Name ________________________________

Homework 13 Seating Section**: R M L**

CS 336

The important issue is the logic you used to arrive at your answer.

1. Consider the functions f and g defined on $\boldsymbol{N}$ by $f(n) = \begin{cases} n^2 & \text{for } n \text{ even} \\ 2n & \text{for } n \text{ odd} \end{cases}$ and $g(n) = n^2$. Show that $f = O(g)$ but that $f \neq o(g)$ and $g \neq O(f)$.

2. Display a function $f: N \to R$ that is $O(1)$ but is not constant.

3. Define the relation "$\le$" on functions from $\boldsymbol{N}$ into $\boldsymbol{R}$ by $f \le g$ if and only if $f = \mathrm{O}(g)$. Prove that $\le$ is reflexive and transitive. (Recall: to be *reflexive*, you must have $f \le f$ for all functions f; to be *transitive*, you must have that $f \le g$ and $g \le h$ implies $f \le h$ for all functions f, g, and h.)