

Let  $f : [0, +\infty) \rightarrow \mathbb{R}$  be a continuous function such that  $\lim_{x \rightarrow +\infty} f(x) = L$  exists (it may be finite or infinite). Prove that

$$\lim_{n \rightarrow \infty} \int_0^1 f(nx) \, dx = L.$$