explain it.

5. A weather prediction often does not explain why it will rain, because it does not cite the cause of rain.

6. Only 6.3 and 6.4 are true. 6.1, 6.2, and 6.5 are false.

CHAPTER 2: The Web of Language

1. Only 1.3, 1.5, 1.6, and 1.9 are explicit performatives.

2. 2.1. C 2.2. N 2.3. S 2.4. C 2.5. N

3. a. Do not say what you believe to be false.
   b. Do not say that for which you lack adequate evidence.

4. 4.1. S 4.2. Q 4.3. M 4.4. S 4.5. R 4.6. S 4.7. Q 4.8. S

5. 5.1. F 5.2. T 5.3. T 5.4. F 5.5. F

6. Yes, because it would be relevant if you had to read more, so she would violate the rule of Strength by not giving you all relevant information if you had to read more and she did not mention it. Thus, if she is trying to conform to the Cooperative Principle, she must not know of any more assigned reading.

7. Imagine that you ask me, "How many dogs does Steve own?" and I reply, "He owns one German Shepherd." My utterance conversationally implies that Steve's German Shepherd is the only dog he owns, because the rule of quantity requires me to give all of the relevant information that I know. Now suppose that Steve also owns a Poodle and a Dachshund in addition to his one German Shepherd. Then what I conversationally implied is false, but what I said is still true, since he does own only one German Shepherd. Thus, what I say can be true even if it conversationally implies something false.

8. A speech act is what a speaker does *in* saying something, but a conversational act is what the speaker does *by* saying something. The conversational act is an effect, whereas the speech act can be done without any standard or intended effect.

9. 9.1. F 9.2. F 9.3. T 9.4. T 9.5. F 9.6.F 9.7. F 9.8. T

10. 10.1. R 10.2. N 10.3. R 10.4. N 10.5. R

11. 11.1. – 11.2. 0 11.3. +

12. Literal: On a wilderness trip in the backwaters of a river, someone asks why you are upset, so you respond, "We are up a creek without a paddle."
Metaphorical: You business partner asks how your business is going, and you respond, "We are up a creek without a paddle."

13. Linguistic act = uttering a meaningful sentence.
Speech act = advising
Conversational act = getting the student to study harder (hopefully).

CHAPTER 3: The Language of Argument

1. 1.1. A 1.2. N 1.3. B 1.4. V 1.5. A

2. 2.1. An argument is invalid iff it is possible that both the premises are true and the conclusion is false.
2.2. An argument is unsound iff it is invalid or has a premise that is not true.

3. 3.1. T 3.2. F 3.3. T 3.4. T 3.5. T 3.6. T 3.7. T 3.8. F 3.9. F 3.10. T

4. 4.1. D 4.2. C 4.3. G 4.4. A 4.5. R

5. 5.1. D 5.2. A 5.3. P 5.4. G 5.5. M

CHAPTER 4: Close Analysis

1. 1.1. D 1.2. G 1.3. E+ 1.4. A 1.5. G 1.6. M
1.7. R or G 1.8. G 1.9. N 1.10. D 1.11. E– 1.12. M

2. 2.1. E+ 2.2. A 2.3. E- 2.4. D 2.5. M 2.6. G 2.7. D 2.8. N
2.9. M 2.10. M 2.11. M 2.12. G 2.13. D 2.14. A 2.15. E-

3. 3.1. N 3.2. A 3.3. E– 3.4. E+ 3.5. M
3.6. D 3.7. M 3.8. G 3.9. N 3.10. M

CHAPTER 5: Deep Analysis

1. "X" next to 1.1, 1.2, and 1.4 but not 1.3.

2. 2.1. Fruit is a dessert.
2.2. The murder was done by Miss Scarlet or Colonel Mustard.
2.3. Joan is in a sorority, and all seniors graduate in 2006.
2.4. No only child is a sister.
2.5. The thief is either Charlayne or Beverly.
2.6. Anyone with a criminal record stretching back a decade or more was not first arrested less than two years ago.

3. 3.1. Students get bad grades when they do not study well.
3.2. Embargoes makes no sense when countries can get around them.

4. Orchids manufacture their intricate devices from parts (components) that are usually fitted for very different purposes.
An orchid (or machine) made of parts fitted for very different purposes would not reflect its designer's wisdom and power.
_____

∴ [Orchids do not reflect any designer's wisdom and power.]
[This lemma or intermediate conclusion is optional.]

If God had made orchids (or any machine), he would have made them so as to reflect his wisdom and power.
_____

∴ Orchids were not made by an ideal engineer (or God).

Either orchids were made by an ideal engineer (or God) or they evolved from ordinary flowers.
(= If orchids were not made by an ideal engineer, then they evolved from ordinary flowers.)
_____

∴ Orchids must have evolved from ordinary flowers.

PART II: How to Evaluate Arguments: Deductive Standards

CHAPTER 6: Propositional Logic

1. 1.1. ~B & ~N or ~(B ∨ N)
1.2. ~T ⊃ ~D or ~D ∨ T
1.3. A & P
1.4. W ∨ (I ∨ S) or (W ∨ I) ∨ S
1.5. C

2. There should be an "X" before 2.1, 2.2, and 2.4, but not 2.3 or 2.5.

3. There should be an "X" before 3.1, 3.3, 3.4 and 3.5, but not 3.2 or 3.6.

4. 4.1. T 4.2. F 4.3. T 4.4. F 4.5. T 4.6. F 4.7. T

5. 5.1. Invalid 5.2. Valid 5.3. Valid 5.4. Invalid

6. "$(p \vee q)$" is equivalent to "$\sim(\sim p \,\&\, \sim q)$."

7. $\sim(p \vee q)$

8. 8.1. No 8.2. Yes

CHAPTER 7: Categorical Logic

1. 1.1. I 1.2. A 1.3. E 1.4. O

2. 2.1. All snakes are reptiles.
   2.2. All mathematicians are logicians.
   2.3. All psychologists are crazy people.
   2.4. All college students are people who work.
   2.5. No solution is a solution to those equations.

3. 3.1. U 3.2. F 3.3. U 3.4. T 3.5. U

4. 4.1. Some swimmers are not students. Invalid
   4.2. No swimmers are students. Valid

5. 5.1. Valid 5.2. Invalid 5.3. Invalid 5.4. Valid 5.5. Invalid

PART III: How to Evaluate Arguments: Inductive Standards

CHAPTER 8: To and From Generalizations

1. There are three main differences: (1) An argument is deductive if and only if the arguer intends or claims that the argument is valid (that is, that it is not possible for the premises to be true when the conclusion is false). An argument is inductive if and only if the arguer does not have this intention or make this claim. (2) Deductive validity is indefeasible, but inductive strength is defeasible, in the sense that adding premises cannot make a valid argument invalid, but it can make an inductively strong argument weak. (3) Deductive validity does not come in degrees, but inductive strength does come in degrees.

2. 2.1. F 2.2. T 2.3. F 2.4. F 2.5. F

3. 3.1. C 3.2. B 3.3. B 3.4. B 3.5. A

4. C

5. 5.1. BS 5.2. HG and BS 5.3. RC 5.4. N 5.5. RC 5.6. BS 5.7. HG

6. 6.1. D 6.2. SA 6.3. SG 6.4. N

CHAPTER 9: Inferences to the Best Explanation and From Analogy

1. … it conflicts with well-established prior beliefs.

2. Yes. For example, identical twins might be similar in many respects, but, even if one is a great basketball player, this does not show that the other probably is, too, if the other twin lost both arms in a car accident.

3. 3.1. N 3.2. AA 3.3. BE 3.4. D

4. 4.1. F 4.2. F 4.3. T 4.4. T 4.5. T

CHAPTER 10: Causal Reasoning

1. 1.1. N 1.2. PS 1.3. NS 1.4. PN 1.5. NN 1.6. PN

2. 2.1. Plug In, Old Software
   2.2. Plug Out
   2.3. _S_ The conjunction of both New CPU and Old Software
   _N_ The disjunction of either Old Monitor or Old Software
   _N_ The disjunction of either Old CPU or Old Software

3. 3.1.

_123_Tomato Soup	_57__Leek Soup
_15__Fish	_237_Chicken
_15__Red Wine	_237_ White Wine
_125_Cake	__7__Pie

   3.2.

_68__Tomato Soup	__4__Leek Soup
__4__Fish	_68__Chicken
__8__Red Wine	_46__ White Wine
_68__Cake	__4__Pie

   3.3. (Fish and Pie) or (Chicken and Red Wine)

4. 4.1. C 4.2. B 4.3. D

5. 5.1. T 5.2. T 5.3. F 5.4. F 5.5. T

CHAPTER 11: Taking Chances

1. Gambler's Fallacy

2. 1/16

3. 82%

4. 4.1. $4/52 = 1/13$
4.2. $40/52 = 10/13$
4.3. $4/52 \cdot 4/52 = 1/13 \cdot 1/13 = 1/169$
4.4. $4/52 \cdot 3/51 = 1/13 \cdot 1/17 = 1/221$
4.5. $1 – (4/52 \cdot 3/51 \cdot 2/50 \cdot 1/49)$

5. 5.1. 75/100
5.2. 45/100
5.3. .25 + .49 – (.25 x .49)
5.4. 8/100
5.5. 1 - (.49) to the third power
5.6. 1/8

6. Let h = the car that hit your neighbor was a Jaguar.
Let e = the eyewitness identified the car that hit your neighbor as a Jaguar.
Pr (h) = 0.01, so Pr (~h) = 0.99. Pr (e/h) = 0.9, and Pr ($e/\sim h$) = 0.1.
So: $$\Pr(q/p) = \frac{\Pr(h) \cdot \Pr(e/h)}{[\Pr(h) \cdot \Pr(e/h)] + [\Pr(\sim h) \cdot \Pr(e/\sim h)]}$$
$$= \frac{0.01 \cdot 0.9}{[0.01 \cdot 0.9] + [0.99 \cdot 0.1]} = \frac{0.009}{0.108}$$

	Jaguar	Not Jaguar	Total
Identified as Jaguar	9	99	108
Not Identified as Jag	1	891	892
Total	10	990	1000

CHAPTER 12: Choices

1. Expected monetary value = (the probability of winning times the net gain in money of winning) minus (the probability of losing times the net loss in money of losing)

2. Expected overall value considers values other than money, such as security & health.

3. $16

4. 4.1. $0 4.2. –$40 4.3. $1 4.4. Game 3 4.5. Game 1

5. 5.3 (The Rule of Insufficient Reason) and 5.4 (The Disaster Avoidance Rule)

6. Choose the option whose worst outcome is better than the worst outcome of any other option.

PART IV: Fallacies
(CHAPTERS 13-17)

1. A. equivocation

2. C. a precising definition

3. C. are always fallacious

4. A. an argument is invalid.

5. C. can be used to refute either a premise or a conclusion.

6. 6.1. Dictionary or lexical 6.2. Stipulative 6.3. Precising 6.4. Theoretical

7. 7.1. S 7.2. B 7.3. E 7.4. D 7.5. N

8. 8.1. T 8.2. F 8.3. F 8.4. F 8.5. F 8.6. T 8.7. T 8.8. T 8.9. T 8.10. F

9. Self-sealing positions are compatible with any possible observation, so they cannot explain why one thing instead of another is observed. That makes them empty or useless.

10. 10.1. T 10.2. F 10.3. T 10.4. F 10.5. T 10.6 F 10.7. F

11. Attacking a straw man is criticizing a position was not really held by your opponent or by anyone else.

12. An argument commits the fallacy of false dichotomy when it depends on a disjunction that does not really exhaust the possibilities.

13. 13.1. It is right for Harold to kiss his wife, but it is not right for everyone to kiss Harold's wife together.
13.2. No counterexample, for it is necessarily true by definition.
13.3. No counterexample, because it is not a universal statement.
13.4. This means "All falsehoods are lies," but innocent mistakes are not lies.

14. 14.1. She's a mother only if she is female, and she is female, so she must be a mother.
14.2. Every member of the band is a sibling, so the band is a sibling.
14.3. I can win the race only if I enter, and I will enter, so I will win.

PART V: Areas of Argumentation
(CHAPTERS 18-22)

1-2. These essay questions can be answered well in numerous ways.

3. 3.1. F 3.2. F 3.3. T 3.4. F 3.5. F 3.6. T
3.7. F 3.8. F 3.9. T 3.10. T 3.11. T 3.12. F