

ICS 202 - Data Structures and Algorithms
Fall Semester 231
Activity # 2 (Complexity Analysis 2)

1. Find c and N to show that
 $f(n) = 6n \lg n + 3n + 1 = O(n \lg n)$, where \lg is log with base = 2

2. How do you express each of the following complexity class in terms of Big O notation. You are provided with the solution for cubic complexity.

Complexity Class	$O(\quad)$
Constant	
Linear	
Logarithmic	
Quadratic	
Cubic	$O(n^3)$
Exponential	

3. Using the Big-O properties, what is the Big-O of each of the following functions?

- $5n^2$

- $n^3 - 45n^2 - 1000n$

- $4 \log_{10} n$

4. An algorithm takes 6 seconds to solve a problem of size 100 and ten minutes to solve a problem of size 1000. Assuming that the hardware/software environment used to run the two problems is exactly the same, what is the likely running time of the algorithm?
- A. constant
 - B. linear
 - C. quadratic
 - D. cubic
 - E. None of the other answers is correct.
5. Which of the following functions grows fastest?
- A. n .
 - B. $\log n$.
 - C. $n \log n$.
 - D. $n + \log n$.
 - E. 2^n .

6. Fill the table with True or False depending on each value of f and g

$f(n)$	$g(n)$	$f = O(g)$	$f = \Omega(g)$	$f = \Theta(g)$
$n^3 - 45n^2 - 1000n$	$n^2 + 1000n\sqrt{n}$			
n^2	$1 + n + 100n^2$			
$n^2 + n\sqrt{n} + 1$	$n^2 \log n$			