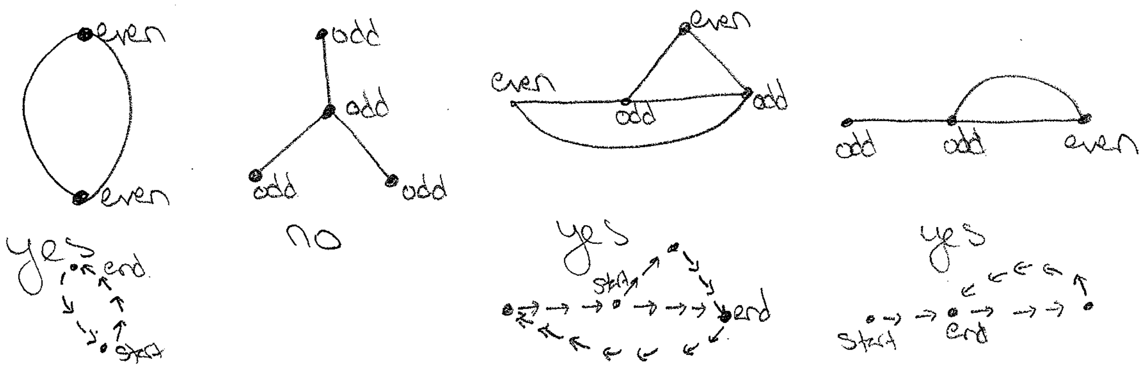
Math 213
Sections 9.5

Key

Form yourselves into groups of three to answer the following questions. Turn in one copy for each group with all the group member's names on it. This worksheet is due Thursday 8/20 by 4:30 pm in my box.

1. Determine if the following networks are traversable:



2. An *odd vertex* is a vertex where there are an odd number of arcs meet. Similarly an *even vertex* is a vertex where an even number of arcs meet. For each of vertex in each of the figures above determine if it is an odd or even vertex.

3. For each of the traversable figures in part 1, how many odd vertices were there?

   0   4   2   2

4. Can you create a traversable network with two odd vertices? Explain why or why not. If it can be built, show an example below.

   yup

or

both work.

The trick to traversing a network with 2 odd vertices is you make sure you start at an odd vertex + end at an odd vertex

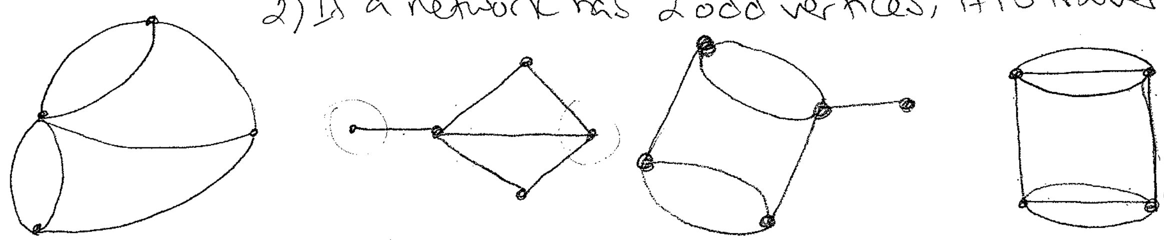
5. Can you create a traversable network with four odd vertices? Explain why or why not. If it can be built, show an example below.

No.

All vertices that are not the beginning or end of a path that traverses a network have pairs of 'entrance' and 'exit' arches. This means any vertex that is not the beginning or end of a path that is traversal, has an even number of arches implying the vertex is even. Thus at most two vertices can be odd; the one at the beginning of a traversal path & the one at the end

6. Read the Properties of a Network on page 630 and determine which of the following are traversable.

1) If a network has all even vertices, it is traversable.
2) If a network has 2 odd vertices, it is traversable.



4 odd vertices => not traversable (by #5)	2 odd verties => traversable (by pg 630, 2)	4 odd verties => not traversable (by #5)	4 even vertices => traversable (by Pg 630, 1)

7. Can a network be built with four vertices where 3 arcs meet at the first vertex, 4 at the second, 4 at the third, and 2 at the last? Explain why or why not. If it can be built, show an example below.

Nope,

Count the total number of arches coming out of all the vertices: $3+4+4+2=13$.

Note that in counting the arches in this manner we have counted each arch in a network exactly twice. (The arch connecting A to B would be counted in both the # of arches ending at A & those ending at B).

A network with the above conditions must then have $\frac{13}{2}$ arches, but $\frac{13}{2}$ is not a whole # & half an arch isn't defined for networks.