Concepts & Notation

- Sec. 1.1: $G$, graph, $V(G)$, vertices, $E(G)$, edges, planar, incident, adjacent, loop/link, $\nu(G)$, $\epsilon(G)$

- Sec. 1.2: isomorphic, $G \cong H$, complete graph, $K_n$, empty graph, bipartite graph, complete bipartite graph $K_{m,n}$, $k$-partite graph, complete $k$-partite graph, $k$-cube, complement, $G^c$, $K_n^c$, $K_{m,n}^c$, automorphism, vertex-transitive, edge-transitive.

- Sec. 1.3: incidence matrix, $M(G)$, adjacency matrix, $A(G)$.

- Sec. 1.4: subgraph, spanning subgraph, induced subgraph, $G[V']$, edge-induced subgraph, $G[E']$, union $G_1 \cup G_2$, $G_1 + G_2$, intersection $G_1 \cap G_2$.

- Sec. 1.5: $k$-regular graph, regular graph, degree sequence, graphic.

- Sec. 1.6: walk, length, trail, path, components, connected, distance, $d_G(u, v)$, diameter

- Sec. 1.7: closed, cycle, girth

- Sec. 1.8: $w(e)$, shortest path problem, Dijkstra’s algorithm, tree

Let $G$ be the above graph. Find the following:

1. $V(G)$.

2. $\nu(G)$.

3. $E(G)$.

4. $\epsilon(G)$. 
5. Find a graph $H$ isomorphic to $G$.

6. Is $G$ planar?

7. Find the incidence matrix $M(G)$.

8. Find the adjacency matrix $A(G)$.

9. Add up the columns in the incidence matrix. What do you notice?