MATH 170: EXAM 03

ANN CLIFTON
UNIVERSITY OF SOUTH CAROLINA

Answer the questions in the spaces provided on the question sheets and turn them in at the end of the class period. Unless otherwise stated, all supporting work is required. You may only use a four-function calculator. No graphing calculators or cell phones are allowed.

Name: _____

1. Problems

1 (15 points total)**.** *State Euler's formula for simple, connected, planar graphs. Define any variables you use.*

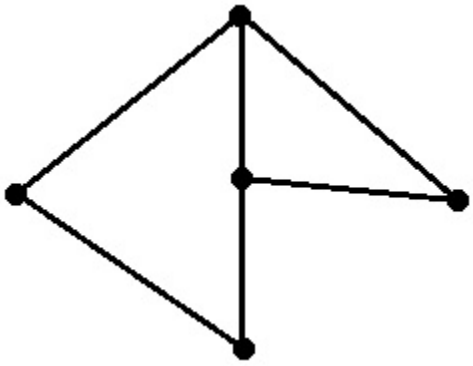
Fill in the following table using Euler's formula.

	V	**E**	**F**
a)	*4*		*2*
b)	*5*	*4*	
c)		*8*	*4*

Date: February 28, 2015.

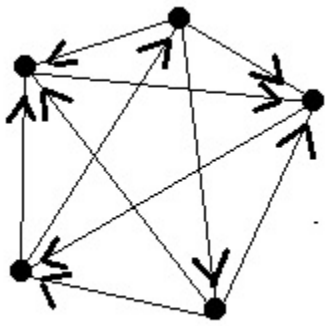
Using the table on the previous page, draw three separate graphs (one corresponding to each part: a, b, and c) that satisfy the conditions. Be sure to label your graphs.

2 (20 points)**.** *Does the following graph have an Eulerian path? If so, label the edges of the graph in the order in which you travel along the path. Label the two vertices where your path begins and ends.*

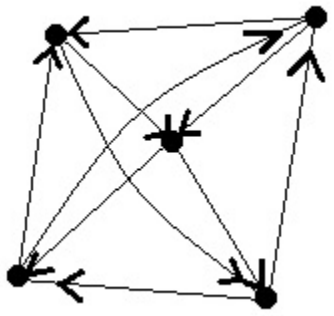


3 (10 points)**.** *Draw an example of a* **non***-planar graph.*

4 (15 points)**.** *Identify the king chicken(s) in the following graph by clearly circling the vertices that satisfy the definition. If there are no such vertices, write NONE.*



5 (20 points)**.** *Does the following graph have an Eulerian cycle? If so, identify it by numbering the edges in the order in which you travel along the cycle. Indicate where the cycle begins and ends.*



6 (20 points)**.** *You decide to put money into a savings account to buy a car. The bank offers a simple annual interest rate of 10%. How much money do you need to put in the account now in order to buy a $30,000 car at the end of 4 years?*

7 (Bonus, 10 points)**.** *Prove that $K_{3,3}$ is not planar (and hence the houses-utilities problem is not solvable).*