[nex106] Life expectancy of the young and the old

The distribution of lifetimes in some population is $f(t) = (4t/T^2)e^{-2t/T}$.
(a) Show that $f(t)$ is properly normalized and that the parameter T is the average lifetime of individuals.
(b) Calculate the conditional probability distribution $P_c(t|\tau)$ for the remaining lifetime of individuals of age τ. Use the expression constructed in [nex38].
(c) If we define the *life expectancy* T_τ as the average remaining lifetime for an individual of age τ calculate T_τ as a function of T and τ.
(d) What is the life-expectancy ratio T_∞/T_0 of the very old and the very young.

Solution: