3.1

(i)

The outer for loop executes n times and the inner for loop executes 1 + 2 + 3… (n-1) times. This is because the outer for loop runs through each element in the array while the inner loop compares the element to every other element in the array. This sequence leads to the formula n(n-1)/2 where n is the number of elements.

(ii)

The average-case number of swaps assume half the comparisons get swapped, so the formula becomes the formula for the number of comparisons but halved. So the formula for the average-case number of swaps is n(n-1)/4.

3.4

Yes, both of the graphs are generally exponential.