Graph Theory Weekly Problems 1

Due: 15 Jan 2026 at Midnight EST as a PDF on Submitty

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1. Draw all possible non-isomorphic graphs in the undirected graph class C defined by the following properties:

   - $\forall G \in C : G$ is acyclic
   - $\forall G \in C : |V(G)| = 5$
   - $\forall G \in C : S_4 \subseteq G$

   Now, prove that all of the graphs you constructed are each pairwise non-isomorphic. Your proof does not need to be rigorous.

2. Draw the undirected graph $G = (V, E)$, **labeling vertices and edges**, and create its adjacency matrix representation:
   $V = \{a, b, c, x, y\}$
   $E = \{e_1 = (a, y), e_2 = (b, y), e_3 = (c, y), e_4 = (x, y), e_5 = (c, x), e_6 = (x, c), e_7 = (b, b)\}$