Graph Theory 1, MATH 5340, Fall 2020

Homework 12, 3.1 Walks and Connection

Due Sunday, December 6, at noon

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook, class notes, or hypotheses. Do not copy the work of others; **do your own work!!!**

3.1.1. If there is an xy-walk in a graph G, prove that there is also an xy-path in G.

3.1.2. Let G be a graph with vertex set V and adjacency matrix $\mathbf{A} = (a_{uv})$. Prove that the number of uv-walks of length k in G is the (u, v) entry of $\mathbf{A}^k$.

3.1.4. Prove that a graph G is connected if and only if there is an (X, Y)-path in G for any two nonempty subsets X and Y of V.