

### Comparison of Function Growth Rates

1. Order the following functions by their growth rates, from slowest growing to fastest growing:

- |               |            |                   |       |              |              |                  |
|---------------|------------|-------------------|-------|--------------|--------------|------------------|
| $n$           | $\sqrt{n}$ | $n^{\sqrt{n}}$    | $n^2$ | $n \log n$   | $n \log^2 n$ | $n \log(\log n)$ |
| $\frac{2}{n}$ | $2^n$      | $2^{\frac{n}{2}}$ | $37$  | $n^2 \log n$ | $n^3$        | $n \log n^2$     |

1	2	3	4	5	6	7	8	9	10	11	12	13	14

2. Determine if the functions  $f$  and  $g$  are related by the given order notation. Entries in the table should be **YES** or **NO**.

$f(n)$	$g(n)$	$f(n) \in O(g(n))$	$f(n) \in \Omega(g(n))$	$f(n) \in \Theta(g(n))$
$100n + \log n$	$n + \log^2 n$			
$\log n$	$\log n^2$			
$n^2 \log n$	$n \log^2 n$			
$\sqrt{n}$	$\log^5 n$			
$n2^n$	$3^n$			