1. Solve the following problems from the text book, you need to show all details. (Do NOT use masters theorem): 4-1 (textbook page 107) parts d, f

2. Solve the following problems from the text book, you need to show all details. (Do NOT use masters theorem): 4-3 (textbook page 108) parts a, c, e, h

3. Use a recursion tree to give an asymptotically tight solution to the recurrence
   \[ T(n) = T(cn) + T((1-c)n) + n, \] where \( 0 < c \leq 1/2 \).

4. Use a recursion tree to give an asymptotically tight solution to the recurrence
   \[ T(n) = T(n/3) + T(2n/3) + n^2 \]

5. Solve the recurrence relation
   \[ T(n) = \sqrt{n} \ T(\sqrt{n}) + n \]