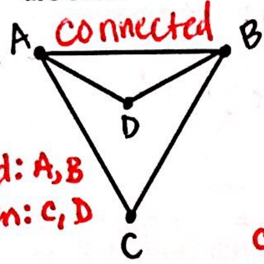
Unit 8 – WS #1 Name ______________________

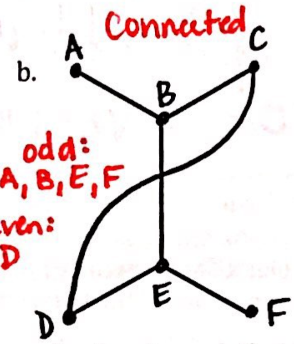
1. In exercises a – d determine whether the graph is connected. Which vertices are odd? Which vertices are even?

a. connected



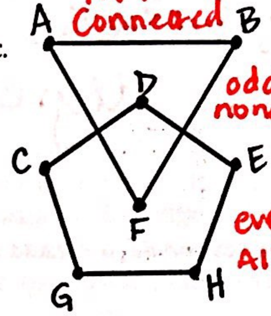
Odd: A, B
Even: C, D

b. Connected



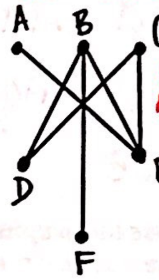
odd: A, B, E, F
even: C, D

c. Not Connected



odd: none
even: All

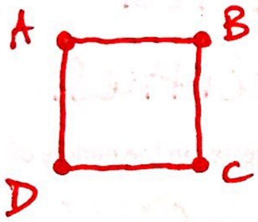
d. Connected



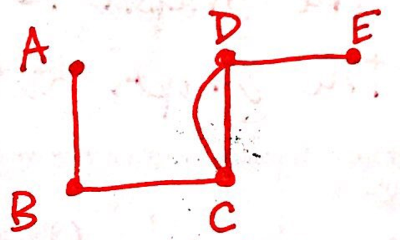
odd: A, B, E, F
Even: C, D

2. In a – d try to give an example of each graph that is described. If after several tries, you cannot find the graph described, explain why you think that it may not be possible to find that example.

a. A graph with 4 even vertices



c. A connected graph with 1 even vertex and 4 odd vertices

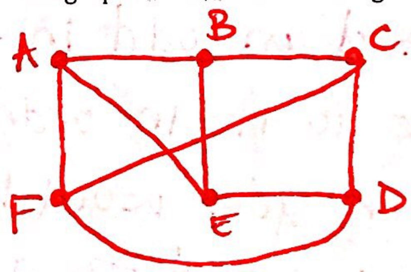


Even: B
Odd: A, C, D, E

b. A graph with 3 odd vertices

Not possible

d. A graph with 6 vertices of degree 3.



3. Make up several examples of graphs. By examining these graphs, explain why the sum of the degrees of all the vertices in a graph must be an even number.

Sum = 6

Sum from #2c is 10.

Sum from #2d is 18

Reason: All edges contribute 2 degrees (one to each vertex)

The sum of the degrees will always be 2 times the number of edges. 2 times any number is going to be an even number.

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EX:

4. Use exercise 3 to explain why a graph cannot have an odd number of odd vertices.

You cannot have an odd number of odd vertices because if you add an edge, it changes the degree of 2 vertices at once

5. ***Use the graphs from question #1, a – d*** and use Euler's Theorem to decide whether each graph can be traced. If the graph cannot be traced, tell which conditions of the theorem fail.

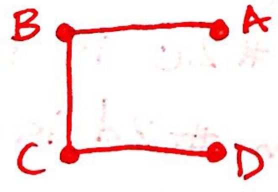
a. Yes
b. NO - the graph has 4 odd vertices
c. NO - the graph is not connected
d. NO - the graph has 4 odd vertices.

6. Assume that a graph is traceable. Explain why we cannot encounter an odd vertex in the middle of tracing that graph.

Traceable only w/ 0 or 2 odds. If you encounter an odd in the middle, you must go back to it in order to trace all edges, but then you would have another odd That you need to get to. You would get stuck.

7. If we are to trace a graph with two odd vertices, explain why we must start at one odd vertex and end at the other.

EX:



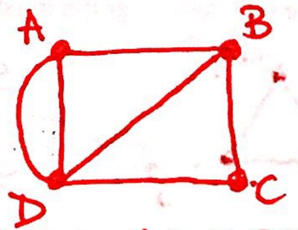
Start @ A
Path: ABCD

Start @ D:
path: DCBA

if you start at B or C, you would have to go over an edge more than once to get A or D.

Start @ C:
path CBA

EX:



odd: A, B
even: C, D

Start @ A: ADCBDAB
Start @ B: BCDBADA

If you try to start with an even vertex, you will get stuck at one of the odds in the middle of the path.

8.
a.
9.
10