1) Selection Sort Outputs:

Given selection_sort([63, 44, 17, 77, 20, 6, 99, 84, 52, 39])

Current Iteration: [63, 44, 17, 77, 20, 6, 39, 84, 52, 99]
Comparisons: 9
Swaps: 1
Current Iteration: [63, 44, 17, 77, 20, 6, 39, 52, 84, 99]
Comparisons: 8
Swaps: 1
Current Iteration: [63, 44, 17, 52, 20, 6, 39, 77, 84, 99]
Comparisons: 7
Swaps: 1
Current Iteration: [39, 44, 17, 52, 20, 6, 63, 77, 84, 99]
Comparisons: 6
Swaps: 1
Current Iteration: [39, 44, 17, 6, 20, 52, 63, 77, 84, 99]
Comparisons: 5
Swaps: 1
Current Iteration: [39, 20, 17, 6, 44, 52, 63, 77, 84, 99]
Comparisons: 4
Swaps: 1
Current Iteration: [6, 20, 17, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 3
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 2
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 1
Swaps: 0
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 0
Swaps: 0

Given selection_sort([84, 52, 39, 6, 20, 17, 77, 99, 63, 44])

Current Iteration: [84, 52, 39, 6, 20, 17, 77, 44, 63, 99]
Comparisons: 9
Swaps: 1
Current Iteration: [63, 52, 39, 6, 20, 17, 77, 44, 84, 99]
Comparisons: 8
Swaps: 1
Current Iteration: [63, 52, 39, 6, 20, 17, 44, 77, 84, 99]
Comparisons: 7
Swaps: 1
Current Iteration: [44, 52, 39, 6, 20, 17, 63, 77, 84, 99]
Comparisons: 6
Swaps: 1
Current Iteration: [44, 17, 39, 6, 20, 52, 63, 77, 84, 99]
Comparisons: 5
Swaps: 1
Current Iteration: [20, 17, 39, 6, 44, 52, 63, 77, 84, 99]
Comparisons: 4
Swaps: 1
Current Iteration: [20, 17, 6, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 3
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 2
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 1
Swaps: 0
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 0
Swaps: 0

Given selection_sort([99, 84, 77, 63, 52, 44, 39, 20, 17, 6])

Current Iteration: [6, 84, 77, 63, 52, 44, 39, 20, 17, 99]
Comparisons: 9
Swaps: 1
Current Iteration: [6, 17, 77, 63, 52, 44, 39, 20, 84, 99]
Comparisons: 8
Swaps: 1
Current Iteration: [6, 17, 20, 63, 52, 44, 39, 77, 84, 99]
Comparisons: 7
Swaps: 1
Current Iteration: [6, 17, 20, 39, 52, 44, 63, 77, 84, 99]
Comparisons: 6
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 5
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 4
Swaps: 0
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 3
Swaps: 0
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 2
Swaps: 0
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 1
Swaps: 0
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 0
Swaps: 0

2) Bubble Sort Outputs:

Given bubble_sort([44, 63, 77, 17, 20, 99, 84, 6, 39, 52])

Current Iteration: [44, 63, 17, 20, 77, 84, 6, 39, 52, 99]
Comparisons: 9
Swaps: 6
Current Iteration: [44, 17, 20, 63, 77, 6, 39, 52, 84, 99]
Comparisons: 8
Swaps: 5
Current Iteration: [17, 20, 44, 63, 6, 39, 52, 77, 84, 99]
Comparisons: 7
Swaps: 5
Current Iteration: [17, 20, 44, 6, 39, 52, 63, 77, 84, 99]
Comparisons: 6
Swaps: 3
Current Iteration: [17, 20, 6, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 5
Swaps: 2
Current Iteration: [17, 6, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 4
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 3
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 2
Swaps: 0
_____

Total Comparisons: 44
Total Swaps: 23

Given bubble_sort([52, 84, 6, 39, 20, 77, 17, 99, 44, 63])

Current Iteration: [52, 6, 39, 20, 77, 17, 84, 44, 63, 99]
Comparisons: 9
Swaps: 7
Current Iteration: [6, 39, 20, 52, 17, 77, 44, 63, 84, 99]
Comparisons: 8
Swaps: 6
Current Iteration: [6, 20, 39, 17, 52, 44, 63, 77, 84, 99]
Comparisons: 7
Swaps: 4
Current Iteration: [6, 20, 17, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 6
Swaps: 2
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 5
Swaps: 1
Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 4
Swaps: 0
_____

Total Comparisons: 39
Total Swaps: 20

Given bubble_sort([6, 17, 20, 39, 44, 52, 63, 77, 84, 99])

Current Iteration: [6, 17, 20, 39, 44, 52, 63, 77, 84, 99]
Comparisons: 9
Swaps: 0
_____

Total Comparisons: 9
Total Swaps: 0

3) **Polynomial Evaluation Outputs and Analysis:**

c) **Given evaluate([12.3, 40.7, -9.1, 7.7, 6.4, 0, 8.9], 5.4]**

returns **227295.86317440012**

d) **Asymptotic Analysis**

Initial sum = $c_0 \times x^0 + c_1 \times x^1 + c_2 \times x^2 + c_3 \times x^3 + \ldots + c_{n-1} \times x^{n-1}$

p is directly proportional to n, therefore $p = n$ in terms of time complexity
n is directly proportional each time (+1 between each) → arithmetic series

Base formula = $S_n = \frac{n}{2}\left(a_1 + a_n\right)$

Our formula = $S_n = \frac{n}{2}(1 + (n - 1)) = S_n = \frac{n^2}{2} = n^2$

Time Complexity $= O(n^2)$