



## Dr. Minerva Cordero - Mathematician

1



If someone told you there was a family that had six children and was so poor they could not afford a TV, board games, or even toys, you might consider this tragic. In my family, however, we unknowingly seized our predicament to develop our imaginations!

I was born in a small town in Bayamon, Puerto Rico, to a family of six children. I had an older brother and two older sisters, as well as a younger sister and brother. Six years spanned the oldest to the youngest. My parents were from farming families—a coffee plantation and a dairy farm. For my parents, going to school was a struggle since they were needed to work for their families on the farm. As a result, my father only completed the second grade and my mother the sixth grade.

At my elementary school, everyone received free lunch and free government shoes, including me. In the fourth grade, I had a very stern and serious math teacher named Ms. Hernandez. She would slap you with a ruler if you didn't know your multiplication tables. Ironically, her threats began my appreciation for a type of certainty and precision in mathematics that is unrivaled by other subjects. I appreciated this, even if sometimes I had to learn the hard way!

In seventh grade, I had another very strict but wonderful teacher named Ms. Figueroa. At lunchtime she occasionally invited me to work on puzzles and play math games by throwing dice and finding the sum as a race. This is when I “officially” fell in love with math!

I had a lot of support for school at home, especially from my mother. She always told us that the best gift she could give us was an education, because that is the one thing that no one can ever take away from you. She instilled a love for learning in all of us. Every day we would learn from each other. After dinner, my three sisters and I would clean up and then sit at the corners of the table spreading out all our books. My sisters and I would share all that we were learning in our classes—it was the most wonderful thing. We would do this every single day, even on the weekends. I remember when my older sister took an art class in college, she told us about all these amazing painters we never knew existed: Monet, Degas, and others. We were fascinated. We just loved learning!

Often my oldest sister, Nilda, would pretend she was a teacher while the other sisters were students who would misbehave. We thought it was hilarious. I admire Nilda a lot, because at age 16, she started college, which was located far from our home. When she would come home, Nilda would tell us all about the subjects she was learning. Nilda got a master's degree in chemistry at the University of Puerto Rico and after all of our make-believe games, really did become a high school chemistry teacher.

I was also very close to my sister Olga, who is just 11 months older than me. In tenth grade, we took algebra together. After doing our homework independently, we would check each other's homework. Our teacher showed us the elegance of mathematics and that is when I fell in love even more with the subject. In eleventh grade I took geometry with my younger sister, and we would work on homework together. During my senior year there were no math classes I could take, so I bought a book to learn more math on my own. It was a book to prepare for the equivalent of the SAT exam in the U.S. In the afternoon after

school, I would sit outside my home in the balcony with a little chalkboard and study the book until it was time for dinner.

At the time, I had a boyfriend who was from another school. Dating was very strict—you needed a chaperone to go out, so there wasn't much chance to get distracted. He ended up going far away to college to study engineering. So it was just me, my books, and my chalkboard once again. I studied very hard to prepare for the college entrance examination; it had 5 parts, each worth 800 points. So the maximum score was 4000 and my school had an average of 1950. I scored 3521! With this score, I was able to attend the University of Puerto Rico, in my hometown of Bayamon.

Many of my classmates came from excellent private schools. It was a challenge trying to stay at the top of my class knowing everyone knew so much more than I did. There were so many things I hadn't been exposed to in school before. There was so much more to learn. Still, I wasn't discouraged—just excited!

In the third year, I transferred to the main campus of the University of Puerto Rico in Rio Piedras where I took a class in abstract algebra. It was so different from the concrete math I was used to learning. Also, my professor was American and could not speak Spanish very well, and I couldn't understand her. It was the very first time ever that I was lost in a math class! Still, I wouldn't settle for less than an A. I asked, "Can I do this?" and I thought, "Sure I can!" I studied and studied and earned an A. I felt that I had learned so much in that class. When I graduated with the bachelor's degree in mathematics, I had the highest GPA of the graduating class and received the award for "Student with the highest GPA in Mathematics."

One of my professors suggested I go to the U.S. to get a PhD, since there was no PhD program in mathematics in Puerto Rico at the time. I didn't see how this was possible. Sadly, a few days before my second year of college, my father had died in a tragic accident. He was the breadwinner of the family, and after completing an undergraduate degree it seem that the only thing to do was to get a job to help take care of my family. One of my professors suggested that I go to Berkeley, California, and work as a nanny while going to school. But I was scared because I didn't speak English well enough. Other opportunities presented themselves and I applied for a National Science Foundation Graduate Scholarship for minorities and got it! I chose to go to Berkeley where I got my master's degree in mathematics; luckily, I didn't have to get a supplemental job to be able to afford the tuition.

After that, I went to the University of Iowa for the PhD program since my sister Olga was already there. I passed my three comprehensive PhD exams in algebra, analysis, and topology. And then, the most terrible thing happened—my mother died of breast cancer. I was 27 and it was a very, very hard time for me. I thought, "Why do I want to do this anymore? She is not going to be able to see me." It took me a long time to recover from this loss. My sisters would just tell me, "You have to keep going! "One day, I finally thought, "Well, wherever my mother is, she is going to see me graduate, and she is going to be very proud of me!" So I continued my studies and received a PhD in mathematics from the University of Iowa. Today, I am an associate professor of mathematics at the University of Texas at Arlington. My research is in finite geometries—which is at the intersection of geometry, algebra and combinatorics.

I am married to a wonderful man, who is also a mathematician, and we have two sons. My life is full and rich, and I am very thankful!

My thoughts or advice for the younger generation is to slow down in your studies and learn the basics very well. Nowadays, students want to do everything fast—REALLY fast, and that is not always the best way. It is best to start slow by getting a good foundation of the subject because later you can catch up with the rest. You have to believe that you can do it, and know that it is going to take time and work. The key is time. If you take your time and work hard, you are going to succeed!