

## [Episode 5 - Sofia Kovalevskaya transcript]

Hi, my name is Tory Roberts, and today I'm going to talk a little bit about a Russian mathematician named Sofia Kovalevskaya. She was born on January 15 in 1850 in Moscow, Russia. Now a little more about her early life and childhood, some fun facts actually: her nursery wallpaper as a young girl was made from her father's old lecture notes about differential and integral analysis, and because of this she was introduced at a very young age to the various symbols of math and calculus, and she took an immediate interest. She also had an uncle who liked to talk to her about math, and he wasn't extremely knowledgeable, but he was able to expose her to more terms and verbal understanding of what she had been seeing on her walls. She was able to begin studying math as a young girl with her family tutor, and she started learning about calculus at around age 15. Initially, her father was very involved in her studies and very supportive of her learning all of the math that she was interested in, but he wasn't interested in helping her pursue math into her adult life, and she ran into some problems when she was of age to begin studying at university, because the Russian universities were closed to women at this time. Her solution was to study abroad, however, she needed written permission from either her father or a husband to leave the country. So in 1868, she married paleontologist Vladimir Kovalevsky in order to leave Russia to study. The two of them travelled together to Austria and then to Germany where in 1869 she landed near the University of Heidelberg, but she was unable to study officially with the university because of her gender, so she had to arrange with teachers to audit the classes that she wanted to take.

A year later in 1870, the two of them moved to Berlin, but again, she couldn't study officially with the University of Berlin, so she sought out Karl Weierstrass for help with pursuing her mathematical passions. At first, he didn't take her seriously, but she presented some of her work, and he began realizing her potential. After working with him for a few years, in 1874, she was able to produce three papers which she presented to the University of Göttingen as her doctoral dissertation. She was able to graduate with *summa cum laude* and became the very first woman in modern Europe to earn a doctorate degree in math. These three papers that she presented to the university included one about Saturn's rings, one about elliptic integrals, and another one about partial differential equations, which became her most influential and contributed greatly to future theories on partial differential equations. It also contained the Cauchy-Kovalevskaya theorem, which is still studied and used today.

After much of her success in Germany, she decided in 1878 to move back to Russia where she gave birth to her daughter. And she soon after, in

1881, separated from her husband and continued studying and working on her own. In 1883, she was invited to become a lecturer at the University of Stockholm in Sweden where she became a full-time professor, actually the very first female full-time professor, in 1889. Just before this in 1888, she became a member of both the Russian Academy of Sciences, as well as the French Academy of Sciences. While with the French Academy of Science, she was awarded the Prix Bordin award for a paper that she wrote on the rotation of a solid body on a fixed point. Another interesting publication that she had was while she was working with the editorial board of a scientific journal, and this was in 1884, where she was actually the very first woman to join an editorial board, and this journal that she was working on was called the *Acta Mathematica*, and it's a journal that's still publishing today. Now she did have very many mathematical and science successes in her life, but she also wrote various novels, short stories, essays, other things that were involved with her math but also involved with her being a very strong advocate for women in general in society, which is why we're talking about her today. All right. That's it. Thanks for listening.