

Lecture 4: Quiz

Name:

Problem 1

We have seen Terry Tao in the Colbert show. He mentioned a number theory problem

- a) The twin prime problem
- b) The perfect number problem
- c) The Goldbach problem

Problem 2

One knows that the gaps $p_{n+1} - p_n$ of prime numbers will again and again will have a property that the gap

- a) becomes 2
- b) become smaller than 100 Million
- c) becomes smaller than 5
- d) that the gap will be odd

Problem 3

Which movie features the Goldbach conjecture

- a) A beautiful mind.
- b) Goodwill hunting.
- c) Calculus of love.
- d) Enigma

Problem 4

When plotting the number of times an even number n can be written as a sum of two primes we get the

- a) Goldbach spiral
- b) Sieve of Erastostenes
- c) Goldbach comet
- d) Euler spiral

Problem 5

What is a twin cousin?

- a) A pair of integers n, m which are both divisible by 1 only.
- b) A pair of integers n, m which both are prime.
- c) A pair of integers $n, n + 2$ which both are prime.
- d) A pair of integers $n, n + 4$ which both are prime.

Problem 6

Which theorem assures that $5^{17} - 5$ is divisible by 17?

- a) The Riemann hypothesis
- b) Fermat's last theorem
- c) Chinese remainder theorem
- d) Fermats litt

Problem 7

Which of the following statements is called **Wilson's theorem**:

- a) $(n! + 1)$ is divisible by n .
- b) $(n + 1)! - 1$ is divisible by n .
- c) $(n - 1)! + 1$ is divisible by n
- d) $(n! - 1)$ is divisible by n .

Problem 8

Two of the following numbers are **perfect numbers**. Which one?

- a) 28
- b) 6
- c) 10
- d) 12

Problem 9

Which of the following theorems characterizes primes. It is a statement which is true if and only if the number is prime

- a) Fermat's little theorem.
- b) The Chinese remainder theorem.
- b) Euclid's theorem on the infinity of primes.
- c) Wilson's theorem
- e) The structure theorem of perfect numbers.

Problem 10

Who proved first that there are infinitely many primes?

- a) Terry Tao
- Gauss
- b) Euclid
- c) Eudoxos
- d) Euler