

Mathematical Nights, Volume II

Night of the  
Frightening  
Fractions

Revised Edition

Robert Black

Royal Fireworks Press  
Unionville, New York

# Chapter One

A chilly autumn wind blew through the afternoon air. Leonarda daVinci Miller—known as Lennie to just about everyone—drew her jacket tight around her shoulders and pulled the zipper all the way up. Before long, it would be too cold to ride her bike to school, and she would have to ride the bus instead. Like most kids in her situation, she wondered what it would be like—which of her friends would be on the bus with her, if the seats would be too bouncy or the bus would smell too bad—but she also had other concerns that her classmates could never imagine.

She crossed the school parking lot and pedaled through the little town of Bailey, Indiana. Her family had moved there from Philadelphia a few months earlier, after her father inherited a plot of farmland and her parents decided to turn it into an artists' retreat. Lennie still missed Philadelphia, but she had discovered that there was more to Bailey than people realized. There was no telling what might be hidden in the large, round barn in the park she rode past. There was no telling what she and her friend Gil might discuss over ice cream or fries at the Launchpad, their favorite hangout. And there was no telling who might be among the customers at Slurpy's Barbecue Hut.

*If they only knew*, Lennie told herself as she rode past the large “Welcome” sign at the edge of town. If only the people

of Bailey knew just who—and *what*—shared their town with them, right next door but hidden from the eyes of all but a few special people. There were plenty of times when Lennie wished she was as clueless as everyone else, but there were other times when she had to admit that she enjoyed being in on the secret.

Just moments later, though, it became one of those times when she would have preferred to be clueless.

When she reached the drug store that sat near the small county airport, Lennie spotted a shopping cart rolling across the drug store parking lot without anyone pushing it. That wasn't *too* peculiar—except that it was being followed by a baby carriage, a wheelchair, a child's red wagon, and an assortment of skateboards, scooters, and other objects with wheels. They were all moving by themselves in a neatly organized formation on a course that would take them directly into her path.

*Oh, great*, Lennie sighed. *Here we go*. She pulled her bike to a stop just as the shopping cart reached the road in front of her. It stopped, twisted itself into a tangled metal ball, and then folded and unfolded itself until it became a small robot looking up at her with glowing, aqua-blue eyes.

“Greetings, Pattern Finder!” it said in a tinny voice. “We have been looking for you!”

This was the part of Bailey's big secret that Lennie didn't much enjoy. She liked knowing that the town sat on the edge of the Mystical Realm, which is filled with strange creatures, some of whom have magical powers. But she wasn't thrilled

about being chosen as their “Pattern Finder”—the one they all came to for help with their math problems. Thanks to fate—and some thievery by one of her ancestors—she was stuck with the task of coming to their rescue when they couldn’t figure out their numbers. And they were all *terrible* with numbers.

“All of you?” Lennie asked. The rest of the convoy had caught up to their leader, and they were all twisting themselves into robots of varying sizes and shapes.

“That is correct, Pattern Finder,” said the leader. “We are the Allobots, and I am our leader. You may call me Bumper Thumper.”

“Well, you can call me Lennie,” said Lennie. “I don’t like all that ‘Pattern Finder’ stuff.”

“As you wish, Pattern Finder,” said Bumper Thumper. “We will obey any command you give us if you can solve our problem.”

Lennie rolled her eyes. “That’s what I’m here for,” she replied wryly. “But can we get out of the street first? I do math better when I’m not in danger of getting run over.”

“Of course,” replied one of the medium-sized robots. It looked like the one that had been disguised as a wagon. Suddenly Lennie felt a wave of dizziness run through her body, and everything went blurry for a moment. When her vision cleared, she found herself standing in another place. It wasn’t too different from Bailey, but the sky had a greenish tint to it, and the buildings all looked slightly askew. The Allobots had taken her to the Mystical Realm,

their homeland. It wasn't her first trip; others had taken her there before. Luckily, they had all sent her back, too—so far.

“That’s better, I guess,” said Lennie. She climbed off her bike and put the kickstand down. “So what kind of problem do you have?”

“It is our duty as Allobots to fight against the evil Obviocons,” explained Bumper Thumper. “Whenever we encounter them, we must join forces and transform! We become *Super* Allobots!”

“Transform!” shouted the rest of the Allobots. “Transform! Transform!”

“Whoa! Hey, wait a minute, guys!” cried Lennie, trying to calm them down. “I don’t know what you’ve heard about me, but I don’t do any transforming.”

“That is not the problem,” said the red-wagon robot. “We know *how* to transform, but we do not know how *many* Super Allobots we can transform into.”

“Why not?” Lennie did a quick head count. “There are twenty-four of you. How many do you need?”

“That depends on what type of Allobots we are,” said Bumper Thumper. He pointed to the robot that had been a wheelchair. “Ramp Rider and I require three of our kind to form a Super Allobot, and we have only two.” Moving on to the red-wagon robot, he continued, “Allobots like Flyerus Maximus require four of their kind to form a Super Allobot, and we have only three.” Finally, he pointed at one of the

smaller robots. “The smallest of our kind require twelve to form a Super Allobot. We have nineteen.”

“Well, at least you can make one of those,” said Lennie.

“Yes, but we need *all* of our combined strength to fight the Obviocons!” Bumper Thumper insisted.

“And in any event,” added the red-wagon robot, Flyerus Maximus, “we all want to transform!”

“Transform!” the rest of the Allobots shouted again. “Transform! Transform!”

“Okay, okay, I get the idea!” shushed Lennie. “Look, if you don’t have enough of your own kind, can you join up with different kinds? You know, mix things up?”

The robots stopped shouting and looked at one another for a moment. “Yes, we can,” said Bumper Thumper finally. “But we still do not know how many we can combine to make.”

“And that’s all?” asked Lennie. Sometimes the problems she had to solve for the Mystical Realm were a real challenge to figure out, but this one didn’t sound like one of those.

“Please help us, Pattern Finder!” cried one of the smaller robots. “We are all eager to transform!”

“Transform!” cried the rest of the robots. “Transform! Transform!”

“Cut that out!” Lennie snapped at them. “I’ll do it if you just quit yelling.” She slipped off her backpack and pulled out a pad of paper, a pencil, and her reading glasses. Since

her first encounter with the Mystical Realm, she had learned not to go anywhere without them.

Once the Allobots were quiet, Lennie knelt down and began writing on the notepad. “Okay, let’s figure out how many super-robots you can make,” she told them. “That’s just a fraction problem. You have two out of three of one kind, three out of four of another kind, and nineteen out of twelve of the third.”

$$\frac{2}{3} + \frac{3}{4} + \frac{19}{12}$$

“Yes, we see that,” said Ramp Rider. “We even attempted to add the fractions, but we became hopelessly confused!”

Lennie frowned. “Did you remember to find the least common denominator?”

The robots looked puzzled, which wasn’t easy for robots to do. “We do not know that process,” Ramp Rider admitted.

Lennie sighed. “Well, that was your problem.” She pointed to the numbers on her notepad. “When you add fractions, the denominators—those are the numbers on the bottom—all have to be the same.”

“How do we accomplish that?” asked Flyerus Maximus.

*At least they’re asking*, Lennie thought to herself. Others in the Mystical Realm simply demanded answers without bothering to learn how she found them. “You have to multiply the denominators by whatever numbers it takes to

make them all the same.” A thought occurred to her. “It’s like you’re transforming them!”

“Transform!” the Allobots all cheered. “Transform! Transform!”

“Exactly!” said Lennie. “But there’s one more thing to remember. Whenever you multiply the denominator, you have to multiply the numerator—that’s the number on the top—by the same thing.”

“Why is that?” asked Bumper Thumper.

“Because that way, you’re just multiplying the whole fraction by one,” Lennie explained. “You’re not changing its value.” But it took only an instant for her to see that the robots had no idea what she was talking about. “Look at it this way,” she suggested. “When you transform, you want to transform all the way, right? You wouldn’t want to transform on the bottom and stay the same on the top.”

The robots nodded in agreement, so Lennie went back to her notepad. “This is an easy one, since twelve is just three times four.”

$$\begin{array}{r} \frac{2 \times 4}{3 \times 4} + \frac{3 \times 3}{4 \times 3} + \frac{19}{12} = \\ \frac{8}{12} + \frac{9}{12} + \frac{19}{12} = \\ \frac{36}{12} = 3 \end{array}$$



She smiled at them triumphantly. “Looks like you can make three Super Allobots in all.”

The robots all cheered. Lennie stood up and began packing her things away.

“But how do we combine to make these three Super Allobots?” Bumper Thumper asked.

Lennie thought for a moment. “I guess there are a couple of ways you could do it,” she replied. “Probably the easiest way would be to make one with twelve little robots, one with the three middle-sized ones and three little ones, and one with the two big ones and two little ones. But I can think of others.” She grinned as an idea occurred to her. “Hey, why don’t you try different things and find out for yourselves? You could see how many different ways you can...,” she paused dramatically before adding, “transform!”

The robots cheered again and began chanting, “Transform! Transform! Transform!” They started to scurry away, eager to take up Lennie’s suggestion.

But as Lennie climbed back onto her bike, an urgent thought popped into her head. “Uh, guys?” she called after the robots. “Before you do all that transforming, can someone send me home?”

## Chapter Two

“You might want to keep an eye out for snakes up here.”

“Snakes?” asked Lennie. “Where? Did you see one?” She ran her rake through the moldy straw on the floor of the barn loft, but it revealed nothing.

“I haven’t seen one yet, but I know they like places like this,” replied Gil. He was busy raking up another corner of the loft. “Plenty of mice and rats for them to eat.”

Lennie wrinkled her nose. “I think I’ll skip those,” she told him. “But a snake would be pretty cool!”

Gil laughed. “And for a minute I thought you were scared.”

“Are you kidding?” asked Lennie. “After all the stuff I’ve seen around here? Snakes are nothing.”

Gil laughed again. He was one of the few people in town who knew about the Mystical Realm. He couldn’t see it or the creatures who lived there, but he had seen enough to know that it existed, and he often helped Lennie with the problems she solved. It was good to have a friend she could count on when things got weird.

“Leonarda! Would you and Gilgamesh like to take a break? I brought some snacks out.”

Lennie winced. Her mother was the only person who called her by her full first name, and now she had taken to calling Gil by his full first name as well. It was embarrassing. At least she didn't use his last name too. Gil's entire name was Gilgamesh François MacBean. That was even worse than Lennie's name.

Lennie and Gil climbed down the ladder to the loft and found her mother waiting for them with a pitcher of iced tea and some of Lennie's favorite snack cakes from Philadelphia. The nearest store that sold them was in the next town, so they weren't in the house very often, and when they were, they didn't last very long. If her mother was bringing those out, it meant she really appreciated their help.

"How's it looking up there?" her mother asked.

"Dusty," Gil told her as he unwrapped a snack cake.

"But no snakes," Lennie added. She noticed a piece of straw stuck in Gil's afro and plucked it out.

"But does it feel stable to you?" her mother asked them. "Did you find any soft spots in the floor that might indicate a problem?"

Lennie shrugged, taking a bite of a snack cake and chewing to buy herself time. "I guess it's okay, but you'll need to have Dad check it to be sure."

Her mother shrugged off the suggestion. "You know your father," she replied. "He doesn't want to get our hopes up before the assessment."

Lennie nodded sympathetically. The barn—a normally shaped one, not like the round barns that were common in the area—had been the focus of their attention for the past week. Her mother wanted it to be the centerpiece of the artists’ retreat, but no one knew if it was sturdy enough to be remodeled. If it wasn’t, they would have to tear it down and build something new. The money and time needed for that would delay her parents’ dream for years—maybe forever. An engineer whom Lennie’s father worked with was coming in a few days to inspect the structure and give them his opinion. They had to get the place ready in time. Even Gil had been drafted to help out.

“Can’t you just imagine what it will look like in here?” Lennie’s mother asked, looking around the barn. “This will be our exhibition hall, and the studios up in the loft will look down on it. And then, if things really take off, we can add on to the back...”

She wandered away, and Lennie signaled to Gil that they should head back up to the loft. They each grabbed an extra snack cake and climbed back up the ladder.

“Are you really okay with all these plans your folks are making?” asked Gil.

Lennie shrugged. “They already dragged me out here from Philly, and it’s not like I can do anything about it.”

“Yeah, but what are you going to do when some weird artist comes to *stay* here?” asked Gil. “Won’t that freak you out?”

“We’ve had people stay over before,” Lennie told him. “At least if they can stay in the barn they’ll have their own bathroom.”

As she finished speaking, the loft suddenly grew dark. The bright sunshine was replaced with a dim gloom, and a creepy-looking full moon shone through the open loft doors.

Lennie sighed. “Besides,” she told Gil, “there’s not an artist on Earth who could freak me out after the things I’ve seen.”

“That’s not very nice.”

Those words didn’t come from Gil. Instead, they came from a voice that sounded sour and depressed. It was a voice that Lennie had come to know all too well.

“Well, it freaks me out when you show up like this,” she replied defensively to the voice. Her eyes searched the loft until they landed on a shadowy figure hanging from one of the rafters. It was a large, brown bat—a Cheshire Bat, to be precise. He was the one who always came to her with official jobs from the Mystical Realm. He was the one who had explained that she was their Pattern Finder because her ancestor had stolen a magical veil from them, which he insisted indebted her to the creatures of the Mystical Realm. He always appeared hanging upside down. If there was nothing around for him to hang from, he magically brought along something. His mouth was always frowning, but since he was hanging upside down, it looked like he was grinning maniacally. And whenever he appeared, the day around him suddenly turned into a dark and gloomy night. Lennie made

a mental note to add a flashlight to her list of things to keep with her at all times.

“We don’t have time for you to be freaked out,” the Cheshire Bat declared. “We’re all in terrible danger.”

“You say that about half the time I see you,” Lennie complained.

“What’s going on, Lennie?” asked Gil. “Is that bat here again?” Since Gil couldn’t see the Mystical Realm, the loft looked empty to him. Sometimes the Cheshire Bat allowed Gil to hear him, but he could use that same power to take over Gil’s body and make it do embarrassing things. Lennie had to keep an eye out for her friend whenever the bat was around.

“He’s here,” Lennie replied. “He was just about to tell me about some big mega-disaster that’s coming.”

“Again?” Gil quipped.

“Fine,” the bat said grumpily. “Go ahead, don’t believe me. You’ll be sorry when the living dead get here!”

“The living dead?” asked Gil. Apparently, the bat had decided to let him listen in. “You mean zombies?”

“You should never call them that,” the bat scolded him. “It’s in their union contract.”

“Zombies have a union?” asked Lennie. She walked over to the rafter where the bat was hanging. Gil followed behind her.

The bat looked at Lennie sternly. “I just told you not to call them that. And why wouldn’t they have a union?” he asked.

“Okay, okay,” said Lennie. “The living dead, or whatever. Why are they coming here?”

“To eat our brains, of course!” said the bat. “That’s what the living dead do.”

“And what am I supposed to do about it?” asked Lennie. “I don’t know anything about dead things that aren’t actually dead.”

“We already have a plan to stop them,” the bat explained. “We just need your help to figure out our attack.”

Lennie sighed. “All right, hang on a minute.” She didn’t have paper and a pencil with her, but fortunately she had seen both down on the floor of the barn, left there by her father. She scrambled down the ladder and retrieved them. Her glasses were in the house, but she wasn’t going to take the time to get them. She would just have to write big enough to see.

“Here’s the problem,” said the Cheshire Bat once she returned. “There are three groups of living dead approaching, all from the same direction. The first is the Terre Haute Transmortified, Local 1260. They’re ninety miles away, coming here at ten miles per day.”

Lennie nodded as she wrote. She chose to represent the first group with a letter  $T$ :

$$T \quad \text{Distance} = 90 \quad \text{Speed} = 10$$

“The second group,” the bat continued, “is the Logansport Lurkers, Local 144. They’re one hundred twenty miles away, coming here at fifteen miles per day.”

Lennie chose a letter  $L$  for them:

$$L \quad \text{Distance} = 120 \quad \text{Speed} = 15$$

“And the third group,” the bat concluded, “is the Beech Grove Biters, Local 666. They’re one hundred eighty miles away, coming here at twenty-five miles per day.”

Lennie chose a letter  $B$  for them:

$$B \quad \text{Distance} = 180 \quad \text{Speed} = 25$$

“So what do you need to know?” she asked. “When they’ll get here?”

“Not exactly,” corrected the bat. “We’re hoping they’ll meet each other before they get here so we can attack them all at once.”

Lennie looked at the numbers, frowning her brow. “I guess they might,” she replied. “I’ll have to check.”

“Perfect,” said the bat. “Because then we can set our trap.”

“What kind of trap?” asked Gil. He was looking at the paper over Lennie’s shoulder.

“We found three different kinds of undead repellent at the Mystical Co-Op,” said the bat. “We want to set them up in as many rows as we can using the same amount of each kind in each row.”