Test 2
Dusty Wilson
Math 107

Name: key

$\bar{X} = 77.8\%$
76.4%

No work = no credit

Television is something the Russians invented to destroy American education.

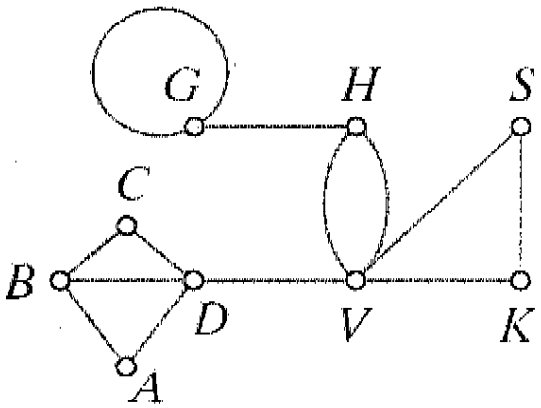
Paul Erdös (1913 - 1996)
Hungarian mathematician

Warm-ups (1 pt each): $\frac{100!}{99!} =$ 100 $5! =$ 120 $1+2\times3=$ 7

1.) (1 pt) Based on the quote above, what suggestion do you have to improve American education?

kill the TV. Reward the Russians for their successful campaign.

2.) (10 pts) Use the following graph to answer the questions.



a) What is the degree of vertex V?

5

b) What is the degree of vertex G?

3

c) What edges are adjacent to BD?

BC DC DV
BA DA

d) Name the bridges in this graph.

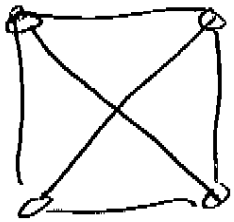
DV
GH

e) Find a path of length 12 from B to G.

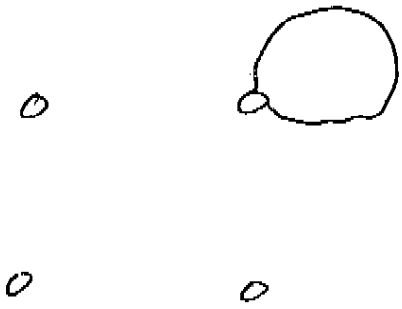
B C D A B D V K S V H G G

3.) (12 pts) Draw an example of a graph with ***four vertices*** and

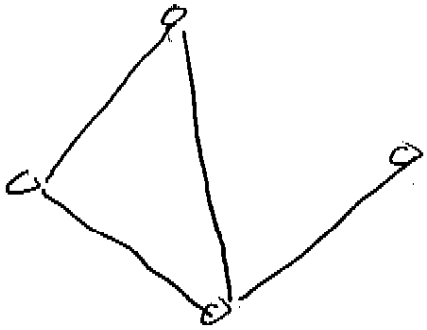
a) connected where each vertex has degree 3.



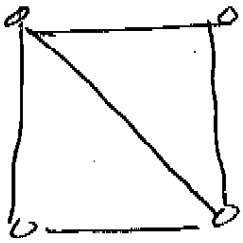
b) disconnected with four vertices and a loop.



c) connected with a circuit and one bridge.

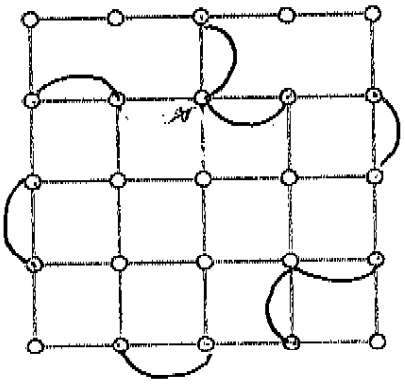


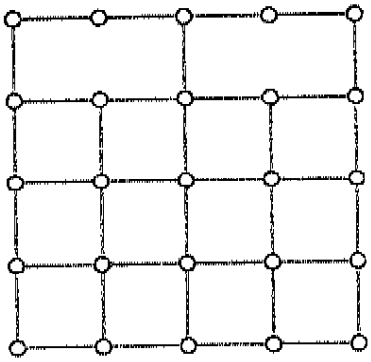
d) a Hamilton circuit, but no Euler circuit.



4.) (10 pts) Find an optimal eulerization of the graph

second copy if needed



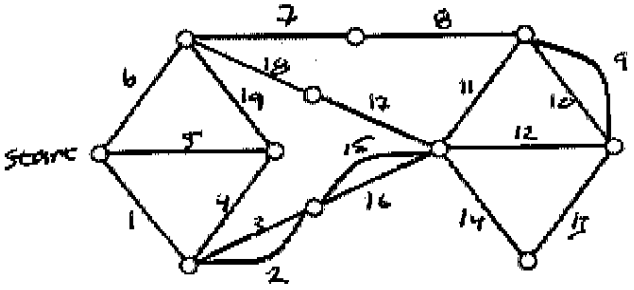


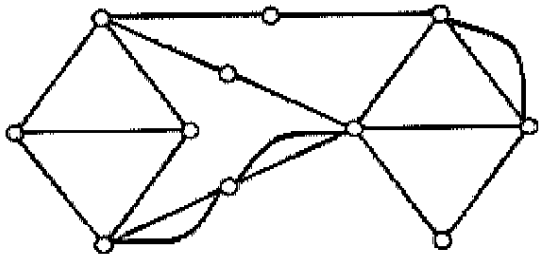
3/10 if left w/ odds.

7/10 if not optimal.

5.) (10 pts) Find an Euler Path for the given circuit; number the edges as they are traversed.

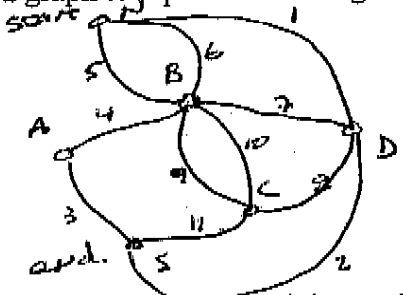
second copy if needed



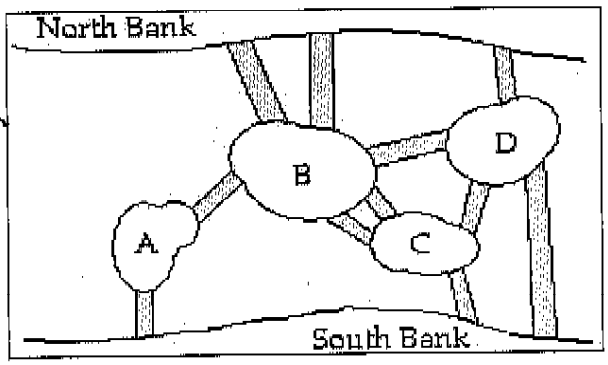


6.) (10 pts) The following diagram shows a river with three islands and nine bridges connecting the islands and shores.

a) Draw a graph to represent the diagram.



4 for graph



b) Determine ~~whether~~ the graph has an Euler Circuit, Euler Path, or neither. Explain why, and if there is an Euler Circuit or Euler Path, *trace it on the graph above by numbering its edges.*

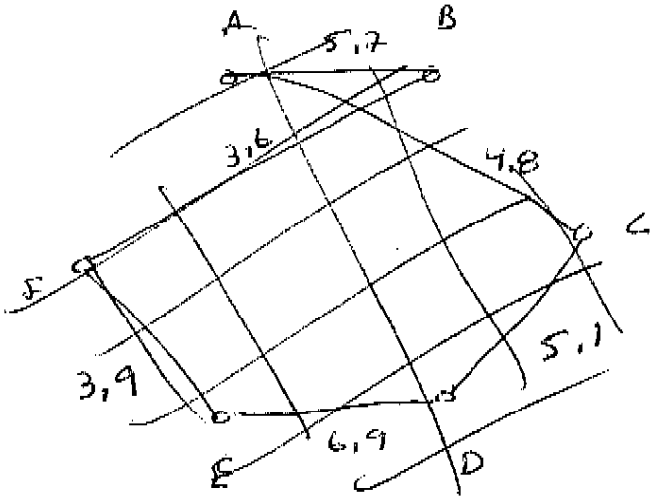
2 vertices of odd degree & connected.

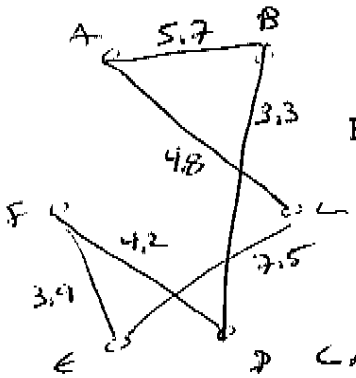
7.) (10 pts) A delivery truck must deliver packages to 6 different store locations (A, B, C, D, E, and F). The trip must start and end at C. The graph below shows the distances (in miles) between locations. Find the nearest-neighbor circuit for starting vertex C. What is the total distance of this trip?

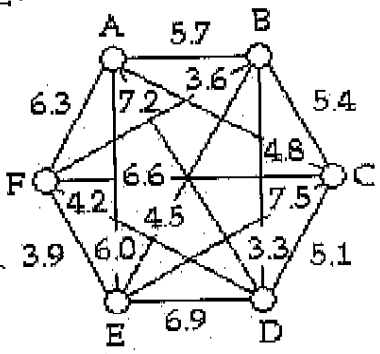
4.8 6 3.9 3.6 3.3 5.1
C A E F B D C

C A B D F E C

4.8 5.7 3.6 3.9 6.9 5.1
C A B F E D C





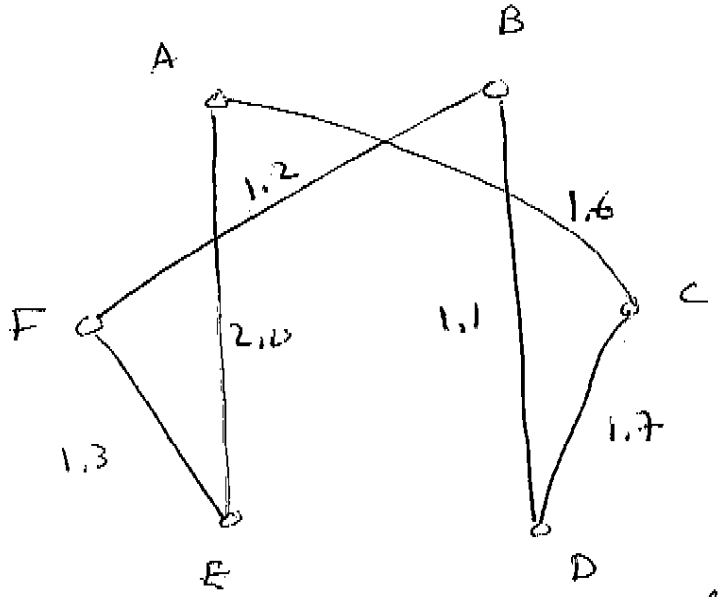


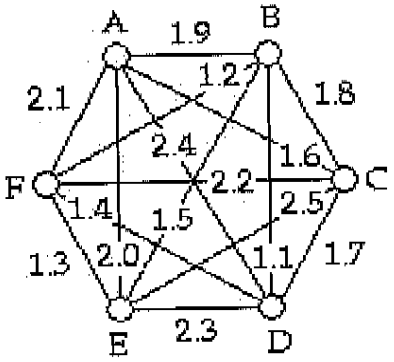
C A B D F E C 29.4

Circuit C A E F B D C and distance 26.7 mi

8.) (10 pts) A delivery truck must deliver packages to 6 different store locations (A, B, C, D, E, and F). The trip must start and end at C. The graph below shows the distances (in miles) between locations. Find the cheapest-link circuit for starting vertex C. What is the total distance of this trip?

1.6 1.9 1.1 1.4 1.3 2.5
C A B D F E C





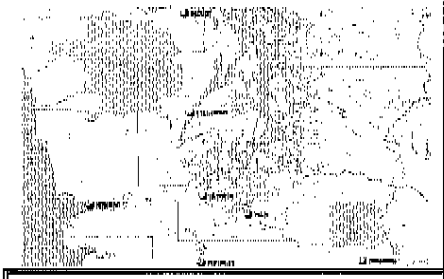
C A E F B D C

C D B F E A C

8.9 mi

Circuit C A B D F E C and distance 5.8 mi

9.) (15 pts) Dusty grew up in Olympia, WA and has "fond" memories in the following cities: Olympia, Lilliwaup, Yelm, Sequim, Chehalis, Packwood, and Hoquim. Dusty wants to take a trip down "Memory Lane" and visit each of these memorable places starting and ending at his home town of Olympia.

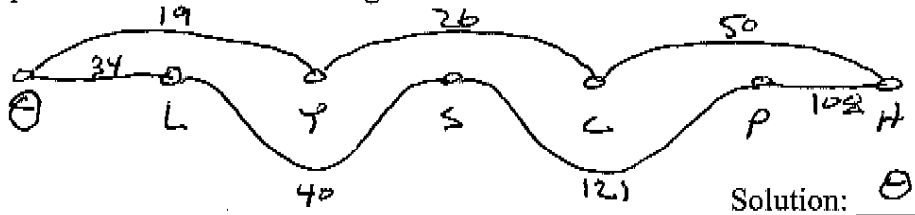


	OLYMPIA	LILLIWAUP	YELM	SEQUIM	CHEHALIS	PACKWOOD	HOQUIM
Olympia O	*	34	19	74	27	67	44
Lilliwaup L	34	*	47	40	61	89	53
Yelm Y	19	47	*	84	26	48	61
Sequim S	74	40	84	*	101	121	84
Chehalis C	27	61	26	~~101~~	*	62	50
Packwood P	67	89	48	121	62	*	108
Hoquim H	44	53	61	~~84~~	50	~~108~~	*

a) Find and write Nearest Neighbor circuit for Dusty to travel beginning in Olympia. What is the total mileage? O 19 Y 26 C 50 H 53 L 40 S 121 P 67 O

Solution: O Y C H L S P O — 542 miles

b) Find and write the Cheapest Link circuit for Dusty to travel where your solution is expressed beginning in Olympia. What is the total mileage?



Solution: O Y C H P S L O — 398 mi — 1pt.

c) Which route should you take, and why is it okay to stick with this decision? How many routes would you have to check using the brute-force method? (Don't include any mirrored routes.)

Take the nearest neighbor. While not necessarily optimal, it is a decent solution that did not require testing the 60 possibilities involved in brute force.