Proving f is $O(g)$

Let $f : \mathbb{N} \to \mathbb{R}$ and $g : \mathbb{N} \to \mathbb{R}$ be two functions.

How can we prove that f is $O(g)$?

- Find positive constants C and k such that $|f(n)| \leq C|g(n)|$ for all $n \geq k$.
- Prove that $\exists C > 0$ and $K > 0$ such that for all $n > K$, $|\frac{f(n)}{g(n)}| < C$.

It is important to realize that f is $O(g)$ if and only it is possible to find these constants C and k.

How you find them is the challenge.