Problem 1 (10 points):
Solve the following recurrences:

a) \( T(n) = 2T(n/2) + n^3 \) for \( n \geq 2 \); \( T(1) = 1 \);

b) \( T(n) = T(7n/11) + n \) for \( n \geq 2 \); \( T(1) = 1 \);

In this and the following problems, you can ignore rounding issues (just round down to the nearest integer). A big-Oh answer is sufficient.

Problem 2 (10 points):
Solve the following recurrences:

a) \( T(n) = 9T(n/3) + n^2 \) for \( n \geq 2 \); \( T(1) = 1 \);

b) \( T(n) = 7T(n/4) + n^2 \) for \( n \geq 2 \); \( T(1) = 1 \);

Problem 3 (10 points):
Solve the following recurrences (if you are stuck on these, ask for help from the instructor, TA, or someone else. Don’t spend too much time on them):

a) \( T(n) = T(\lfloor \sqrt{n} \rfloor) + 1 \) for \( n \geq 2 \); \( T(1) = 1 \);

b) \( T(n) = 4T(\lfloor \sqrt{n} \rfloor) + 1 \) for \( n \geq 2 \); \( T(1) = 1 \);

Extra Credit 4 (10 points):
Page 246, Exercise 1.