More induction on recursive definition

Define the function $f : \mathbb{N} \to \mathbb{Z}$ by:

(1) $f(0) = 0$

(2) For every $k > 0$, $f(k) = k + f(\lfloor \frac{k}{3} \rfloor) + f(\lfloor \frac{k}{5} \rfloor) + f(\lfloor \frac{k}{7} \rfloor)$

Use induction to prove that $f(k) < 4k$ for every $k > 0$.