Exercise 2.8

One can easily verify that $S_0(x) = e^{-0.001x^2}$, for $x \geq 0$, is a legitimate survival function by showing that (i) $S_0(0) = 1$, (ii) $\lim_{x\to\infty} S_0(x) = 0$, and (iii) $S_0(x)$ is non-increasing in x.

(a) $f_0(x) = -\dfrac{dS_0(x)}{dx} = 0.002xe^{-0.001x^2}$. One may recognize that this has the form of a density function of a Weibull.

(b) $\mu_x = \dfrac{f_0(x)}{S_0(x)} = \dfrac{0.002xe^{-0.001x^2}}{e^{-0.001x^2}} = 0.002x$. In this case, the force of mortality is linearly increasing with age x.