

Name: \_\_\_\_\_

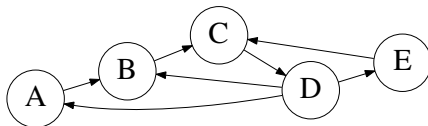
1. (1 pt.)

- **Read all material carefully.**
- *If in doubt whether something is allowed, ask, don't assume.*
- You may refer to your books, papers, and notes during this test.
- E-books may be used *subject to the restrictions* noted in class.
- No computer or network access of any kind is allowed (or needed).
- Write, and draw, carefully. Ambiguous or cryptic answers receive zero credit.
- Use class and textbook conventions for notation, algorithmic options, etc.
- Budget your time: roughly one minute per point.

Read the above carefully; then write your name in the space provided above.

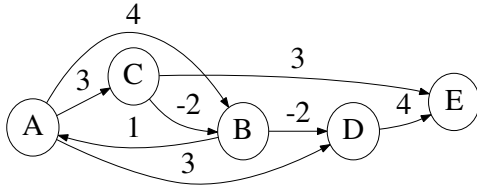
2. (14 pts.) Trace the operation of  $\text{DFS-VISIT}(G, A)$ , for the following directed graph  $G$  using the conventions of Figure 22.4 (p. 605) of the textbook. In particular:

- Depict the state of the graph after each iteration of the for loop.
- Annotate each vertex with its color: **White**, **Gray**, **Black**.
- Record the discovery and finishing times in the format **d/f**.
- Highlight tree edges using double lines, and annotate **Forward**, **Backward**, and **Cross** edges.



[additional space for answering the earlier question]

3. (15 pts.) Trace the execution of the Bellman-Ford single-source shortest paths (SSSP) algorithm on the following directed graph, with vertex A as the source. Use the textbook's Fig. 24.4 (p. 652) as a model. Relax edges in lexicographic order. Annotate predecessor edges with check marks.



[additional space for answering the earlier question]