

10 Problems from Dr. Colin INGALLS (INGALLS 教授からの 10 problems)

1. You know there are solutions to the equation $x^2 + y^2 = z^2$ where x, y, z are integers and $xyz \neq 0$. Can you describe all the solutions?
2. Fermat's Last Theorem says there are no solutions to $x^n + y^n = z^n$ where x, y, z, n are integers and $n \geq 3$ and $xyz \neq 0$. This was stated by Fermat in 1637. It was proved by Andrew Wiles 1994. Can you describe some of the history and some overview of the proof?
3. Can you derive Kepler's laws from Newton's Law of Universal Gravitation.
4. Explain time dilation as a consequence of Einstein's theory.
5. What is the biggest known prime number? What can you say about how it was found?
6. Describe the RSA cryptosystem.
7. Elliptic curves are also used in cryptography. What are they?
8. What is the abc conjecture? What is known about it?
9. You know the quadratic equation. What is the cubic equation?
The quartic equation? Is there a quintic equation?
10. What are complex numbers? What is the Fundamental Theorem of Algebra?