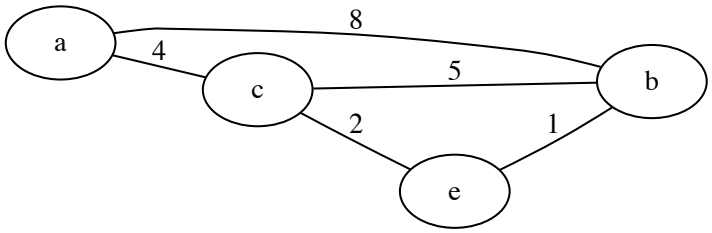
Name: _____

This test will cover chapters 1-5, except sections 4.7, 4.8,4.9 and 5.6

1. (10 points) Sort the following functions on ascending order of growth
   - $f_1 = n^2$
   - $f_2 = 2^n$
   - $f_2 = n \cdot log\, n$
   - $f_2 = 3^n$
   - $f_2 = n^{1.5}$

   Answer: _____

2. (5 points) A _____is a connected undirected graph with no cycles
3. (5 points) The best sorting algorithms that uses comparisons, runs in O(_____) time.
4. (5 points) The worst case for insertion in a hash table runs in O(_____) time.
5. (5 points) The best case for insertion into a binary search tree runs in O(_____) time.
6. (5 points) The adjacency matrix representation of a graph requires O(_____) memory
7. (5 points) The adjacency list representation of a graph requires O(_____) memory
8. (5 points) Given the following graph, calculate the shortest route from a to b



9. (10 points) Given the graph above, provide a Minimum Spanning Tree (give the edges that would be included)

10. (10 points) Describe an algorithm to find the connected components of a graph
11. (10 points) Name and briefly describe one of the optimal greedy algorithms we studied
12. (10 points) Name and briefly describe one of the optimal algorithms for finding an MST
13. (10 points) Name and briefly describe one of the divide and conquer algorithms we studied
14. (5 points) Given $T(n) \leq 2 \cdot T(\frac{n}{2}) + c \cdot n$ then T(n) $\in$ O(_____)

    Total questions: 14 Total points: 100