Week 5 Assignment

The due date for submitting this assignment has passed.

Due on 2021-02-24, 23:59 IST.

As per our records you have not submitted this assignment.

Countable and uncountable sets, examples of countably infinite sets, properties of countable sets, examples of uncountable sets, Cantor's diagonalization argument, Cantor's theorem, uncomputable functions

1) Select the correct option(s) from the following statements: ***1 point***

- [ ] A bijection between two sets implies that they have the same cardinality
- [ ] A one-to-one (injective) function between two sets implies that they have same number of elements
- [ ] If the elements of a set can be mapped to the set of integers, then it is a countable set
- [ ] None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
A bijection between two sets implies that they have the same cardinality
If the elements of a set can be mapped to the set of integers, then it is a countable set

2) Select the correct option (s) from the following statements: ***1 point***

- [ ] The set Z is not a countable set
- [ ] A set is countable if it is finite or if it is countably infinite
- [ ] The set of rational numbers Q is an uncountable set
- [ ] The union of two countably infinite sets is a countable set

No, the answer is incorrect.
Score: 0
Accepted Answers:
A set is countable if it is finite or if it is countably infinite
The union of two countably infinite sets is a countable set

3) Select the correct option (s) from the following statements: ***1 point***

- [ ] An integer polynomial is a polynomial with only integer coefficients. The set of integer polynomials is an uncountable set
- [ ] The set of finite subsets of N is an uncountable set
- [ ] The set of real numbers R is an uncountable set
- [ ] The set of complex numbers C of the form a+ib where a,b $\in$Z,i is $\sqrt{(-1)}$, is an uncountable set

No, the answer is incorrect.
Score: 0
Accepted Answers:
The set of finite subsets of N is an uncountable set
The set of real numbers R is an uncountable set

4) Select the correct option (s) from the following statements: ***1 point***

- [ ] If A is an infinite set, then P(A) is uncountable
- [ ] The set of all possible functions from Z^+ to the set {0,..., 9} is uncountable
- [ ] Since there are an infinite number of prime numbers, the set P of all prime numbers is an uncountable set
- [ ] An uncountable set has ONLY uncountable subsets

No, the answer is incorrect.
Score: 0
Accepted Answers:
If A is an infinite set, then P(A) is uncountable
The set of all possible functions from Z^+ to the set {0,..., 9} is uncountable

5) Let A be the set of all positive even integers and set B is set of all positive integers (Z^+). Then, choose the incorrect statement from the following: ***1 point***

- ( ) The sets |A| and |B| have different cardinalities
- ( ) There is an injective mapping from A to B
- ( ) Sets A and B are countable
- ( ) There is a bijection between A and B

No, the answer is incorrect.
Score: 0
Accepted Answers:
The sets |A| and |B| have different cardinalities

6) Consider the following sets: ***1 point***

1. Set 1: The set containing least common multiple (LCM) of every pair of consecutive positive integers
2. Set 2: Set of positive integers that can be represented as a product of two prime numbers

Which of the following is true about the given sets?

- ( ) Set 1 is countable and Set 2 is uncountable
- ( ) Set 1 is uncountable and Set 2 is countable
- ( ) Set 1 is countable and Set 2 is countable
- ( ) Set 1 is uncountable and Set 2 is uncountable
- ( ) None of the given options

No, the answer is incorrect.
Score: 0
Accepted Answers:
Set 1 is countable and Set 2 is countable

7) Let K be the set of all strings of infinite length over {0,1,2}. The set K is: ***1 point***

- ( ) Finite and countable
- ( ) Infinite and countable
- ( ) Uncountable
- ( ) None of the given options

No, the answer is incorrect.
Score: 0
Accepted Answers:
Uncountable

8) Let A=(0,1] and B=[0,∞). Choose the correct option(s) ***1 point***

- [ ] |A|<|B|
- [ ] |A|>|B|
- [ ] |A|=|B|
- [ ] A $\subseteq$B

No, the answer is incorrect.
Score: 0
Accepted Answers:
$|A|=|B|$
$A \subseteq B$

9) Let A=(0,1]. Choose the correct option(s). ***1 point***

- ( ) $|A|<|A^2|$
- ( ) $|A|>|A^2|$
- ( ) $|A|=|A^2|$
- ( ) None of the given options

No, the answer is incorrect.
Score: 0
Accepted Answers:
$|A|=|A^2|$

10) Let A and B be arbitrary sets such that A has the same cardinality as R and B has the same cardinality as N. Choose the correct option(s). ***1 point***

- [ ] |B|<|A|
- [ ] |A×B|=|R|
- [ ] |A×B|<|R|
- [ ] |A×B|>|R|

No, the answer is incorrect.
Score: 0
Accepted Answers:
$|B|<|A|$
$|A \times B|=|R|$