MATH314 HW 1

due **Jan 21** before class, **answer without justification will receive 0 points**. The typing the HW in LaTeX is optional.

If question has (No drawing), you must presents a writeup that is complete and correct without using a picture. If you add a figure to (No drawing) question, it will not be treated negatively but you should not refer to it in the solution.

1: Give an example of a graph that models something (abstract or physical) that was *not* discussed in class.

2: Let $S = \{-6, -3, 0, 3, 6\}$. Draw the graph G whose vertex set is S and such that $ij \in E(G)$ for $i, j \in S$ if $i + j \in S$ or $|i - j| \in S$.

3: Let $P = (u = v_0, v_1, \ldots, v_k = v)$, be a $u - v$ geodesic in a connected graph G. Prove that $d(u, v_i) = i$ for each integer i with $1 \leq i \leq k$.

4: Suppose that the vertex set of a graph G is a (finite) set of integers. Two vertices x and y are adjacent if $x + y$ is odd. To which well-known class of graphs is G a member?

5: Give an example of a graph on four vertices which is isomorphic with its complement. Do the same for five vertices.

6: Find in the book what is Petersen graph. Draw it. Determine if it is bipartite. Find the order of the largest empty induced subgraph.