

## Algorithms – Practical 2

### Exercise 1: Complete these sentences..

1. Algorithms with time complexities such as  $n$  and  $100n$  are called linear algorithms.
2. Algorithms with time complexities such as  $n^2$  are called quadratic-time algorithms (**True** or **False**).
3. Any quadratic-time algorithm is eventually more efficient than any linear-time algorithm (True or **False**).
4. Functions such as  $5n^2$  and  $5n^2 + 100$  are called quadratic functions.

T(N)	Growth function
$n^2$	2
480	6
$2^n$	1
$\log N$	$5x$
$2^4$	7
$380N$	3
$1/2N$	4

T(N)	Growth function
$N \log N$	4
$N^4$	2
$2^n$	1
$\log_8 N$	5
$n \log_4 N$	4
$\log_2 N$	5

$n \log_6 N$	4
300	6
$6N^3$	3

below?

T(n)	Constant	Linear	Polynomial	Exponential
1	X			
$2n^3$			X	
$(4/3)n$		X		
$2^n$				X
$4n^2$			X	
5600	X			
$2493n$		X		
$3/2^n$				X

**Try these ones yourself:**

1.  $f(n) = 5n + 12$
2.  $f(n) = 109$
3.  $f(n) = n^2 + 3n + 112$
4.  $f(n) = n^3 + 1999n + 1337$

1.  $O(n)$
2.  $O(1)$
3.  $O(N^2)$
4.  $O(N^3)$

What is the complexity of the functions below?

1.  $O(n^2)$
2.  $O(1)$
3.  $O(n)$
4.  $O(n^2)$
5.  $O(n)$

6.  $O(1)$
7.  $O(n^2)$
8.  $O(n)$
9.  $O(n^2)$