

DECRYPTING THE LINK BETWEEN ELLIPTIC PRIMES AND TWIN PRIMES

JOHN ELIZARRARAS, DEVIN FERRI, JAVIER HERNANDEZ JR., ANTHONY LUO,
ISABEL SWAFFORD, DR. LILJANA BABINKOSTOVA (MENTOR), ROBIN BETCHER
(MENTOR), SPENCER NELSON (MENTOR), AND DR. MARION SCHEEPERS (MENTOR)

Abstract: From Caesar's cipher to Germany's enigma machine to modern day cryptosystems, cryptography spans throughout history. Methods of encryption have evolved over hundreds of years and continue to evolve as computational efficiency increases. Over 2.5 quintillion bytes of data are generated per day through online networks such as banking, shopping, and social media. More than 90% of the total data in the world has been generated in the past two years, thereby requiring more sophisticated cybersecurity systems and an increasing demand for research in the field of cryptography. A curve of the form $y^2 = x^3 + Ax + B$, where A and B are constants, is what is known as an elliptic curve, which have become increasingly prevalent in modern cryptosystems. Our research focuses on the notion of elliptic primes, some of their properties, as well as some of their applications in cryptography. We also examine the primes that are both an elliptic prime and a twin prime.