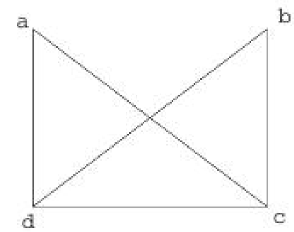
Homework #8 Name: ___________________________

If a question is wrong, or has no acceptable answer, do not mark any choice.
If a question has several correct answers, choose the most accurate/complete/informative one.
On a separate sheet, write a detailed justification of your choice.
You will be graded on the accuracy and precision of this justification only.
You will get 1 point for each correct answer and 0 points for missing or incorrect answers.
Your grade will be written on the back of this page.

1. Consider the graph defined to the right.
   The number of nodes and arcs respectively are

   [-A-] 4 and 5
   [-B-] 5 and 4
   [-C-] 6 and 4
   [-D-] 4 and 6




2. Consider again the previous graph.
   The number of non-zero entries in any adjacency matrix of this graph is

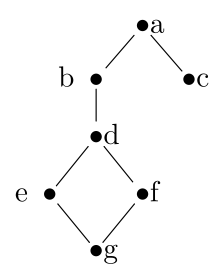
   [-A-] 5
   [-B-] 8
   [-C-] 9
   [-D-] 10

3. Consider again the previous graph.
   Let $E$ denote "there is an Euler path" and $H$ denote "there is a Hamilton path."

   [-A-] $E$ and $H$
   [-B-] $E$ and not $H$
   [-C-] not $E$ and $H$
   [-D-] not $E$ and not $H$

4. Consider the graph to the right.
   Which is **not** a breadth-first traversal:

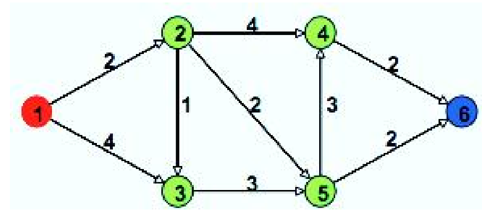
   [-A-] $a\ b\ c\ d\ e\ f\ g$
   [-B-] $c\ a\ b\ d\ f\ g\ e$
   [-C-] $e\ d\ g\ b\ f\ a\ c$
   [-D-] $d\ b\ e\ f\ a\ g\ c$




5. Consider again the graph of the previous question.
   Which is a depth-first traversal:

   [-A-] $a\ b\ c\ d\ e\ f\ g$
   [-B-] $a\ b\ d\ e\ f\ g\ c$
   [-C-] $a\ c\ b\ d\ e\ g\ f$
   [-D-] $g\ e\ f\ d\ b\ a\ c$

6. Consider the graph defined to the right.
The shortest path from 1 to 6 has length:




[-A-] 6
[-B-] 7
[-C-] 8
[-D-] 9

7. Consider again the previous graph.
Execute Dijkstra's SP algorithm starting at 1.
The order in which nodes go into the SP tree is:

[-A-] $1, 2, 4, \ldots$
[-B-] $1, 2, 5, \ldots$
[-C-] $1, 2, 3, 4, \ldots$
[-D-] $1, 2, 3, 5, \ldots$

8. Let $G = (N, E)$ be a graph where $N$ are the nodes and $E$ the edges.
Let $G' = (N', E')$ be a subgraph of $G$.

[-A-] $N'$ is contained in $N$
[-B-] $N'$ contains $N$
[-C-] $N'$ and $N$ are the same
[-D-] Any of the above can be true

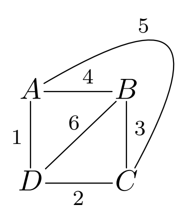
9. Let $G$ and $G'$ be isomorphic graphs.

[-A-] $G$ and $G'$ have the same nodes
[-B-] $G$ and $G'$ have the same edges
[-C-] $G$ and $G'$ have the same nodes and the same edges
[-D-] None of the above

10. Let $N$ be a set of 4 nodes and $G_1 = (N, V_1)$ and $G_2 = (N, V_2)$ two graphs with nodes $N$. We say that $G_1$ and $G_2$ are *different* iff $V_1 \neq V_2$. Assume edges are undirected and non-cycling. The number of different graphs with nodes $N$ is:

[-A-] 8
[-B-] 16
[-C-] 32
[-D-] 64

11. Consider the graph $G$ to the right.
The cost of a minimal spanning tree of $G$ is




[-A-] 3
[-B-] 6
[-C-] 10
[-D-] 21