MET CS566 - HOMEWORK #3

Problem #1:

Solve the following recurrence exactly.

$$t(n) = \begin{cases} 9n^2 - 15n + 106 & \text{if } n = 0, 1 \text{ or } 2 \\ t(n-1) + 2t(n-2) - 2t(n-3) & \text{otherwise} \end{cases}$$

Problem #2

Solve the following recurrence exactly, using repetitive substitutions.

$$t(n) = 4\,t(n-1) - 15 \quad \text{for all } n \geq 2, \text{ where } t(1) = 5$$

Problem #3:

Solve the following recurrence exactly.

$$t(n) = \begin{cases} n + 1 & \text{if } n = 0, \text{ or } 1 \\ 3t(n-1) - 2t(n-2) + 3\times 2^{(n-2)} & \text{otherwise} \end{cases}$$

Problem #4.

Solve the following recurrence exactly for *n* a power of *2*.

$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ 4T(n/2) + n & \text{otherwise} \end{cases}$$

Problem #5.

Solve the following recurrence exactly for *n* a power of *2*.

$$T(n) = \begin{cases} 1 & \text{if } n = 1 \\ 2T(n/2) + \log n & \text{otherwise} \end{cases}$$

Note: In each problem, express your answer as simply as possible using the θ notation. It is just fine if your general solution is not a non-decreasing function.