CSCI 338: Quiz 1

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Problem 1

Given the set $A = \{-36, -25, -16, -9, -4, 1, 4, 9, 16, 25, 36\}$, is A countable? Why?

Set A is countable.

By definition, set A is countable if either it is finite or it has the same size as N (the set of natural numbers).

Set A is a finite set, therefore it is countable.

Problem 2

Let B be the set of all complete graphs. Is B countable? Why?

Set B is countable.

By definition, a complete graph is a simple undirected graph in which every pair of distinct vertices is connected by a unique edge.

By definition, a set is countable if either it is finite or it has the same size as N (the set of natural numbers, i.e 1 to 1 mapping correspondence).

If set B is the set of all complete graphs, then set B is NOT finite, it is an infinite set. Then, for set B to be infinitely countable, it must have a 1-1 correspondence with N (the set of natural numbers).

If a_1 is the first element in set B, and a_2 is the 2nd element in B, such that a_2 has 1 more vertex than a_1.... and so on .... $B = \{a_1, a_2, ..., a_n\}$. Then we can see that set B can be mapped in a 1-1 correspondence with N (the set of natural numbers).

Therefore, set B is infinitely countable.