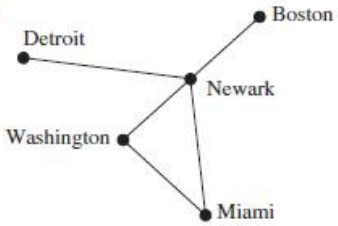
SE 3306 Homework 5 Solutions

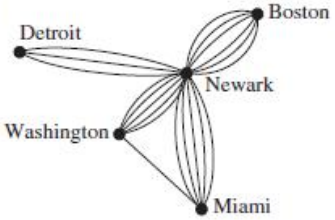
Chapter 10.1

1. Max Points Possible - 10

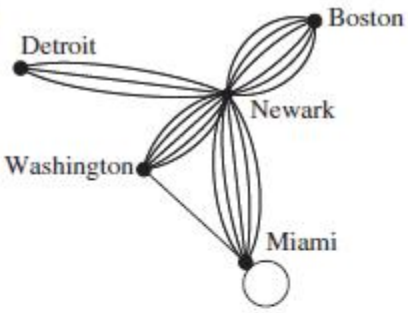
a)



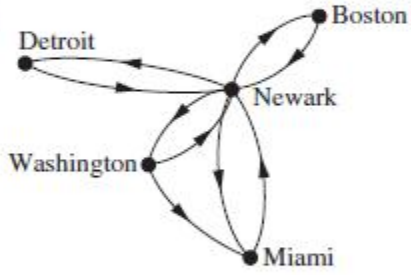
b)



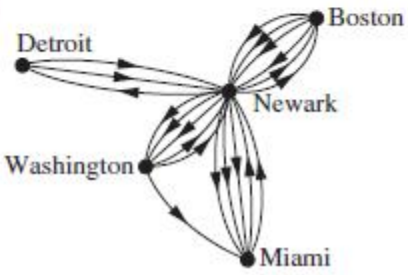
c)



d)



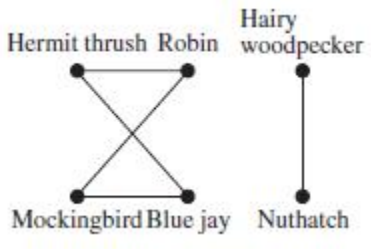
e)



8. Max Points Possible - 3

This is a directed multigraph; the edges are directed, and there are parallel edges.

15. Max Points Possible - 5



20. Max Points Possible - 5

Team four beat the vertices to which there are edges from Team four, namely only Team three. The other teams—Team one, Team two, Team five, and Team six—all beat Team four, since there are edges from them to Team four.

Chapter 10.2

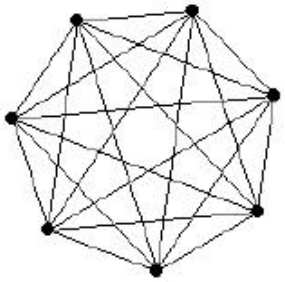
3. Max Points Possible - 14
v = 9; e = 12; deg(a) = 3, deg(b) = 2,
deg(c) = 4, deg(d) = 0, deg(e) = 6, deg(f) = 0;
deg(g) = 4; deg(h) = 2; deg(i) = 3; d and f are isolated.

8. Max Points Possible - 12

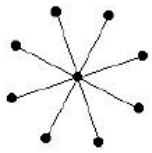
In this directed multigraph there are 4 vertices and 8 edges. The degrees are deg−(a) = 2, deg+(a) = 2, deg−(b) = 3, deg+(b) = 4, deg−(c) = 2, deg+(c) = 1, deg−(d) = 1, and deg+(d) = 1.

20. Max Points Possible - 12

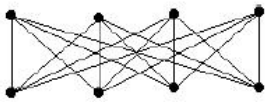
a) This graph has 7 vertices, with an edge joining each pair of distinct vertices.



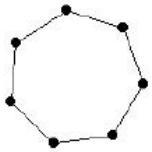
b) This graph is the complete bipartite graph on parts of size 1 and 8; we have put the part of size 1 in the middle.



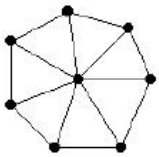
c) This is the complete bipartite graph with 4 vertices in each part.



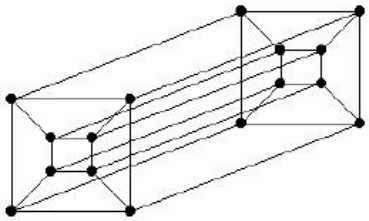
d) This is the 7-cycle.



e) The 7-wheel is the 7-cycle with an extra vertex joined to the other 7 vertices. Warning: Some texts call this W_8, to have the consistent notation that the subscript in the name of a graph should be the number of vertices in that graph.



f) We take two copies of Q_3 and join corresponding vertices.



21. Max Points Possible - 4

Bipartite

Chapter 10.3

3. Max Points Possible - 4

Vertex	*Terminal Vertices*
a	a, b, c, d
b	d
c	a, b
d	b, c, d

7. Max Points Possible - 4

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}$$

19. Max Points Possible - 4

$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix}$$

35. Max Points Possible - 5

Isomorphic

Chapter 11.1

1. Max Points Possible - 6

(a), (c), (e)

3. Max Points Possible - 8

a) a
b) a, b, c, d, f , h, j , q, t
c) e, g, i, k, l, m, n, o, p, r, s, u
d) q, r
e) c
f) p
g) f , b, a

h) e, f , l, m, n

20. Max Points Possible - 4

By Theorem 4(i), the answer is $[(m - 1)n + 1]/m = (2 \cdot 100 + 1)/3 = 67$.