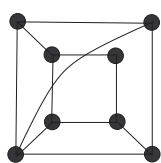


**MAT 1348 B**  
**Assignment 5**  
**Due Date: April 4, at DGD**

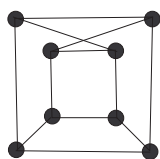
1. Use Mathematical Induction to prove that  $n^2 - 7n + 12 \geq 0$  for all integers  $n \geq 3$ . *Clearly define the proposition  $P(n)$  to be proved.*
2. Which amounts of money can be formed using just twoonies and five-dollar bills? Prove your answer using strong induction. *Clearly define the proposition  $P(n)$  to be proved.*
3. Does there exist a **simple graph** with 7 vertices of the following degree degree sequence? *If so, draw a picture of such a graph. If not, explain why.*

- (a)  $(2, 3, 3, 3, 3, 3, 3)$
- (b)  $(3, 3, 3, 3, 3, 3, 3)$
- (c)  $(0, 1, 1, 2, 2, 4, 6)$

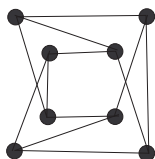
4. Which of the following graphs are bipartite? *If the graph is bipartite, give a 2-colouring of the graph. If not, explain why.*



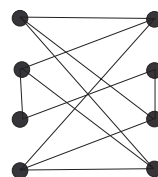
**G**



**H**



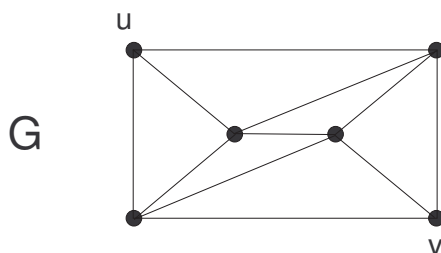
**I**



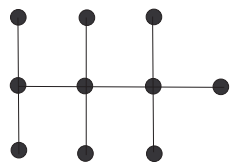
**J**

5. Does the graph  $G$  below have
  - (a) an Euler tour? (If so, give such an Euler tour as a sequence of vertices.)
  - (b) an open Euler trail? (If so, give such an open Euler trail as a sequence of vertices.)
  - (c) Let  $G + uv$  denote the graph  $G$  with the edge  $\{u, v\}$  added to it. Answer the two questions above for the graph  $G + uv$ .

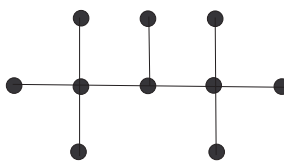
*Fully justify your answers referring to appropriate theorems in graph theory.*



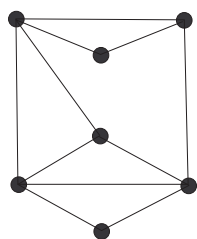
6. Consider the two pairs of graphs whose drawings are below. For each pair of graphs, determine whether or not they are isomorphic. *If the two graphs are isomorphic, give an isomorphism. Otherwise, explain why the graphs are not isomorphic.*



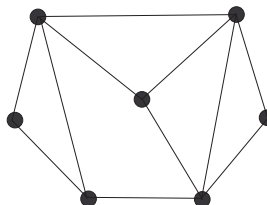
$T_1$



$T_2$



$G_1$



$G_2$