DSII: Quiz 5

Name:	**ID:**

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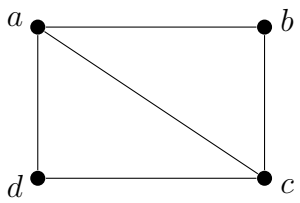
1. What is the condition required for an undirected graph to have an **Euler circuit**?

Solution:

2. The graph below is an undirected graph G. Does it have an Euler circuit? Explain why or why not by checking the degree of each vertex.



Solution:

3. In your own words, explain the difference between an **Euler path** and a **Hamiltonian path**. What does each one traverse?

Solution:

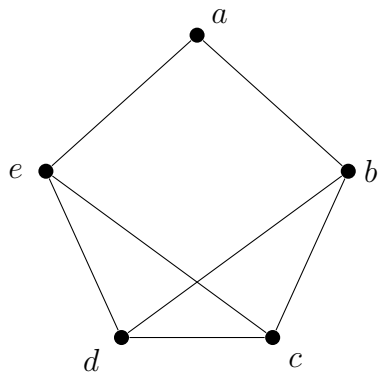
4. The graph $K_{5,7}$ is a complete bipartite graph. How many edges does it have? Show your calculation.

Solution:

5. Is a triangle (3-cycle) a bipartite graph? Justify your answer.

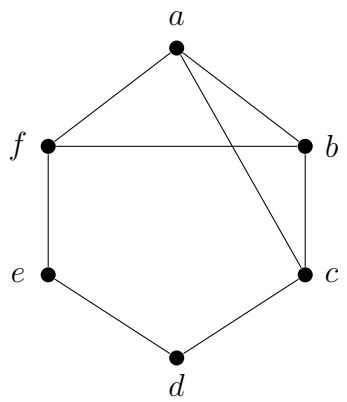
Solution:

6. Examine the graph below. Determine whether it has an Euler *circuit*, an Euler *trail* (but not a circuit), or neither. Justify your answer by identifying the degree of every vertex.



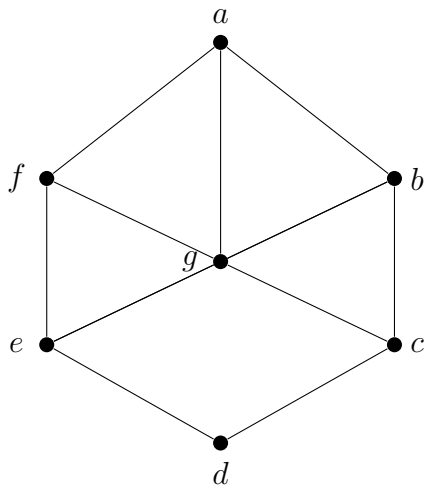
Solution:

7. The graph below has vertices a, b, c, d, e, f. Determine whether it contains a **Hamiltonian cycle**. If yes, write out the cycle explicitly as a vertex sequence. If no, explain why one cannot exist.



Solution:

8. Consider the graph G shown below with vertices a, b, c, d, e, f, g.



Answer all four parts, showing full reasoning for each.

(a) Find the degree of every vertex in G. Show how you counted each one.

(b) Does G have an Euler circuit? Why or why not?

(c) Does G have a Hamiltonian cycle? If yes, write out an explicit cycle as a vertex sequence. If no, argue why one cannot exist.

(d) Suppose you remove the edge $\{g, c\}$ from G to form a new graph G'. Does G' have an Euler circuit, an Euler trail, or neither? Justify fully.

Solution:

Solution: