

2143-110 Discrete Mathematic

Quiz: Graph 18/Mar/2011 16:30 – 17:30 (60 minutes)

Name _____ Sect _____ ID _____

Notes

- This paper has 1 question pages and 3 blank answer sheets. **Write down your name and ID on top of every page.**
- Write down your answer **only** in the blank sheet.
- You can bring in 1 A4 paper (2 pages) note.
- Cheating will not be tolerated.

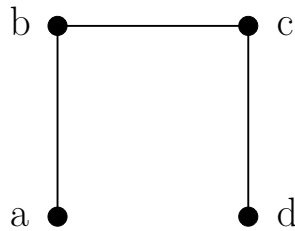


Figure 1

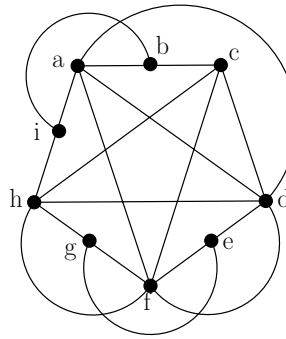


Figure 2

1. Draw the graph Q_4 . Label the vertices correctly as well.
2. How many vertices and how many edges do these graphs have?
 - a) K_n
 - b) C_n
 - c) W_n
 - d) $K_{m,n}$
 - e) Q_n
3. The **complementary graph** \overline{G} of a simple graph G has the same vertices as G . Two vertices are adjacent in \overline{G} if and only if they are not adjacent in G . If the simple graph G has v vertices and e edges, how many edges does \overline{G} have?
4. A simple graph G is called **self-complementary** if G and \overline{G} are isomorphic. Show that the graph in Figure 1 is self-complementary.
5. Find the number of paths of length n between two different vertices in K_4 if n is
 - a) 2
 - b) 3
 - c) 4
 - d) 5
6. For which values of n do these graphs have an Euler circuit?
 - a) K_n
 - b) C_n
 - c) W_n
 - d) Q_n
7. Use Kuratowski's Theorem to determine whether the graph in Figure 2 is planar.
8. Prove that a simple graph with at least two vertices there must be two vertices that have the same degree.
9. Suppose that a connected bipartite planar simple graph has e edges and v vertices. Show that $e \leq 2v - 4$ if $v \geq 3$.

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