The Taj Mahal
A Wonder Designed with Mathematics

Priyanka Singh

BEFORE YOU READ: What are the Seven Wonders of the World? What makes them wonderful? What is something that makes you feel wonder?

As a kid, I never liked math. It was tedious to memorize formulas and to solve mathematical problems. But my visit to the magnificent Taj Mahal changed it all. Henceforth, math became my favorite subject. I graduated from college with an Engineering degree, and I work as a volunteer math tutor.

How could the Taj Mahal, a 400-year-old mausoleum that an emperor built as a tomb for his favorite wife, affect me so much as a little girl? Yes, it is one of the Seven Wonders of the World, but how did it change the course of my life? I will tell you.

> **How did the Taj Mahal change the course of my life? I will tell you.**

My grandparents live in Agra, India, where the Taj Mahal is located. When I was a kid, I used to visit them during summer vacations. I decided to do my summer project on the astounding Taj Mahal. My grandfather took me and my siblings to visit the Taj and to take some pictures and get some information for my project. I asked my grandfather why it is one of the Seven Wonders of the World. He explained to us that the glorious Taj Mahal is not only a beautiful memorial, it is also a tribute to mirror symmetry.

> **As a child, I was left in awe of its majestic architecture and the mathematics behind the construction.**

The monument was constructed using mathematics—especially geometry—beyond its time. All the windows and doors are at equal distance from one another. All the four minarets are identical and of equal measurements. The structure is situated on a raised square base, and the tomb is located at the exact center of the base. Many geometrical structures are used to build this spectacular monument. The floor tiling pattern combines regular hexagons with six-pointed stars. The stones are laid into a walkway using a pattern that combines squares and elongated hexagons to create regular octagons. All in all, the Taj Mahal is surely one of the world's most impressive and beautiful examples
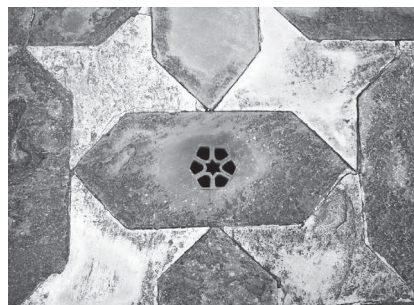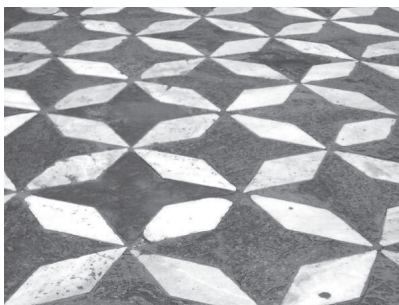
Floor patterns at the Taj Mahal involve elaborate, symmetrical patterns that include stars, hexagons, and other shapes. Even the drain (right) is perfectly symmetrical. Left and right photos by Ivars Peterson at <mathtourist.blogspot.com>. Middle photo by Arindambasu2 from Wikimedia Commons.

WORLD EDUCATION

of the use of symmetry in architecture and design.

As a child, I was left in awe of its majestic architecture and the mathematics behind the construction. My interest in math developed from there. After visiting the memorial, I realized that I did not have to learn math only from books. I could also learn it from my surroundings. If we relate math to real-world examples, then it will be easier to comprehend it. Not only was the Taj Mahal designed using mathematics but so were other wonders in the world. I guess you could say that math is wonderful!

AFTER YOU READ: According to the author, how did the Taj Mahal change the course of her life? Look around you. Where do you see symmetry?

Priyanka Singh is from India and has been in the USA for four years. She is an ESL student at Dover Adult Learning Center in Dover, NH. She has a graduate degree in Technology. In India, she worked for an IT Company as a Quality Assurance Engineer. She loves to paint and read in her spare time.
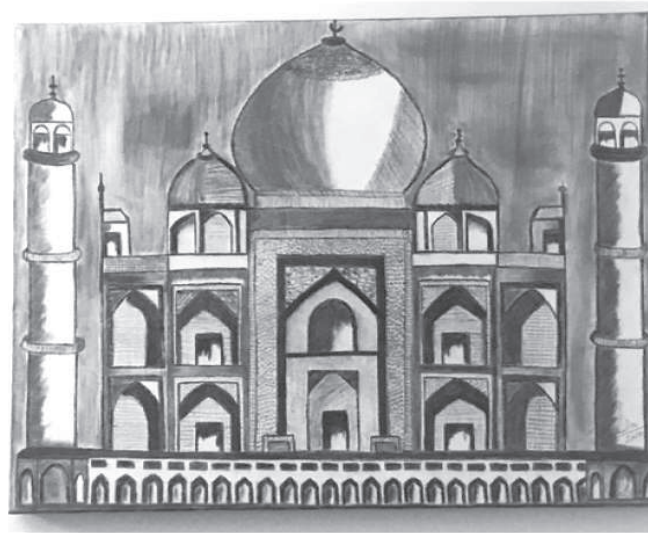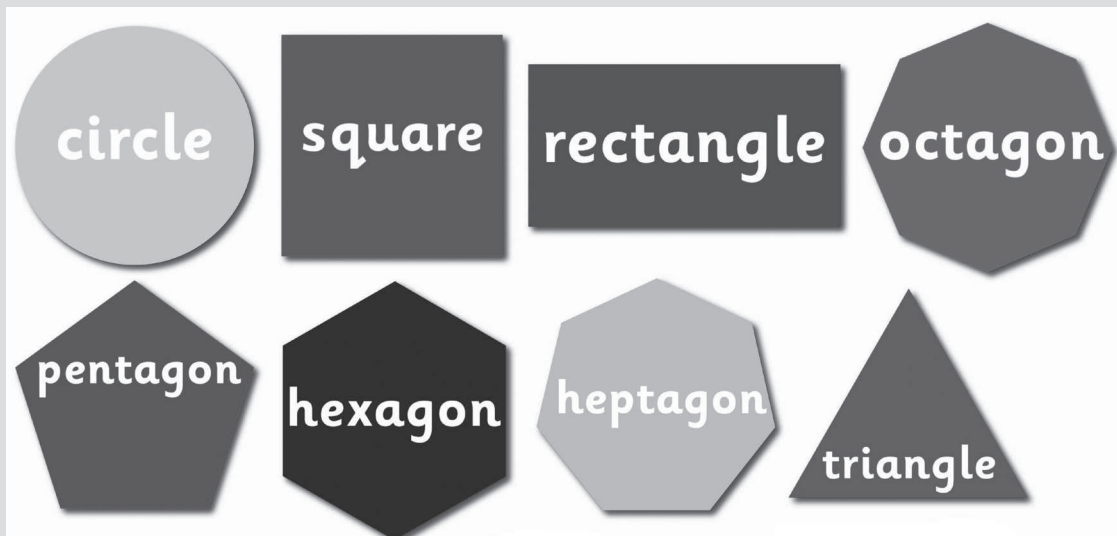

Illustration by Priyanka Singh. She says, "I have been so fascinated by the Taj Mahal that I made a sketch of it using geometry and some mathematical tools, such as a ruler, compass, and divider."

References: <en.wikipedia.org/wiki/Taj_Mahal>

Make Symmetrical Shapes

What shapes are symmetrical? One way to find out is by cutting a shape out of paper. If you can fold it in half, and the two halves line up, then it is symmetrical. Try it. Can it be symmetrical in more than one way? How many ways can a circle be symmetrical?*

Answer: an infinite number.