1.)

ex 3.)   Bubble Sort

- Formula for

i.) number of comparisons

$$\frac{[n \cdot (n-1)]}{2} \Rightarrow O(n^2)$$

Comparisons are done for each element of the array (n passes), and each loop of the array requires n-q comparisons (n=number of array elements).

ii.) avg-case # of swaps

$$\frac{[n \cdot (n-1)]}{4} \Rightarrow O(n^2)$$

In the best case, the array is sorted so there need to be no swaps per comparison, in the worst case, every comparison needs a swap, so the average case is having a swap for half the comparisons.

4.) The graphs match the analysis above, especially the interpolated line. It can be seen that the comparisons line has an equations of (n(n-1))/2 and the swaps line has an equations of (n(n-1))/4