

## Lubna of Cordoba

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### Learning Objectives:

1. SWBAT learn the story of a slave girl who became the greatest mathematics educator at the royal library consisting of more than 500,000 books.
2. SWBAT uses the website to learn about the contributions of Lubna of Cordoba to mathematics in order to counter misconceptions and address stereotypes that students might carry about the abilities of Muslim students in STEM classes.
3. SWBAT presents the life of Lubna of Cordoba to recognize mathematical contributions of a community that has historically been unrecognized in the STEM field. Minority students will be motivated upon finding someone who looks like them in the STEM field, while other students will benefit from a more inclusive mindset of who can be a mathematician and scientist.

Lubna was born in 927 AD in Madinat al-Zahra, a beautiful City in Cordoba in present day Spain which was under the rule of Abd Al Rahman, a member of the Umayyad dynasty and the First Caliph of Al Andalus. She was born as a Saqaliba-- a term used for Slavs who were enslaved in Cordoba, the biggest city in 10th century Europe.

At an early age, Lubna developed an enthusiasm for education—especially for mathematics. During his 60 years reign, from 912-961, Caliph Abd Al Rahman gave access to education to everyone, even those who were born as slaves. Lubna took full advantage of this opportunity. She received education at the Andalusian royal court. According to the famous Andalus scholar Ibn Bashkuwāl: “She excelled in writing, grammar, and poetry. Her knowledge of mathematics was also immense and she was proficient in other sciences as well. There was none in the Umayyad palace as noble as her.” (Bashkuwal, 2008).

Caliph Abd Al Rahman died in 961 AD and his son Al-Hakam II took over the reign. He was a book lover. Al-Hakam also founded 27 free schools in Cordoba for children of slaves. He collected books from every corner of the world and brought them to his library. By 962 AD, it became the biggest library in the world with the collections of 60,000 different types of books which he named the House of Knowledge which is also known as Library of Cordoba. He freed over 100 people from enslavement, and one of them was Lubna. In addition, he gave her a job as a copyist in the famous Library of Cordoba.

Lubna was responsible for translating books written in different languages and some of these books were authored by famous philosophers and scientists like Archimedes and Euclid. She was fascinated by the transcendental number Pi which was derived by Archimedes who computed  $\pi$  and showed that it had a value between  $223/71$  and  $22/7$ . In fact, she would spend hours teaching children about the ratio between circumferences and its diameter and arrive home late at night with satisfaction that students of Cordoba are learning mathematics.

Lubna was also in charge of the Library of Cordoba, where she transcribed, translated, and annotated many texts, including the manuscripts of Archimedes and Euclid. Lubana worked with Jewish scholar and patron Hasdai Shaprut to found the influential Madinat al-Zahra Library in Cordoba, which has over 400,000 books, and specializes in books on Astronomy and Mathematics.

Lubna also worked as a math tutor outside the palace, teaching mathematics to the public. Dr. Joyce E. Salisbury, an American historian from the University of Wisconsin, notes that Lubna tutored children in math and as she returned to the palace, the children would follow, reciting multiplication tables. A street in Cordoba was named after her in 2019, *Avenida Escriba Lubna*, commemorating her work as a copyist.

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