1. History of Riemann (3 minutes) keep it focused - Yuriy
   1. Origin
   2. Development as mathematician / education
      1. Interesting connection to Gauss and Dirichlet (from P. Obsession)
      2. Riemann’s doctoral dissertation, teaching acceptance lecture that was groundbreaking (according to Gauss)
      3. Acceptance into Academy, before which he gave a lecture and posed the zeta function and Riemann hypothesis
2. Definitions - Jude
   1. http://www.math.jhu.edu/~wright/RH2.pdf
   2. Zeta function
      1. http://blog.coachingactuaries.com/2019/05/01/the-hidden-gems-of-mathematics-riemann-4-of-4/
      2. (s) = i=01is for s > 1
   3. Trivial zeros - negative even integers (maybe include sine function for explanation why)
   4. Critical strip - 0 <= Re(s) <= 1
      1. 10 trillion non-trivial zeros found, all with Re(s) = 1/2
   5. Euler first made history by connecting natural numbers to prime numbers with a zeta function
   6. Riemann extends it to complex values including using analytic continuation for values where it would not be defined
   7. Riemann’s explicit formula
3. Mathematical Concepts - Yuriy
   1. Big Picture - how the zeta function relates to The Hypothesis
      1. Re(s) = ½ for all non-trivial zeros
   2. Details of major theorems or results
      1. https://mathoverflow.net/questions/17209/consequences-of-the-riemann-hypothesis
      2. Riemann Hypothesis - results
   3. Weil Conjectures - Baby Riemann Hypothesis, actually true
4. Examples of concepts - Yuriy
   1. Hecke, Deuring, Mordell, Heilbronn theorem - excluded middle proof
5. Real world application if possible - Jude
   1. Quantum Computing
   2. Applications of primes
6. Current/Future research in this area - Both
   1. Riemann Hypothesis:
      1. Jensen polynomials
      2. Find a proof!
7. Class Activity or involvement
   1. Possible exploration of “golden key” (see Prime Obsession)
   2. Card trick

Multiple Choice Questions:

1. The Riemann Hypothesis posits that all the non-trivial solutions to the Riemann Zeta function have a real component of:
   1. 𝜻(1) \* sin 𝝿
   2. ½
   3. ei𝝿-1
   4. i2 + 1
2. Riemann based his work on the Zeta function on Euler’s work with the Z function. How was the Zeta function an improvement on the Z function
   1. It is defined for negative numbers
   2. It is defined for complex numbers
   3. It is defined for numbers between 0 and 1
   4. All of the above
3. Riemann’s doctoral supervisor/advisor was:
   1. Paul Erdos
   2. Carl Friedrich Gauss
   3. Leonard Euler
   4. Euclid of Alexandria