

Lecture 6: Quiz

Name:

Problem 1

We have seen Archimedes derivation of the volume of the sphere. How did he do it?

- Compute the integral $\int_0^1 1 - x^2 dx$
- Placed ball in bath and noticed water swap over. Prompted streaking and shouting Heureka!
- Exhaust the sphere with polyhedra and compute this volume.
- Compute the difference of the volumes of a cylinder and a cone.

Problem 2

Which two mathematicians invented integral and differential calculus as we know it today?

- Archimedes
- Leibniz
- Newton
- Bernoulli
- Galileo

Problem 3

Gauss had to compute is the sum of the first 100 natural numbers 1-100? What was the result?

- 5050
- 500500
- 500501
- 5051

Problem 4

What is the next element in the sequence 2, 3, 5, 9, 17, 33, 65, ...?

- 128
- 129
- 130
- 131

Problem 5

The concept of limits had a hard time to get established. Which Greek Philosophers were most prominently thinking about this problem.

- Plato
- Zeno
- Aristotle
- Archimedes

Problem 6

When was calculus developed?

- Around 1580
- Around 1680
- Around 1780
- Around 1880

Problem 7

The two statements make up the fundamental theorem of calculus?

- $\int_0^x f'(t) dt = f(x) - f(0)$
- $\int_0^x f'(t) dt = f(x)$
- $d/dx \int_0^x f(t) dt = f(x) - f(0)$
- $d/dx \int_0^x f(t) dt = f(x)$

Problem 8

We know $f(x) = \log(\log(x))$ satisfies $f'(x) = 1/(x \log(x))$. Which function is an anti derivative of $1/(x \log(x))$?

- $1/(x \log(x))$.
- $\log(x)$
- $x \log(x)$
- $\log(\log(x))$

Problem 9

What can you say about the series $\sum_{k=1}^{\infty} 1/k$?

- It is the geometric series and converges.
- It is the harmonic series and diverges.
- It is an unsolved problem.
- The sum is equal to $\pi^2/6$.

Problem 10

The sequence 1, 4, 10, 20, 35, 56, 84, .. has a name. Which one?

- Tetrahedral numbers.
- Triangular numbers.
- Fibonacci numbers.
- Harmonic numbers.