MAT 100, Euler Graph Properties   Name _____**KEY**_____
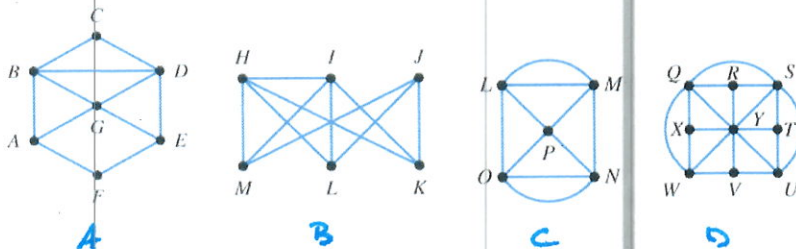
A <u>**network**</u> (graph) consists of two finite sets:

- A set of **vertices**, represented by a set of points in the plane and
- A set of **edges** that join some of the pairs of vertices, represented by joining the corresponding points in the plane by a curve.

Here are examples of **networks (graphs)**:

A   **B**   **C**   **D**

Note: An edge has two endpoints which are also vertices in the network and the edge does not pass through any other vertices between the two endpoints. However, a point at which two edges cross one another is not a vertex of the network.

1.) How many vertices are in each network above?   A:7, B:6, C:5, D:9

     a. How many of the vertices are even?   A:5, B:2, C:5, D:3

     b. How many of the vertices are odd?   A: 2, B:4, C: 0, D: 6

2.) How many edges are in each network above?

    A:11, B:10, C:10, D: 19

3.) A network can have a connected path or a not connected path. The four networks above are all connected networks. Draw a graph which is not connected below.
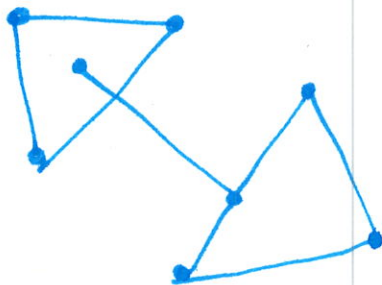
#	Figure	Vertices (V)	Contains an Euler Path or Circuit?	#	Figure	Vertices (V)	Contains an Euler Path or Circuit?
1.)	(C, D, B, G, A, E, F)	#: 7 Odd: 2 Even: 5	Path	5.)	V = 7, E = 9, R = 4	#: 7 Odd: 4 Even: 3	none
2.)	(H, I, J, K, L, M)	#: 6 Odd: 4 Even: 2	none	6.)		#: 3 Odd: 0 Even: 3	Circuit
3.)	(L, M, P, N, O)	#: 5 Odd: 0 Even: 5	Circuit	7.)		#: 8 Odd: 8 Even: 0	none
4.)	(Q, R, S, T, U, V, W, X, Y)	#: 9 Odd: 6 Even: 3	none	8.)		#: 11 Odd: 6 Even: 5	none

Figure	Vertices (V)	Contains an Euler Path or Circuit?
9.)	#: 5, Odd: 2, Even: 3	Path
10.)	#: 5, Odd: 4, Even: 1	none
11.)	#: 8, Odd: 0, Even: 8	circuit
12.)	#: 7, Odd: 6, Even: 1	none
13.)	#: 9, Odd: 0, Even: 9	Circuit
14.)	#: 6, Odd: 2, Even: 4	path