1. Let $X_1, X_2, \ldots, X_n$ be independent identically distributed random variables with density function

$$f(x) = \begin{cases} 2x & \text{if } x \in (0,1) \\ 0 & \text{if } x \notin (0,1). \end{cases}$$

Find the limiting distribution of $n(1 - X_{n:n})$.