

Mathematical Nights, Volume I

Night of the  
Paranormal  
Patterns

Revised Edition

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Royal Fireworks Press  
Unionville, New York

# Prologue

There are things in this world that are not of this world. Strange creatures and ghostly spirits walk the face of the Earth with us. Enchanted objects containing powers beyond belief are tucked away in hidden, out-of-the-way places, where no ordinary mortal would think to look for them. People who look as normal as you or I do are out there too, performing miraculous feats by wielding great forces of magic. There's an entire Mystical Realm out there, sitting right alongside our own world without anyone realizing it.

Well, almost anyone. A few lucky people have a gift for seeing the otherworldly. A few clever people know just where to find mysterious, hidden wonders. And then there are people who know nothing about the Mystical Realm at all, until the Mystical Realm comes looking for them.

You see, the Mystical Realm isn't perfect. It has strengths and weaknesses, just like the regular world does. Its residents may be able to do some amazing things, but there are other things they don't do very well. For example, they are especially bad at mathematics.

Surprising, isn't it? You would think that people who perform miraculous feats of great magic could handle mathematics without breaking a sweat. Either that or they would have magical computers handy to do the math for

them. But not even a magical computer can help you with your math if you don't understand the purpose of math. It doesn't do much good to have a machine tell you that one plus one equals two if you don't understand what "one plus one" means or why you should care that they equal two.

So the denizens of the Mystical Realm are always on the lookout, always watching for mortals like us who can help them with their mathematical problems and puzzles. Those they choose can look forward to a life of adversity, peril, and even danger—and that's just from the math problems.

This is the story of one such person.

# Chapter One

Lennie Miller was bored—bored and disgruntled with the unfairness of her life.

It was easy to be disgruntled when she felt as though her entire life—even her summer vacation—had been stolen from her. The day after her sixth-grade graduation, her parents told her that they were leaving their home in the western suburbs of Philadelphia and moving to the little town of Bailey, Indiana—Bailey, middle-of-nowhere, Indiana, at least two hours from a city that wasn't even as exciting as Philadelphia.

How had that happened? It was all because of a relative Lennie didn't even know—a great-uncle who had left her father a plot of farmland in his will. It was a small stretch of land just outside of town, hardly big enough to be a working farm but the perfect size for her parents to realize their lifelong dream. No, Lennie's parents didn't want to be farmers. They were art lovers, and they had always wanted to set up their own artists' retreat.

So instead of hanging out with her friends, vacationing at Cape May, and doing all of her other favorite summer activities, Lennie had to pack up her belongings, say goodbye to her friends, and move away. And once her family arrived at their new home, she had to help her parents set up the

retreat. There had barely been time for her to explore the town or meet the kids who lived in it. It was hard to believe, but she was looking forward to the start of school and the chances it offered for something new and interesting to happen.

Lennie was sitting on the back porch of her new house one August afternoon, reading text messages from her friends about how much fun they were having, when something strange caught her eye. Two men were walking across the field behind her house, heading straight toward her. That was strange enough, but when she looked closer, she realized that things were even weirder.

The two men were dressed in matching outfits that looked unbearably hot in the August sun: long black boots, white pants, and jackets that were an even brighter shade of red than Lennie's long, curly hair. White shoulder straps crisscrossed their chests, and tall black hats perched on their heads. Each one carried a long, old-fashioned musket. They looked just like the British Redcoats Lennie had seen once at a Revolutionary War reenactment. But what were they doing in her family's field?

She was just getting up to go meet them when they reached the old split-rail fence that separated the back yard from the rest of the field—and walked right through it. For a moment, Lennie wondered if she was seeing things or if there was a gap in the fence that she hadn't noticed before. But no, the two men, or whatever they were, had walked *through* the fence. And then one of them walked through the tree that was next to the fence.

The shock sent Lennie falling back into her chair. Her phone dropped onto the porch at her feet. She wanted to run, but it was too late. The men were already close enough that they could see her.

“Oi! Look ’ere, sir!” cried one of the men. He had a British accent and appeared to be older than his companion. “I think that girl can see us!”

The younger man signaled for them to stop at the foot of the porch steps. He looked up at Lennie curiously. “My word!” he exclaimed. His accent wasn’t quite as gruff as the older man’s, but it was just as British. “I think you’re right, private! Been a while since we met one of these.”

“Who...who are you?” asked Lennie. She leaned forward in her chair tentatively. “*What* are you?”

“We are soldiers of His Majesty, King George,” the younger man proclaimed. “Sent to defend upper Canada from you Yankees.”

“Although...,” the older man added, “it’s been quite some time since we got those orders.”

“Um, yeah,” replied Lennie. “I bet it has.” She stood up and walked cautiously to the top of the steps. *They’re ghosts*, she told herself. *They’ve got to be ghosts. But they don’t look scary, unless.... Can ghost guns shoot people?*

“Well, yes..., quite,” the younger man reluctantly agreed. “It’s possible that our unit has received new orders by now. We got separated from them during our assault.”

“Assault?” The older man’s eyebrows shot up. “You marched us off a cliff, and we drowned in a river.” A second later, he added, “Uh, sir.”

The younger man glowered at his companion. “You didn’t have to tell her that,” he said sourly. “We’re not going to strike fear in the hearts of our enemies if we just blurt out our faults in front of them.”

The older man frowned. “I always thought them not seeing us was what kept us from striking fear into ’em, sir.”

“But I *can* see you,” protested Lennie.

“Yes, and that’s quite remarkable,” said the younger man. “We haven’t met someone who could see us in...in...” He turned to the older man. “How long has it been, private?”

“Er, let’s see,” said the older man. He lifted his musket up to look at it. Lennie leaned forward and saw that the gunstock was covered with tally marks—a single row of normal-sized marks followed by row after row of progressively smaller ones until the bottom rows were little more than dots.

“What are all those?” she asked.

“That’s how I keeps track o’ how long we been marching,” the older man explained. “One mark for every trip out o’ the fort an’ back. Last time anyone saw us was...” he looked down at the musket again, “oh, I’d say ’bout three or four hundred trips ago.”

“Three or four *hundred*?” exclaimed Lennie. “How many trips have you done?”

“This is number five thousand two hundred!” the older man said proudly. “Been looking forward to it all year.”

Lennie’s mind reeled. *Five thousand two hundred times!* “Why?” she asked.

The older man shrugged. “Five thousand two hundred seemed like a good number,” he replied. “Better than five thousand one hundred, anyway.”

“No, I mean why have you been going back and forth so many times?” asked Lennie.

“Orders!” the younger man said forcefully. “Our orders were to engage the enemy forces here in Indian Territory and then return to our fortress.” His expression fell, and he sounded sheepish as he added, “Unfortunately, we’ve never actually found any enemy forces.”

“No, I suspect not,” muttered Lennie, rolling her eyes. The two ghosts were looking less scary by the minute. “Your battle has been over for a long time.”

“Nevertheless, orders are orders,” the younger man insisted. “We wouldn’t want to be accused of desertion.”

“But you’re dead!” Lennie reminded them. “What are they going to do, shoot you?”

The older man frowned again and scratched his head as if the idea had never occurred to him. “She has got a point, sir.”



“Besides,” Lennie went on, “I bet the people who gave you those orders are dead, too. How long did it take you to do all that marching?”

The two ghosts looked at each other. “How long?” repeated the younger man. “Well, that’s...that’s a complicated question—one that involves a lot of mathematics.” He looked at her condescendingly. “I imagine it’s well beyond the abilities of the fairer sex.”

“Hey!” Lennie cried angrily. “What’s that supposed to mean?”

“He means that a girl like you couldn’t figure it out,” the older man supplied helpfully.

Lennie glared at him. “I know that,” she replied hotly. “But I bet I know more math than he does.”

“Do you?” asked the younger man. “Then perhaps you can work out for yourself how long we’ve been marching.”

“What?” Lennie suddenly felt as though she had been tricked. She suspected that the younger man didn’t know the answer himself and was goading her into finding it for him. But it was already too late to back down from the challenge. “Okay, that’s easy,” she said defiantly. “To find out how long you’ve been walking, you just need to know how far you’ve gone and how fast you’ve walked. You said you’ve made five thousand two hundred trips. How far is that?”

“It’s three hundred thirty-six miles from our fortress to the place we were supposed to attack,” said the older man. “An’ three hundred thirty-six miles back again, o’ course.”

*Three hundred thirty-six miles?* Lennie thought to herself. *Each way? Ghosts must not get tired.* She couldn't compute numbers that big in her head, so she picked up her phone and opened the calculator app. "Okay," she said, "that means the total distance you've gone is..."

$$336 \times 2 \times 5,200 = 3,494,400 \text{ miles}$$

"So all we need to know now is how fast you guys march," she continued. "How fast is that?"

"We maintain a steady pace of four miles per hour," the younger man told her.

Lennie grinned confidently. She was about to type that number into her phone when the older man spoke up. "O' course, that's when we're on level ground. When we go uphill, my rheumatism slows us down."

"That's true," the younger man agreed. "We only manage three miles per hour then. But on the other hand, when we're going downhill, we march faster. I'd say we go six miles per hour then."

*Uh-oh.* Lennie saw trouble heading her way. "How often do you go uphill and downhill?" she asked them.

The older man thought for another moment. "Can't rightly say, I'm afraid," he confessed. "I threw away our map after the first thousand trips or so. Didn't need it anymore."

"And I gave him a thorough reprimand when he did," said the younger man. "Destroying the Crown's property. What nerve!"

“Yes, sir, and right you were, sir,” said the older man. “Won’t happen again, sir.”

But Lennie was too busy feeling her head spin to pay them much attention. How was she going to account for all the times the two ghosts went uphill and downhill? She didn’t even know how many hills there were! A problem she had thought was easy had suddenly become impossible.

“So, do you still think you’re up to the challenge?” the younger man asked. “We haven’t got all day, you know.”

“I can do it,” Lennie insisted. “I just need to...uh...check on a couple of things.”

The younger man grinned slyly, amused by Lennie’s predicament. “All right, then,” he said. “We shall return this way tomorrow evening after we’ve reached our destination and have turned back toward the fortress. You have until then to find the answer.”

“I’ll have it by then,” Lennie replied, trying to sound confident. “It’ll be a snap!”

“Oh, jolly good!” said the older man. “Can’t wait to hear how it turns out.”

Lennie could only smile as the two ghosts resumed their march—going straight through the wall of her house. But as soon as they were gone, she plunked herself down on the porch steps to think. She only had one day to solve the problem or face humiliation—and at the hands of Redcoat ghosts, of all things.

Life was so unfair.

## Chapter Two

By the next morning, Lennie still didn't have any answers. She had searched online the night before, looking for a website that could tell her about the geography from northern Indiana to Canada. What she had found was far too complicated to be of any use. She needed to narrow down the area to routes that the Redcoats might have marched, and she hadn't been able to find those details on any of the websites she had visited. She would have to look elsewhere.

After breakfast, she hopped onto her bicycle and pedaled into town. The Bailey Public Library was a decent size, and it probably contained some books about local history. It was a long shot, but it was the only idea she could think of.

The library was a couple of blocks on the other side of Main Street, on the edge of what counted as "downtown" Bailey. As Lennie stopped at one of the Main Street traffic lights, another bicycle pulled up beside her. On it was a lanky African-American boy about her age. He grinned at Lennie when he looked over.

"Hey there," said the boy. "You must be new around here."

Lennie replied with a nod. "How can you tell?"

"This town doesn't get many new people," the boy explained, "so you kinda stick out."

“Well that’s great,” Lennie sighed.

The boy grinned again. “There aren’t many black folks around here, either. We’ll stick out together.”

That made Lennie laugh. “It’s a deal,” she said, extending her hand for him to shake. “I’m Lennie.”

“I’m Gil,” said the boy, taking her hand. “I’ve never met a girl named Lennie before. Does it stand for something?”

Lennie let go of his hand and looked away for a moment, unsure of whether to reveal her second-most-hated thing that people always found out about her. It would come out on the first day of school anyway, and Gil seemed like someone who would be nice about it, so she decided to get it over with. “My full name is Leonarda daVinci Miller,” she confessed. With a roll of her eyes, she added, “My parents are big art lovers.”

“No way!” cried Gil. “Your parents are setting up that hippie place on the old Miller farm!”

“It’s not going to be a hippie place,” Lennie insisted, but then she added, “I hope.” Eager to change the subject, she asked, “So what does your name stand for? It can’t be any worse.”

“Don’t be so sure,” said Gil. “My dad’s an anthropologist. My full name is Gilgamesh François MacBean.”

Lennie did her best to keep a straight face, but she could feel the corners of her mouth curling up. Fortunately, Gil was struggling with the same problem. They burst out laughing

almost at the same moment. “You’re right!” Lennie said between giggles. “Yours is just as bad.”

They exchanged phone numbers and email addresses, and then Lennie explained that she had to get going to the library. She didn’t tell Gil what she was looking for or why she was looking for it.

“I gotta get going too,” said Gil. “I’m taking a long ride today up across the river.”

“What’s up there?” asked Lennie. She looked down and noticed a saddlebag hanging under Gil’s bicycle seat. It looked like it was packed full.

“Nothing special,” Gil said quickly—a little too quickly, perhaps. “You know, just stuff,” he added.

Lennie was curious, but not curious enough to pry, especially with someone she had just met. Besides, her mind was still on her own problems. “Do you have to go up or down any hills to get there?” she asked him. She figured it wouldn’t hurt to ask.

Gil laughed at the question. “Have you seen any hills around here? This town is about as flat as it gets.”

Lennie smiled and shook her head. After growing up in Philadelphia, she had noticed Bailey’s flat terrain almost immediately. “I guess that’s lucky for you,” she said, still thinking about the problem she had to solve. “Going uphill would take a lot longer.”

Gil shrugged. “I guess,” he replied, “but then it’d be faster coming back.”

Something clicked in Lennie's mind. "What?" she asked Gil. She had felt as though she had been missing something obvious, and now it was hitting her right between the eyes.

"You know, when you come back, you're going down the same hills you went up," said Gil, unaware of what was racing through Lennie's mind.

Lennie nodded distractedly. "Right. Right. I get it!" She grabbed her bike's handlebars and turned herself around. "I've got to get home," she said as she started to pedal.

Gil gave her a puzzled wave. "Okay," he replied. "Take it easy."

"It was nice to meet you!" Lennie called back. But she was already focused on the numbers that were running through her head. By the time she got home, she knew she would be ready when the ghosts returned.

That evening, just before dinner, Lennie was sitting on the front steps of her house when the two Redcoats came into view. She got up to meet them in the front yard, waving at them with a pad of paper that she had brought along.

"Look, sir, she's back!" said the older ghost. "An' you thought we wouldn't see her again!"

"Private!" the younger ghost snapped. "I thought we had a talk about not revealing our confidential communications."

The older ghost began to reply but then hesitated.

"Well?" the younger ghost asked impatiently.

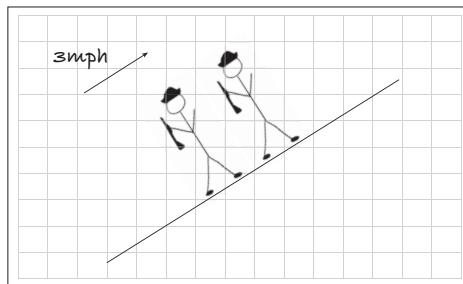
“Er...was that talk a confidential communication, sir?” asked the older ghost. “Because if it was, then I’m not allowed to reveal it.”

The younger ghost could only sigh in exasperation. He turned to Lennie instead of replying. “Good evening, young lady,” he said. “I take it you’ve found the answer to our challenge?”

“I had it done before lunchtime,” boasted Lennie.

The younger ghost looked startled. “You mean you figured out how many hills we go up and down?”

“I didn’t need to,” replied Lennie confidently. She showed them her notepad. At the top of the page was a sketch of the two ghosts going up a hill:



“You said you go uphill at three miles per hour,” she explained. “That means you go one mile uphill in one third of an hour, or twenty minutes.”

“All right,” said the younger ghost, examining the sketch.

“But since you take the same route back and forth,” Lennie continued, “every time you go uphill one way, you go downhill the other way.” She pointed to another sketch