The Math Problem

By Tom Jolly ©2017

Robbie Young had taken the measure of his math teacher, Mr. Henderson, and found the teacher full of himself. The man clearly wanted to feel superior to his students, reveling in their youthful ignorance on a subject in which he was barely ahead of them. By the time they were in 10th grade, they would probably leave him behind.

Though Mr. Henderson was a tall man, he struggled to maintain a certain inflated self-image, and only managed this by proving that his math skills were far ahead of the meager algebraic skills of his own students. Years of memorized patterns and solutions to repetitious math problems were his crutch and his bat. Today featured him boasting of his skill at factoring simple quadratic equations, scribbled variations of the problems cluttering the whiteboard.

He spun away from the whiteboard, thin hair flipping up in the light wind, his sharp nose peering down over wide glasses at his students. "Your assignment for tomorrow is written in the upper right corner of the board. It will be due at the start of class. And for today's extra credit…"

If there was an Olympic event for synchronized eye-rolling, the class would have won it. The entire class knew the daily extra credit was bogus. It invariable involved something they hadn't learned yet. No one was really expected to get it.

Mr. Henderson continued, "…can anyone tell me; if you roll two six-sided dice, how many different ways can you have a six in the result?"

The rest of the students scrambled to get out paper and pencil to figure it out. *Statistics,* Robbie thought. *We won't have statistics until senior year.* But this didn't sound that hard. He closed his eyes and thought about the problem, picturing a six-by-six grid, numbered one-to-six on each axis, each space representing the two numbers from a dice

roll. All the possible combinations of dice. Only the two edges would have any sixes, with one overlap at the corner. He opened his eyes and said, “eleven.”

“Not out-loud, Mr. Young.” Mr. Henderson looked down at Robbie’s desk, raising a scraggly eyebrow questioningly. No pencil, no paper. “So you’ve heard this problem before?”

Robbie shook his head.

“I suppose you’re going to tell me that you did it in your head?”

Robbie nodded silently.

Mr. Henderson, unable to imagine or condone someone who might be smarter than he, especially a mere *student*, contemptuously curled his lip at Robbie. All eyes were on them. Mr. Henderson looked at a cheat sheet he held in the palm of his hand and said, “Then, Mr. Young, I suppose you can tell us, if you roll three dice, how many rolls will contain a six?”

Robbie closed his eyes again and pictured the problem, opening them five seconds later. “Ninety-one,” he said softly.

Some of the students gasped as Mr. Henderson looked at his scrap of paper and frowned. “You are cheating, somehow.”

Robbie shook his head. “It’s easy. It’s just a six-by-six-by-six cube. Only three of the sides of the cube can have sixes as part of their solution. Add up the little cubes on those sides, and there are ninety-one. Six-times-five three times, and a corner cube. Ninety-one.”

Maggie, one of the other students in the class, said, “Oh, yeah, I can see that.” Mr. Henderson hissed and scowled at her. She cringed in her seat.

Mr. Henderson rubbed his chin and gritted his teeth, bringing his full attention back to the rebellious Robbie. “So, smartypants, how many rolls would have exactly *one* six in them?” He waved a finger in the air, sure that he had subdued and overwhelmed Robbie’s intellectual bravado.

Robbie blinked once. “Seventy-five. You just subtract the sixteen edge pieces where the planes intersect. Those are the only solutions with two or three sixes.”

Mr. Henderson turned red and crushed the scrap of paper in a ball in his clenched fist. “Four dice!” He shouted. “How many combinations with exactly one six are there with four dice? Tell me *that*, Mr. Young!”

Robbie closed his eyes. *Hmm,* he thought. *Two dimensions were easy to imagine. Three dimensions, not too bad. But four dimensions? Like space and time together?* He struggled for a minute, and could hear Mr. Henderson chuckling, savoring his miniscule victory. Then a picture slowly started to form. *Four dimensions, yeah, that’s what it looks like.* He slowly opened his eyes and found himself in a blurred stream of selves stretching forward and backward in time, and clutched his desk as the disorienting view twisted his mind. Stretching backward, he saw the moment he walked into class this morning. He looked back down the timeline at other events, not really seeing them as much as being a part of them. Forward, there was Mr. Henderson scrawling the answer to his latest problem on the board. All he had to do was read it, return to the present moment, then tell Mr. Henderson the answer. It seemed too easy. Curious, he skimmed farther up the timeline, finding himself placed in a new class with older students, then found himself in a lab answering questions, and then in a small, sterile locked room. He frowned. There were other paths, though. Other paths he could take down the timeline. He looked. And chose.

He closed his eyes again, returned to *now*, then opened them. Mr. Henderson’s piercing glare skewered him in his seat. “Well, Mr. Young? *Well*?”

Robbie shook his head humbly. “I haven’t the slightest idea, Mr. Henderson. Not a clue.”

Mr. Henderson grunted in satisfaction. The rest of the class sighed as though the red wire had just been cut and nothing exploded. Mr. Henderson returned to his rightful place at the head of the class, the self-described master molder of malleable minds, and wrote the answer on the board, glancing down at his cheat-sheet as he did so. Robbie looked around the class and met smiles from his friends. Friends that he would see next year, and the year after that. Friends he would graduate with.

He grinned and copied down his assignment. From a million possible futures, this was going to be a good one.