

Math 317: Practice Problems for Quiz 1

Problems From Textbook

Edition 4:

Section 2: 2.3

Section 5: 5.5

Section 6: 6.1, 6.2, 6.3

Section 7: 7.1, 7.2

Section 8: 8.1, 8.4

Section 11: 11.1, 11.2

Section 12: 12.1, 12.2, 12.4

Edition 5:

Section 1.1: 1.4, 1.5

Section 2.1: 2.6

Section 2.2: 2.15, 2.16, 2.17

Section 2.3: 2.27, 2.28

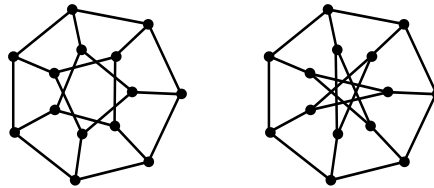
Section 2.4: 2.36, 2.38

Section 3.3: 3.20, 3.21

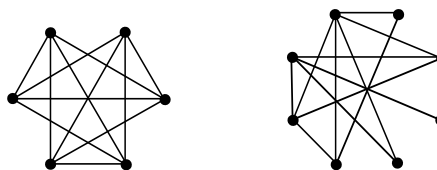
Section 4.1: 4.1, 4.2, 4.4

Additional Problems:

1. Determine whether the following graphs are isomorphic. Justify your answer.

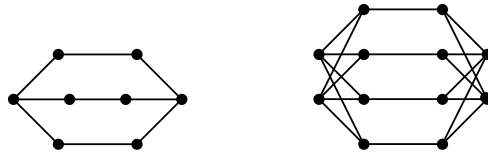


2. (a) Draw all non-isomorphic simple graphs with 5 vertices and 9 edges.
(b) Draw all non-isomorphic simple graphs with 5 vertices and 8 edges.
3. Consider the following graphs:



For each of these graphs, determine whether the graph is Eulerian. Justify your answers.

4. Consider the following graphs:



For each of these graphs, determine whether the graph is Hamiltonian. If the graph is Hamiltonian, indicate a Hamiltonian cycle.

5. (a) For which values of n is K_n Hamiltonian?

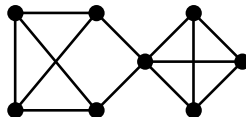
(b) Which complete bipartite graphs are Hamiltonian?

6. Let G be a weighted graph with 5 vertices a, b, c, d, e . For each edge, the weight is given by the following table (if two vertices do not share an edge, then the weight for those two vertices is given as ∞).

	a	b	c	d	e
a	0	3	5	11	9
b	3	0	3	9	8
c	5	3	0	∞	10
d	11	9	∞	0	7
e	9	8	10	7	0

Find a minimum weight spanning tree for G .

7. Consider the following graph G :

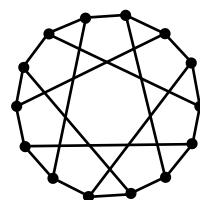
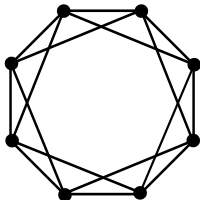
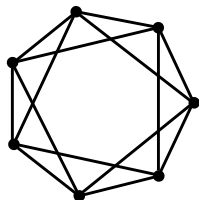


Determine the connectivity $\kappa(G)$ and the edge-connectivity $\lambda(G)$ of this graph.

8. Draw a graph G with $\kappa(G) = 2$ and $\lambda(G) = 3$.

9. Suppose that G is a planar graph with 20 vertices, and suppose that every vertex of G has degree 3. How many edges does G have? How many faces does G have?

10. Consider the following graphs:



For each of the above graphs, determine whether the graph is planar. Justify your answers.