

Find the Laplace transform of the function

$$f(t) = \begin{cases} 10 & \text{if } 0 \leq t \leq 1 \\ t & \text{if } t > 1 \end{cases}$$

using the definition

$$\mathcal{L}\{f(t)\} = \lim_{R \rightarrow \infty} \int_0^R e^{-st} f(t) dt$$