

Lecture 7: Quiz

Name:

Problem 1

Which of the following operations is the addition in the Boolean ring?

- a) intersection
 b) complement
 c) symmetric difference
 d) union

Problem 2

Remember that $*$, the multiplication is given by the intersection. In the Boolean ring, there is a 1 element satisfying $1 * A = A$ for all sets A . Which set has this property?

- a) the empty set \emptyset
 b) the full set X
 c) the set $\{1\}$
 d) there is no 1 element

Problem 3

In a Boolean ring with addition $+$ (symmetric difference) and multiplication \cdot (intersection) one of the following five properties does not hold. Which one?

- a) $A + \emptyset = A$
 b) $A + A = \emptyset$
 c) $A \cdot A = A$
 d) $A + (B \cdot C) = (A + B) \cdot (A + C)$
 e) $A \cdot (B + C) = A \cdot B + B \cdot C$
 f) $A \cdot \emptyset = \emptyset$

Problem 4

Which of the following sets have the same cardinality as the set of integers?

- a) The even numbers
 b) The interval $[0, 1]$.
 c) The algebraic numbers.
 d) The set of primes.

Problem 5

Which mathematician established first that there are different types of infinities?

- a) Douglas Hofstadter
 b) Georg Cantor
 c) Alfred Tarski
 d) Kurt Goedel

Problem 6

We have mentioned three (sometimes traumatic) revolutions in Math education: "The math wars", the "new math" and "attack of the Moocs". When did the "Math wars" take place?

- a) 1970 b) 1990 c) 2010

Problem 7

How did Kurt Goedel die?

- a) He proved that he could not exist.
b) He starved himself to death.
c) He got poisoned.
d) He had a stroke.

Problem 8

What does the heap paradox tell?

- a) There no surprise heaps.
b) A heap from which a grain has been taken remains a heap.
c) A heap contains all grains which do not contain themselves.
d) A heap can not lie.
e) Heaps are creaps.
f) There is no heap.

Problem 9

Which two paradoxa have been found by Russell:

- a) The liars paradox: I'm a liar.
b) The Berry paradox about the smallest integer which can be described in 11 words.
c) The set of all sets which do not contain themselves as a set.
d) There is no way to make a surprise examination this year.
e) The barber's paradox: the barber shaves everybody who does not shave himself.
f) In a waiting line in the supermarket one is always in the slowest line.

Problem 10

What does Goedel's incompleteness theorem tell? Pick two:

- a) The Zermelo-Frenkel axiom system is incomplete.
b) Life is like a box of chocolates. One never knows what one is going to get.
c) We never know what is true since we can always change the axiom system.
d) The set which consists of all sets which do not contain themselves is not a set.
e) In a strong enough system, there are true statements which can not be proven within the system.
f) The consistency of a strong enough axiom system can not be proven within a system.