1. Order the following functions by growth rate from smallest to largest.

N, N^0.5, N^1.5, N^2, N log(N), N log^2(N), N log(N^2), 2/N, 2^N, 2^N/2, 37, N^2 log(N), N^3

Answer: 2/N, 37, N, N^0.5, N log(N), N^1.5, N log(N^2), N log^2(N), N^2, N^2 log(N), N^3, 2^N/2, 2^N

2. Which of the following are equal when being reduced to Big-O notation and what is their Big-O?

2N^2, N^2+5N+300, log(N) + 5N + log(5N), 2N^0.5 + 42, 136, 3N \* 5N + 32, 2N^0.5 \* 7N^1.5

Answer:

* 2N^2, N^2+5N+300, 3N \* 5N + 32, 2N^0.5 \* 7N^1.5 = O(N^2)
* log(N) + 5N + log(5N) = O(N)
* 2N^0.5 + 42 = O(N^0.5)
* 136 = O(C)

3. In a recent court case, a judge cited a city for contempt and ordered a fine of $2 for the first day. Each subsequent day, until the city followed the judge's order, the fine was squared. Day 1 = $2, Day 2 = $4, Day 3 = $16, Day 4 = $256 and so on.

a. What is the formula to solve for the fine on the Nth day?

2^N

b. Which Big-O item on the chart is closest to the formula?

2^N