HW4

1. Simplify the following sum (a solution will have no remaining sums and will be somewhat simplified – minimize the number of terms within reason):

$$f(n) = \sum_{i=0}^{n-2} \sum_{j=1}^{n-1} ij$$

2. Simplify the following sum (a solution will have no remaining sums and will be somewhat simplified – minimize the number of terms within reason):

$$f(n) = \sum_{i=1}^{n} 2^i - \sum_{i=0}^{n-1} 2^i$$

3. Solve the following recurrence (a solution will have no remaining sums or recursive definitions and will be somewhat simplified – minimize the number of terms within reason). You will have to find a pattern in the "layer costs". Be sure to look at Appendix A:

$$T(n) = T(n-1) + n^2$$
$$T(1) = 1$$

4. (Somewhat tricky) Solve the following recurrence (a solution will have no remaining sums or recursive definitions and will be somewhat simplified – minimize the number of terms within reason). You will have to find a pattern in the "layer costs". Be sure to look at Appendix A:

$$T(n) = T\left(\frac{n}{3}\right) + 3n$$
$$T(1) = 0$$