

Each problem is worth 10 points. Show all work for full credit, and use correct notation. Simplify answers completely. See other side for additional problems.

1. Given ${}_tq_x = \frac{t}{90-x}$, determine $DML(90)$

(a) $\mu_{50} = \frac{1}{90-50} = \frac{1}{40} = .025$

(b) $\mu_{60} = \frac{1}{90-60} = \frac{1}{30} = .0\bar{3}$

2. Given ${}_tp_x = \left(\frac{90-x-t}{90-x}\right)^{1/4}$, determine $GDM L(\omega=90, \alpha=1/4)$

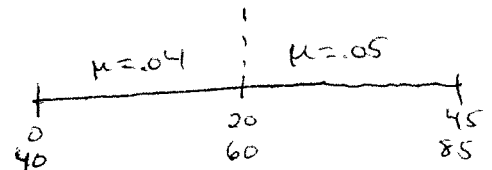
(a) $\mu_{50} = \frac{1/4}{90-50} = \frac{1}{160} = .00625$

(b) ${}^o e_{40} = \frac{90-40}{1/4+1} = 40$

3. Given $l_x = 1000(0.95)^x$, determine ${}_{20}q_{30}$ $CF(p=.95)$

$${}_{20}q_{30} = 1 - {}_{20}P_{30} = 1 - (.95)^{20}$$

4. Given $\mu_x = \begin{cases} .04 & \text{if } 30 < x < 60 \\ .05 & \text{if } x \geq 60 \end{cases}$, determine ${}_{45}P_{40}$



$${}_{45}P_{40} = {}_{20}P_{40} \cdot {}_{25}P_{60} = e^{-20(.04)} \cdot e^{-25(.05)} = e^{-2.05} \approx .1287$$

5. Use ILT assumptions to determine (round answer to the tenths place)

(a) $1000 \cdot ({}_{20}q_{30}) = 1000 \frac{l_{30} - l_{50}}{l_{30}} \stackrel{ILT}{=} 57.9$

(b) $1000 \cdot ({}_{5|15}q_{30}) = 1000 \frac{l_{35} - l_{50}}{l_{30}} \stackrel{ILT}{=} 49.4$