1. Consider the following insertion-sort-like algorithm: Sort the odd-indexed elements using insertion sort (leaving them in the odd-indexed locations). Sort the even-indexed elements using insertion sort (leaving them in the even-indexed locations). Sort all of the elements using (standard) insertion sort.

(a) Write the pseudo code for this algorithm, without a sentinel.

(b) Assume $n = 8$. What is the best-case number of comparisons? Just state the number and show your input. Otherwise, no justification needed.

(c) Assume $n = 8$. What is the worst-case number of comparisons? Just state the number and show your input. Otherwise, no justification needed.

(d) Calculate the number of comparisons the algorithm uses in the worst case for $n$ even. Show your work.

2. In class we showed that the harmonic series

$$H_n \leq \lg(n + 1)$$

Use an analogous proof to derive a lower bound for $H_n$ assuming $n$ is a power of 2.

3. Use the integral method to get upper and lower bounds for

$$\sum_{i=5}^{10} 2i^2$$

Show your work.