Theorem (3.2.1e)**.** *Let f be the function defined by $f(x) = \lfloor x \rfloor$. $f(x)$ is $\mathcal{O}(x)$.*

Proof. Let g be the function defined by $g(x) = x$. The floor function of x is less than x by the properties for floor functions. So $|\lfloor x \rfloor| \leq |x|$ is true for all $x \in \mathbb{R}$. Therefore, $|f(x)| \leq 1|g(x)|$, for all $x \in \mathbb{R}$. It follows from the definition of big-O notation that $f(x)$ is $\mathcal{O}(x)$ with constant witnesses $C = 1$, and any $k \in \mathbb{R}$. ■