CSE 542 – Advanced Data Structures and Algorithms *Jon Turner*

Review Questions 3

Your Name:

Please print out this form (two-sided, if you can) and write your answers *legibly* in the spaces provided. If you can't write legibly, type.

1. Draw a picture of a directed graph with vertices *a, b,..., f* and edges *ab, ad, ae, bc, be, bf, ca, db, df, ed, ef, fa* and *fc* with edge weights 8, 3, 6, 1, 4, –2, 5, 4, 2, 10, 9, 2, 3, (in that order). Find a shortest path tree rooted at vertex *f* and highlight the edges by drawing them extra heavy.

2. Select three edges that are not in your shortest path tree from problem 1. Show that all three edges satisfy the shortest path tree condition.

3. Select some edge from your shortest path tree. If you increase the length of this edge by a large enough amount, the tree will cease to be a shortest path tree. Determine the smallest integer edge weight for which this is true. Show that there is at least one edge in the graph that now violates the shortest path tree condition.