The forces of mortality that apply to males and females, respectively, are

\[ \mu^M(x) = 0.05 \text{ for all } x \]
\[ \mu^F(x) = \frac{1}{100 - x} \text{ for } 0 \leq x < 100 \]

1. (5 pts.) Calculate \( \hat{e}_{20.25} \) for a male (20) and a female (25) with independent future lifetimes.

2. (5 pts.) Assume that the mortality of males \((x)\) and females \((y)\) living in a certain area follows a common shock model. \( T^M(x), T^F(y), \) and \( Z \) are independent and their force of mortality equal to \( \mu^M(z), \mu^F(y), \) and \( \lambda = 0.01, \) respectively. Calculate the probability that both a male (20) and a female (25) survive 5 years.