4) (10 pts) ALG (Binary Search Trees and Hash Tables)
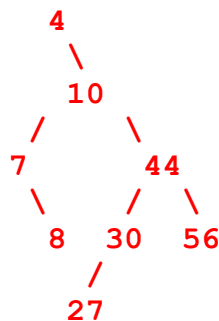
   a) (8 pts) Draw a **single** binary search tree that gives rise to all three of the following tree traversals:

      Inorder: 4 7 8 10 27 30 44 56

      Preorder: 4 10 7 8 44 30 27 56

      Postorder: 8 7 27 30 56 44 10 4

```
        4
         \
          10
         /    \
        7      44
         \    /   \
          8  30    56
            /
           27
```

Grading: 8 pts total, 1 pt per node placement, try to adjust for errors so that you don't take off multiple points for one incorrect node; namely, grade relative to an initial error they made.

   b) (2 pts) If we insert an element into a hash table using quadratic probing to resolve collisions, what two conditions must be met to ensure that if an open spot exists in our hash table, we will find that spot (rather than getting stuck in an infinite loop)?

      1. The table size must be a prime number.

      2. The table must be at least half empty.

Grading: 1 pt each