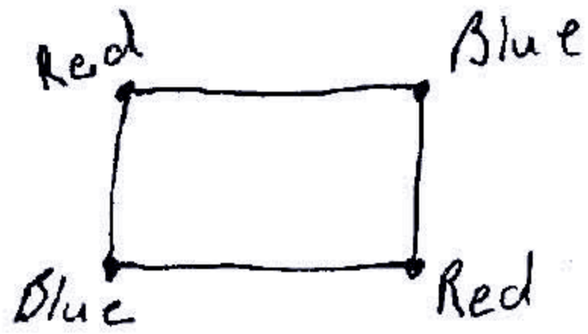
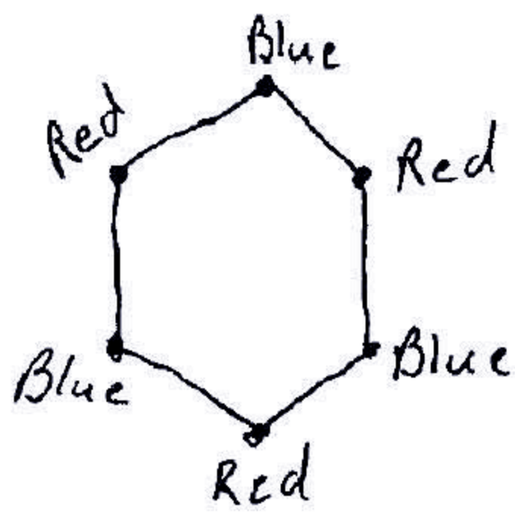
Exploratory Set 4.6

3.) a.) 1.)



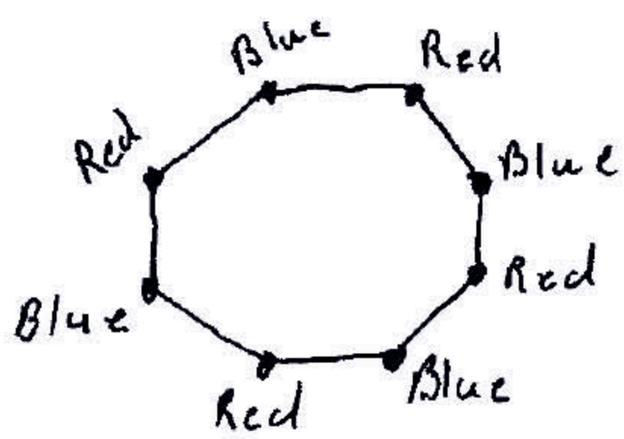
chromatic number = 2

2.)



chromatic # = 2

3.)



chromatic # = 2

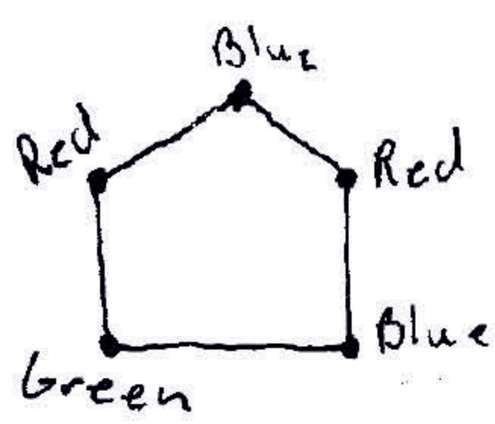
4.) chromatic number is 2 for a cycle with an even number of vertices.

b.)

1.)

chromatic # = 3

2.)

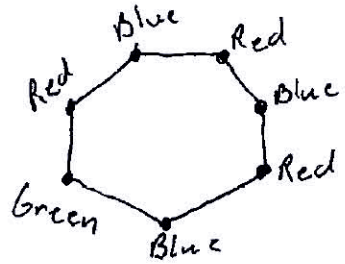


chromatic # = 3

Exploratory Set 4.6

3.) b.)

3.)



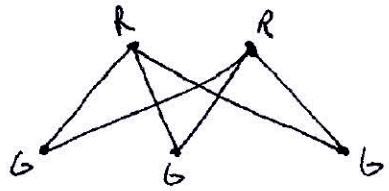
chromatic # = 3

4.) chromatic number is 3 for a cycle with an odd number of vertices.

5.) chromatic number would have to be at least three.

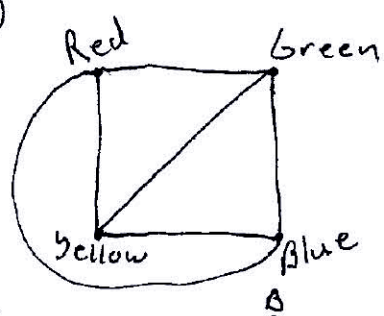
Exercise Set 4.6

2.)



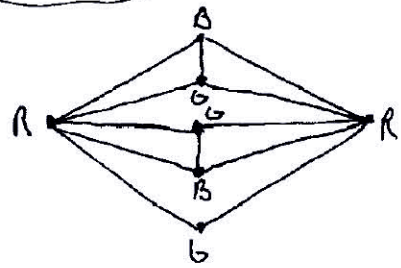
chromatic # 2

4.)



chromatic # 4

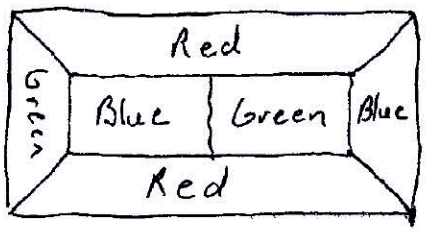
6.)



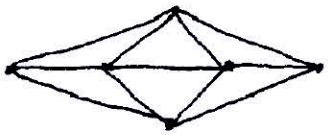
chromatic # 3

Exercise Set 4.6

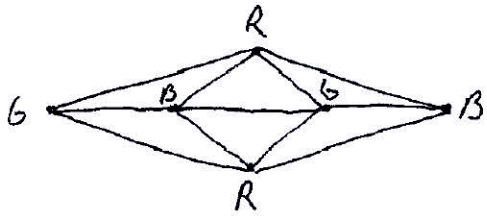
10.) a.)



b.)

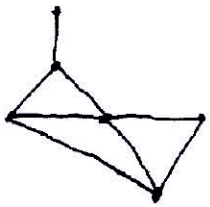


c.)

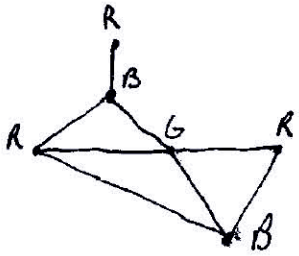


11.) a.)

b.)



c.)



4.)

Vertex	Indegree	Outdegree
a	0	2
b	2	2
c	1	1
d	1	2
e	3	0

5.)

vertex	Indegree	Outdegree
p	2	2
q	2	2
r	3	1
s	2	1
t	1	4
u	1	1

6.)

#4 is weakly connected, there are more than two vertices for which the indegree does not equal the outdegree. Does not have an Euler Path nor Euler Circuit.

#5 there are more than two vertices for which the indegree does not equal the outdegree. Does not have an Euler Path nor Euler Circuit.

Exercise Set 5.1

10.)

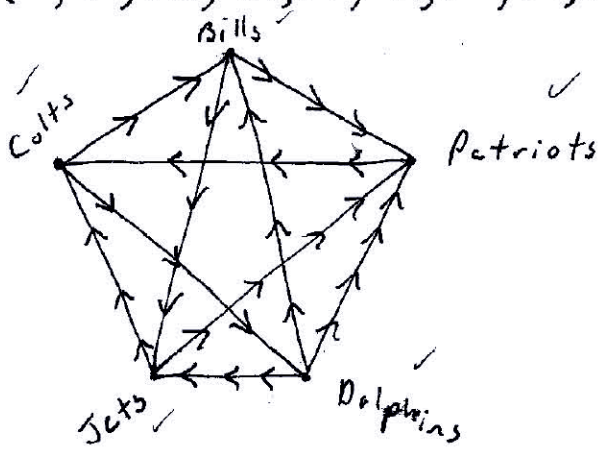
vertex	indegree	outdegree
a	2	2
b	3	3
c	2	2
d	4	4
e	2	2

Indegree equals the outdegree for each vertex, so graph has an Euler Circuit.

(a, d), (d, e), (e, b), (b, a), (a, e), (e, d), (d, b)
(b, c), (c, b), (b, d), (d, c), (c, d), (d, a)

14.)

a.)



b.)

All are winners because each has a hamilton path that begins with themselves.

c.) No, we also know this because the graph has simple circuits, and by theorem 4 there cannot be a unique winner.

Exercise Set 5.1

14.) d.) There can only be a unique ranking when there is a unique hamilton path.

Exercise Set 5.2

1.) yes
2.) No, has a cycle
3.) No, Not connected
4.) yes
5.) yes
6.) No, not connected
7.)

	vertices	edges
#1	5	4
#4	7	6
#5	4	3

confirms theorem 6

10.)

a.) Asst. Superintendent; Instruction Superintendent
b.) Asst. Superintendent; Instruction
c.) Director; Budget
Director; Transportation
d.) Superintendent

Exercise Set 5.2

19.) a.) By the definition of a cycle the simple circuit is a cycle.

b.) Since $v_i = v_j$ only one vertex is repeated where it is the initial and terminal. Therefore, $\hat{C}$ is a cycle.

c.) There are only a finite number of vertices.

d.) there are no repeated vertices in the simple circuit produced by the process other than the initial and terminal vertices.

20.) a.) there is a unique simple path between each pair of vertices.

b.) because both are equal to y.
because both are equal to x.

c.) There is suppose to be two unique paths. $t > 1$ because $w_1 = u_1 = x$.

d.) the path has to end at y.

e.) because w_{t-1} is only vertex repeated. and no edge has been repeated

f.) because there is a simple circuit where the intial and terminal vertex is the only repeated vertex then there is a cycle. However, a tree is a connected graph with no cycles. So, contradiction.