13.9 Use property number 7 to find $\mathcal{L}[f(t)]$ if $f(t) = te^{-at}u(t-1)$.

SOLUTION:

let $g(t) = t\,u(t-1) \Rightarrow F(s) = G(s+a)$

$G(s) = \mathcal{L}[t\,u(t-1)] = e^{-s}\mathcal{L}[t+1] = e^{-s}\left(\frac{1}{s^2} + \frac{1}{s}\right)$

$$F(s) = e^{-(s+a)}\left[\frac{1}{(s+a)^2} + \frac{1}{s+a}\right]$$