

LOGIC 1 INFORMAL LOGIC

Truth Through the Lenses of INFORMAL LOGIC

MICHAEL G. EATMON



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CONTRIBUTING EDITOR DJ GOODWILER



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FOREWORD

I have known some smart people in my lifetime, but the author of this logic text is, quite honestly, the smartest one I know. His mastery of language includes more than 10, his recall of history and theological developments makes him a favorite source for my questions, and his love of classical education made him the perfect author for the Veritas logic text.

What we should have done a long time ago is now a reality: a logic curriculum that blends story, basic logic principles, cognitive biases, fallacies, and argumentation seamlessly in one first year text. It is exactly what is needed. The text focuses on the more familiar informal logic with an expectation that formal logic will follow in year two.

Logic is one of the most important distinctives of a classical education. Without clear, precise thinking, all the knowledge in the world will do us little good. Until recently, few students had any classes in logic. And it shows. As I write this, I find the world to be filled with those motivated by gain of power and wealth with little concern for truth and what's right. I hold great hope, though. We should expect students armed with the knowledge and tools of logic to have taken the first step into clearer thinking and, by God's grace, leadership that will be part of making things as God intended.

It is a crucial step, and this is a crucial work in

"Restoring Culture to Christ One Young Heart and Mind at a Time."

Marlin Detweiler

President | Veritas Press June 2022

PREFACE

Much of what passes for civil discourse today is often neither. The honest answering of a simple question can turn into a shouting match or a seething silence. A spontaneous chat about a current event can descend into a verbal chaos. Today's conversational landscape is a minefield that the wise are often wary of crossing.

What's worse, many conversations today can be as unreasonable as they are uncivil. This is nowhere more painful or obvious than when the topic touches on politics or culture. Exchanges of opinions can lack clarity of thought and carefulness of language. They can be rife with errors in understanding and mistakes in reasoning. They can lack both the warmth of charity and the light of truth. Today's exchanges too often freeze the heart while they darken the head.

In such a volatile and perplexing situation, what are the wise to do? Some keep their beliefs, ideas, and points of view to themselves. Others engage in verbal combat, weaponizing their words to win at all costs.

The book before you has chosen a third way. It aims to teach young adults how to think in better ways so that they may think better things. It offers them basic tools they'll need for cogent reasoning and clear communication. This book aims to teach students how to argue, as well, but to do so with equal parts honesty and humility. Conversations today too often lack both thoughtful care and careful thought. This book strives to set a better course, both through its instruction and by its example.

None of what's been said so far should frighten the reader, though! This book aims for lofty heights, but it hopes to get its readers there gently. It treats its topics with a plain approach and its readers with a playful tone. When possible, it simplifies complexity, and when helpful, it scaffolds the learning process. This incremental approach is vital when covering epistemology, cognitive biases, and logical fallacies. It's crucial when covering them in middle school.

This book would not have happened were it not for the support and encouragement of others. First, thanks go to the Detweilers, who nudged and nudged (pushed?) me until I said yes. Thanks for overcoming my resistance. My deep gratitude goes to DJ Goodwiler, too, a friend and colleague at the Cambridge School of San Diego. He saw into my blind spots, and his keen inputs and kind deliveries improved every chapter. Thanks go to my wife and younger daughter, also, who offered feedback on everything I wrote. Last, I extend a special thank-you to my editor and colleague Carl Petticoffer. He caught issues that four other pairs of eyes missed, and his suggestions always helped my work.

Michael Eatmon

Orlando, Florida

Part 1: Philosophical Principles of Logic





THE PROBLEM OF INVISIBLE CATS

Renny grabbed a spoon from the drawer and a paper napkin from the counter. (Taking a napkin to the table was a dead giveaway that he was up to something. Napkins, as he'd made clear many times, were much ado about nothing.) He sat down at the kitchen table and poured himself a bowl of cereal. Renny couldn't wait for Jen to show up for breakfast. That morning, he'd put a cramp in *her* brain.



"Think any more about Zeno's paradoxes?" came Jen's first words of the day as she rounded the corner into the kitchen.¹ "Bet that puzzle about the midpoints got your head spinning!"²

Jen may have thought she was cracking a smile as she spoke, but that's not what Renny saw. He saw what looked a lot more like a half-suppressed smirk. Jen, Renny's older and only sibling, started college last year. After only three philosophy classes, she felt sure that she was an expert in the subject. She knew that many of philosophy's thought puzzles were over Renny's head, but she liked to watch him squirm.

What is **philosophy**?

It's the study of what is really real, how we know things, and what the difference is between right and wrong.

"Nah. Most middle-schoolers aren't talking much about Zeno these days. What's got everyone *really* fired up is the proliferation of invisible cats."³ Renny hadn't even delivered his best material, but he was already pleased with himself. He used what his mom would call a \$5 word, *proliferation*, and he was pretty sure he'd used it correctly. More satisfying, he'd baited a trap that he knew his sister couldn't resist.

"Invisible *what*? Cats?! What in the world are you talking about? Everyone knows there's no such thing."

"On the contrary," Renny revved up his response. "Everyone's starting to realize that the evidence is overwhelming. Consider this. You and I are sitting in only two

¹ Zeno was an ancient Greek philosopher who lived in the fifth century BC. He's famous for coming up with puzzles that appear to show that motion is impossible.

Here's the puzzle Jen is talking about. To move from any starting point to any ending point, you must pass through the point that's midway between them. The same is true of that midpoint, though. To move from your starting point to that midpoint (we'll call it midpoint 1), you must pass through another midpoint (midpoint 2). You may guess what comes next. To move from your starting point to midpoint 2, you must pass through midpoint 3. Following this pattern, how many midpoints must we pass through to get to our ending point? If you said "an infinite number," then you're on to Zeno's point. If we must pass through "an infinite number," of midpoints to move anywhere, then can we ever actually move at all? Wouldn't it take an infinite amount of time to travel an "infinite number" of distances?

³ Thanks to C. S. Lewis (in *The Four Loves*) for the invisible-cat setup.

of the four chairs around this table. What about the other two?"

"Um, what about them?" Jen gathered that her brother was trying to outwit her, but she couldn't figure out where he was going with this one. "What do two empty chairs have to do with invisible cats?"

"Oh, how little you've learned in your philosophy classes!" Renny felt victory approaching. "Right now, two invisible cats are sitting in those two other chairs."

"Okay, Ren, now I *know* you're losing it! The other two chairs are empty. Anyone can see that."

"No, what anyone can see are chairs that *appear* to be empty. This isn't surprising, of course, because you can't *see* invisible cats."

"Mmm, fine. We can't *see* invisible cats, but I'll bet we can *feel* them." Jen waves her hands over the seat of each chair. "Nope, nothing here . . . or here, and that proves—"

"You really don't know much about these creatures, do you? Not only are they invisible," Renny closed the trap on his sister, "but they're also wicked fast. Most of the time, they ignore us, but they scamper away the moment we get close."

Jen realized that she'd played into her brother's hands, which was embarrassing. She also started to wonder whether Renny took his own claim

seriously. Was he playing, or did he believe what he was saying? "You don't honestly think there were invisible cats in our kitchen, do you?"

"You can't prove that they *weren't* here, *can* you? If not, then I'll say again that the evidence for their existence is overwhelming." With that, Renny grinned wide and strode out of sight. Had he looked back, he would've noticed the dumbfounded look on his sister's face. She'd been had, and she

knew it. What pained her most was that it wasn't clear to her how to get un-had.

We All Have Our Moments

Few of us have had conversations about invisible cats. Many of us have had "Ren" and "Jen" moments, though. They're like a senior moment that a great-grandparent

might have. All three are temporary mental lapses. Each is a sort of hiccup in a person's thinking. People need to have quite a few years behind them to have a senior moment. A Ren moment or a Jen moment, though, can occur at most any stage of life. What's more, we needn't be a young man to have a Ren moment nor a young woman to have a Jen moment. Anyone can experience either, and in time, everyone will experience both.

Like Renny, many of us have tied someone's brain in a knot with (what we're sure is) our clever thinking. We've seen the look of bewilderment in another's eyes, and we felt smarter for having stumped her. Most often, this happens when we're trying to show someone why we're obviously right about something. Of course, it may be obvious *only to us* that we're right. In fact, our thinking may be neither obvious nor right. The smug rush of a Ren moment can keep us from seeing just how faulty our own thinking is.

Many of us have had Jen moments, too. We've heard or read something that's baffled us. We're confident we understood the words, but what they communicated made our head spin. We disagreed with something, or thought we did, but we couldn't figure out how to reply. Either we weren't sure about what we believed, or we were sure about what we believed but not about why we believed it. We started to wonder whether we do indeed know what we think we know.

Whenever we experience them, Ren moments and Jen moments reveal places in our lives where we can grow. It may be that our thinking needs attention; it may be that our character does. Renny and Jen give us examples of both.

Renny left his sister stunned. That doesn't mean, though, that he'd shown a dazzling display of brilliance. His proof of invisible cats was funny but faulty. Had Renny realized the faultiness of his thinking, he could've worked to improve it. That in turn may have moved him to question his "evidence" for fanciful felines.

Renny's Ren moment may have revealed an aspect of his character that needs tending to, as well. Siblings like to get one another's goat, and some of that's to be expected in any normal relationship. Still, Renny could've taken a few seconds to reflect on why dazing his sister brought him such delight. Maybe he simply got up that morning in a playful, ribbing mood. Maybe he had some hurt feelings he hadn't dealt with, and he wanted his sister to know it.

Jen's Jen moment revealed areas of her life that needed attention, too. She was sure she didn't believe in invisible cats, but she hadn't a clue about how to respond to her brother. She realized in a flash of awareness how easily her thinking could be scrambled. In a maturing young adult, that realization might prompt both curiosity and humility. Disorientation can spur us to look for answers and to look for them with a teachable spirit.

Not everyone who experiences a Ren or Jen moment learns from what it reveals. Those who do, though, often find that a particular set of tools proves most helpful. That set of tools is **logic**, and it's helpful for improving both our thinking and our character. If we learn how to use its tools well, logic can help us grow through life's Ren moments and Jen moments. It can help us see the importance of a humble heart and a resilient mind.

Patterns of Logic & Illogic

Logic can be useful, you might be thinking, but what exactly is it? A common definition is that it's the art and science of reasoning well. Logic focuses on finding and using good reasons for believing something is true. It's a science in that it can help us discover truth about ourselves and the world. It's also an art: over time and with practice, we can improve our use of logic and its tools.

What is truth?

This is a deep question with a complex answer. This textbook won't even come close to answering it fully. For our purposes in a logic course, we can say that truth is a quality that certain statements possess. For a statement to possess that quality—for a statement to be true—what it says must reflect reality. That is, true statements reflect what is.⁴

⁴ What it means for a true statement to reflect "what is" is itself oh-so complex. Throughout the book, we'll say more about the nature of truth and how it may be expressed.

An even simpler way to look at logic may be to see it as a set of good thinking patterns. Logic shows us, that is, which ways of thinking are orderly and justified and which are flawed. We can study logic's patterns and learn to use them in our speaking and writing. We can learn to recognize when our and others' thinking strays from logical patterns, too.



Most courses in logic divide the subject into two types: **informal logic** and **formal logic**. The two-volume logic series from Veritas Press will do the same. In case you wonder, "formal" and "informal" have nothing to do with how well you're dressed or how polite your language is.



Logic 1: Informal Logic focuses on words, statements, and arguments, especially those in natural conversation. The text begins, though, with some basics of philosophy. These philosophical starting points are important because the Veritas logic series assumes them. Logic 1: Informal Logic talks about the nature of knowledge and truth. It also explores how we can be fairly sure we know what we think we know.

This first logic textbook examines common obstacles to good thinking, too. There, we'll pay close attention to cognitive biases and logical fallacies. Don't worry if you don't know what these are. You'll find out what they are—and how troublesome they can be—soon enough. Along the way in this book, we'll consider logic's limits, as well. Logic is a helpful set of tools, but its tools aren't best suited for *everything* in life.

Three Acts of the Mind

Before we take a look at logical patterns of thought, we need to talk about what the mind is doing when it's thinking. Ever stopped to, well, think about that? Thinking is a complicated set of processes, but for our purposes in a logic course, we can simplify.

We can say that logic is most concerned with three mental processes, which we call the three acts of the mind. When we think, that is, our mind aims to do three things. It seeks to understand, to judge, and to reason.

Understanding is the first and simplest of the three. When our mind **understands** something, it grasps its ed ver

meaning, or the idea of it. "Jack ate a chocolate-chip cookie. Jill drank a glass of milk. Spot chewed on a bone." We understand the meanings of *chocolate-chip cookie, milk,* and *bone* in these sentences. Because we do, we've a good idea of what Jack ate, what Jill drank, and what Spot chewed on.

The second act of the mind, which is more complicated than the first, is judging. This word *judging* is prone to all kinds of definitions and all sorts of abuse. When we use it in logic, though, it means something specific and inoffensive. When our mind **judges**, it links two concepts; it forms an opinion about how one idea relates to another. "A chocolate-chip cookie tastes better with a glass of milk." In this



sentence, we've linked a cookie and some milk, and we've said that they go great together. Which they do.

Reasoning is the third and most complex act of the mind. Just as judging builds on understanding, so reasoning builds on them both. When our mind reasons, it tries to justify, or prove, the truth of some statement. "Milk and cookies go well together because the milk washes down the crumbs." One statement is true, says our reason, because of the truth of another statement. "Dog bones and cookies don't go well together because they leave your mouth too dry." (We'll take Spot's word for it.)

THE THREE ACTS OF THE MIND	WHAT THE MIND IS DOING WHEN IT'S DOING THESE THINGS
When our mind understands,	it grasps an idea or the meaning of something.
When our mind judges,	it links two concepts; it forms an opinion about how one idea relates to another.
When our mind reasons,	it tries to justify, or prove, the truth of some statement.

In chapter 2, we'll take a closer look at the three acts of the mind and their relationship to logic. We'll also talk about some of the key differences between informal logic and formal logic. Both have their place in life; both can improve our head and our heart. For ordinary thinking needs, though, informal logic may offer more versatile tools.

Chapter 2

MORE LIGHT THAN HEAT

Logicians, those who study the ins and outs of logic, think a lot about thinking. They're curious about what the mind is doing when it understands, judges, and reasons. At the end of chapter 1, we summarized these three acts of the mind.

Logicians appreciate summaries, but they prefer a fuller description of the thinking process. One important detail they point out is that the three acts of the mind are *creative* acts. Each produces something crucial to the thinking process.

When the mind understands, it creates a *concept.* Read the words "oatmeal-raisin cookie," and your mind creates the idea of one. In your imagination, you may see its size, shape, texture, and colors. (The more purplish lumps you see, the better your imagination, the better the cookie.) When your mind understands "oatmeal-raisin cookie," it's produced a concept of one.

When the mind judges, it creates, not surprisingly, a *judgment*. Let's



say you're asked about your favorite *kind* of cookie. Three sorts spring to mind: chocolate-chip, oatmeal-raisin, and snickerdoodle. Your mind imagines the cookies, creating a concept for each kind. Your imagination sees what each looks like and even recalls what each smells and tastes like.

Then, your mind starts linking and comparing one kind to another. Which is better: chocolate-chip or oatmeal-raisin? Oatmeal-raisin or snickerdoodle? Snickerdoodle or chocolate-chip? In the end, one cookie comes out on top. Your mind will have produced the *judgment* that oatmeal-raisin

cookies are best. (If that wasn't your conclusion, you may want to reconsider.)

When the mind reasons, it creates an *argument*. Surprised? If so, then it's likely because of how you defined the last word in that sentence. What meaning of *argument* came to mind



when you read it? Likely, it wasn't the meaning that logicians intend when they use the word. Like *judgment*, the word *argument* has several legitimate meanings.

The most common use of the word in ordinary conversation may be as a synonym for *fight*. "We got into a heated argument last night, and it got ugly. She sure knows how to push my buttons!" Another common use of the word is as a synonym for *disagreement*. "She kept saying that chocolate-chip cookies were better than oatmeal-raisin. Why couldn't she leave my opinion alone and not argue about it?" To the logician, though, *argument* means something else. An **argument** is an attempt to give reasons, evidence, or support for some point of view.

What is an **argument?**

It's an attempt to give reasons, evidence, or support for some point of view.

Spot the dog provided us an example in chapter 1. "Dog bones and cookies don't go well together," he barked, "because they leave your mouth too dry." The point of view, or opinion, he wants to get across is that one shouldn't eat bones and cookies at the same time. The reason he provides for his opinion is that munching them together leaves one's mouth dry.

Logicians are interested in studying the three acts of the mind. They're curious about what the mind produces with each creative act, too. They focus most of their energy on studying arguments, though. They're fascinated by our attempts to support an opinion with reasons for believing it's true.

THE THREE ACTS OF THE MIND	WHAT THE MIND CREATES WHEN IT'S DOING THESE THINGS
When our mind understands,	it creates a concept.
When our mind judges,	it creates a judgment.
When our mind reasons,	it creates an argument.

How Now, Brown Cow?

José watched the clock on his phone flip from 3:59 to 4 pm. Time to call Renny. The discussion they began the week before didn't fit into the hour they gave it. The topic, which touched on the very survival of the human race, needed more time.

Renny answered the video chat, and the two swapped a few courtesy questions and comments. "I'm doing okay today," began one of the guys. "Finally got that paper turned in for Comp 1. Thank goodness!" The chitchat ended at 4:02, when they dove into the deep



end of their conversation.

"Yeah, but what I don't get," José started, "is how you can *deny* that aliens did it. How many cattle have to be mutilated before you'll accept the truth?"

"You are *so* sure that little green men from Mars—" Renny got in only ten words before José corrected him.

"I didn't say 'little green men'; you did, and I doubt they're from Mars."

"Okay, I'll start over. You're so sure that extraterrestrial lifeforms have conducted lab experiments on cows. How in the world can you believe something so crazy?"

"I don't think it's crazy at all. The universe is a big place, with millions and billions of stars and planets. What's crazy about thinking that at least one of those planets has intelligent life on it?"

"Mmm, nothing, I suppose," Renny conceded.

"And if there are intelligent beings out there, what's so crazy about believing that some of them may've come to earth?"

"But to perform tests on *cows*? Know how silly that sounds?" Renny snickered. "Why in the world would an alien want to do that?"

"This isn't funny, Ren. You shouldn't laugh at what you don't understand. Cattle mutilation is serious."

"Yeah, sorry, but still. Why would advanced beings from outer space want to abduct our cattle?"

Renny was putting words into José's mouth, and that started to annoy him. "I never said that they *abduct* our cows. I said that they experiment on them. Besides, the visitors are much more likely to abduct humans."

"Where do you come up with this stuff?" Ren asked with obvious disbelief and



growing impatience. "Know how many top-notch scientists we have on the earth? A lot. If there were little green m—eh, I mean extraterrestrial beings—visiting us, don't you think they'd know about it?"

"They do," José replied with a tone that combined confidence with concern. "Many scientists know all about UFOs and aliens, but they're afraid to speak out. They know they'll either be laughed at or silenced."

"Oh, good grief!" Renny blurted. It dawned on him (with no amusement whatsoever) that he was having a Jen moment. His head hurt, and he didn't know where or how to respond to José's talk of aliens. "Hey, look, I've gotta go. Next time, let's talk about something much easier to prove, like ghosts."

A Tale of Two Logics: The Formal One

Chapter 1 mentioned that logic courses often divide the subject into two types. Both types of logic, formal and informal, study thinking patterns. Both want to know which patterns are fine and which are flawed. Each aims to expand knowledge, correct errors, and express truth. Studying either sort of logic will improve not only how we think, but also what we think. Learning to think in better ways will help us to think better things.

For all their similarities, though, the two types of logic don't think about arguments in the same way. Each talks about arguments and tests their thinking patterns with different tools. To highlight their key differences, let's take a look at formal logic's two distinguishing traits.

One is that *form*al logic focuses on an argument's *form*, or its symbolic shape. To a formal logician, an argument's *content*—what it's trying to prove—is important but secondary. Arguments that take certain shapes are seen as following good thinking patterns. Put an argument together in a particular way, that is, and it'll be logical. Give an argument the wrong form or shape, though, and it'll be faulty, regardless of its content.

Many students find talking about an argument's "form" too abstract to understand. For these students, and most everyone else, an illustration may be helpful. Recall José and Renny's discussion of aliens. José's main argument was that cows are mutilated because aliens are experimenting on them. To the formal logician, that argument could look something like this: ¹

Formal logicians would say that this argument's shape is a good thinking pattern. They even give that form of argument a special Latin name: *modus ponens*.²

"Wait. What?" you may be wondering. "I was tracking with that whole 'shape' of arguments talk, but you lost me with those symbols. Where did those letters, dots, and that horseshoe thing come from? How is that logic? It looks more like math!" If you're thinking that, then you're right.

 $3x_{A}$

You've also discovered formal logic's second distinguishing trait. This sort of logic often uses math-like symbols and rules to talk about ideas and arguments. Some people find this use of symbols convenient. It can reduce pages of arguments

¹ You'll learn how to read and interpret this in Logic 2. It'll suffice for now to know what some of its symbols mean. M stands for the sentence "Cattle are being mutilated." A represents the sentence "Aliens are responsible." The symbol ⊃ means "if the statement on the left is so, then the statement on the right is so." The symbol ∴ means "therefore."

² It's Latin for the "mode," or way, "of affirming."

to a few lines of "math-ish" code. Once reduced to this code, arguments' shapes, or thinking patterns, can be seen more easily. José's main alien argument, which we symbolized above, showed us an example. A logician can look at that argument's form, *modus ponens*, and declare it to be a good thinking pattern.³

A Tale of Two Logics: The Informal One

Like formal logic, informal logic studies patterns of thinking and arguing. It wants to know which are justified and which aren't. Unlike its formal counterpart, informal logic doesn't use math symbols. More than that, it doesn't have a mathematical mindset at all.

Instead, informal logic wants to stick as close as possible to the use of natural language. It wants to *talk* about our thinking in the language we use to *do* our thinking. It wants to study reasoning and arguing as they're found in ordinary conversation. Many students just breathed a sigh of relief

To the informal logician, José's main argument looks something like this:



Cattle mutilation has no other reasonable explanation than alien experimentation.

Cows are being mutilated.

Therefore, aliens are experimenting on them.

Informal logicians agree that José's argument follows a good pattern. Some would describe his reasoning pattern as *modus ponens*. Others would describe it using the phrases "necessary condition" and "sufficient condition." For now, you needn't concern yourself with what *either* type of logic calls José's thinking pattern. It's enough to say that it's logical.

Saying that it's logical isn't the same thing as saying that it's reasonable, though.

³ There's more to a *sound*—what many would call "true"—argument than following a logical pattern. For an argument to be sound, its reasoning must be valid ("logical"), and its supporting statements must be true. *Logic 2: Formal Logic* will discuss this in detail.

To be reasonable, we need to look not only at an argument's form, but also at its content. It's not enough to say that a thinking pattern's logic is justified. We also want to know whether what an argument is saying is true.

Informal logicians would want to camp out awhile on the first statement in José's argument. "Cattle mutilation has no other reasonable explanation than alien experimentation." They'd want to ask all sorts of questions about how he



knows this to be true.

Informal logicians are deeply curious about a lot of things. One of the questions that keeps them talking for hours (or years!) is a simple one. How can we know to be true what we believe to be true? In chapter 3, we'll dip our toes into the shallowest spot of that oh-so deep river.

Chapter 3

BEWARE THE CHESHIRE GRIN

Renny strolled in and grabbed the last seat in the back of the room. He wanted to be first to dart out when class was over. He pulled out his logic textbook and waited for the teacher to speak.

First days of class can be awkward, but this one set the record. The teacher gazed at each student, grinning mysteriously. For a moment, Renny wondered whether the young Lewis Carroll might have sat in one of her logic classes.

"Hello, class. My name is probably Mrs. Sagewright,"

she began. "Kindly tell me your name and why you believe you are who you think you are."

Never before had Renny heard an introductory bit like this. What did she mean when she said her name is *probably* Mrs. Sagewright? Was she hav-

ing a senior moment? How weird, too, that students have to explain why they think they are who they are! After what felt like a minute of silence, a hand went up, and the teacher nodded toward the student.

"My name's José Reyes. I know because my parents say so. Not only that, but I've seen my birth certificate." José sat back and crossed his arms, confident that he'd settled the matter in only three sentences.

Without pause, the teacher asked José how he knew the birth certificate was authentic. "How do you know it's original? Even if it is, how do you know it's reliable? Couldn't someone have entered the wrong name by

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accident? What if someone entered the wrong name *on purpose*? Isn't it possible that your birth certificate is a forgery?"

"Well, um" José fumbled for words. "I suppose it's *possible*, but my parents have told me many times who I am."

As the words left his mouth, José had a realization. If his birth certificate's a forgery, do his parents know? How could they *not* know, though, if they were there when he was born?! Could his birth certificate be fake, and his parents know it?

Why would they pretend it's the real thing, then? So many what-ifs ran through José's mind, it was difficult to sort them out.

Mrs. Sagewright seemed to read his thoughts by the pained expressions on his face. "Your parents could be in a witness protection program," she said in a hushed tone. "Your identity and theirs may've been made up by the government—to keep you safe, of course."

José was sitting toward the front of the room, but Renny could still see his head spin.

"Um" José struggled to put a sentence together. "May I go get a drink of water, Mrs. Sagewright?"

"Please do, but why call me Mrs. Sagewright? That may not be my name," she added with a wink.

Renny wasn't entirely sure of what happened in class that day. Even after class ended, he stayed in his seat. After a single day with Mrs. Sagewright, he felt a little less sure about whether he was who he thought he was. He was a lot surer about one thing, though. He was glad José raised his hand first.

The Calling of the Informal Logician

Contrary to what José may have felt, an informal logician's calling isn't to scramble our mind. In fact, it's to unscramble it. Logicians want us to think better, and better thinking begins with difficult questions. The two most important may be these. What do we believe we know, and why do we believe we know it? Mrs. Sagewright gave us a demonstration of how disorienting those questions can be. We all know who we are and could prove it if asked, right? A store cashier gives a customer a cash refund and asks him for proof of identification. The store wants to know who's walking out with its money. The customer produces a driver's license, and the cashier is satisfied.

Logicians and philosophers aren't so easily satisfied. They wonder why we believe a picture ID proves who we are. They're curious about the argument we're making. (Recall that an argument is an attempt to give reasons, evidence, or support for some point of view.) "I am who I say I am because this card says so.¹ The customer never voiced that argument, but he implied it when he handed over his license.

Life is full of arguments, full of attempts to prove all kinds of things. Some of those arguments are *explicit;* they're clearly expressed. "Everyone should read *Alice in Wonderland* because it was written by a mathematician."² Explicit arguments tell us what their point of view is and what the reasons for believing it are. We can find them in persuasive essays, public debates, and Mrs. Sagewright's logic class.

Other kinds of arguments are only *implicit*; they're not clearly expressed. They require us to do some imagining to figure out what exactly they're saying. What's the point of view, opinion, or idea we're being asked to believe? What are the reasons or evidences offered in support of it? What makes implied arguments even trickier to figure out is that they don't always use words. Sometimes, they use actions. A cashier asks for proof of identification, and we hand her a small card.³ Even though we're saying nothing, our action implies an argument.

Informal logicians are interested in both kinds of everyday arguments, explicit and implicit. They look for them in ordinary conversations and try to figure out what exactly they're saying.⁴ They assess the reasonableness of those arguments, too, and they look for ways to improve them.

One could also reasonably flip this argument. "This card says what it does because of who I say I am." This turn of the argument highlights an important problem in logic. Many times, it's difficult to know whether *this* is because of *that* or the other way around.

² Most any reason's a good reason to read the book.

³ As a form of identification, driver's licenses prove less than many realize. They prove only that we convinced a government official that the name on the card is our own.

^{4 &}quot;Ordinary conversations" are any common means of communicating in natural language. These conversations may be dialogues, debates, published essays, whatever.

A Logician's Three Pairs of Glasses

If you're reading this textbook, then you're an informal logician in training. As you learn more about logic, you'll learn how to spot arguments in ordinary conversations. You'll also learn what makes some arguments reasonable and others flimsy or even faulty.

In chapters 1 and 2, we talked about the three acts of the mind. We discussed what the mind is doing when it understands, judges, and reasons. We talked about what the mind creates when it does these things, as well. When our mind understands, judges, and reasons, it creates concepts, judgments, and arguments.

Now, we want to learn how to assess, or evaluate, an argument. How do we know when an argument is good? What criteria does a logician use to make that determination?

In chapter 1, Renny baffled his sister with his argument for invisible cats. Not only do they exist, he maintained, but they're also sitting at the breakfast table. The two kitchen chairs that Ren and Jen *aren't* sitting in prove it, he says. We can summarize his argument like this.

Chairs that appear to be empty have invisible cats in them. Two chairs at our kitchen table appear to be empty. Therefore, those chairs have invisible cats in them.

Renny was pleased with himself, but his thinking was far from dazzling. Let's take a look at *some* of the reasons for saying so.⁵ To evaluate his argument, we need to ask three key questions about it. We need to view it as if through the lenses of three pairs of glasses. Each gives us a distinct perspective on how reasonable Renny's thinking was. What we want to know about his argument—about *any* argument—are answers to three questions.

1. Are its terms clear?



⁵ Renny's argument has all kinds of problems. Here we're considering only a couple of them.

LOGIC IS THE ART AND SCIENCE of reasoning well. It focuses on finding and using good reasons for believing something's true. Studying logic is an invaluable part of learning to think well.

Logic 1 focuses on informal logic. This branch of logic deals with arguments as they appear in ordinary language. Students learn to assess and construct arguments that use inductive and abductive reasoning. First, though, they learn about the nature of truth and the justification of belief. Logic 1 also covers common hurdles to sound thinking and reasonable inference. Chief among these hurdles are cognitive biases and informal fallacies.

Logic 1 aims to teach young adults how to think in better ways so that they may think better things. It offers them basic tools for cogent reasoning and clear communication. This book aims to teach students how to argue, but to do so with honesty and humility. Conversations today too often lack both careful thought and thoughtful care. This book strives to set a better course.



