

Show all work for full credit, and use correct notation.

1. Given ${}_{12.3}p_{32.5} = .995$ determine ${}_{12.3}q_{32.5}$.

$${}_{12.3}q_{32.5} = 1 - {}_{12.3}p_{32.5} = 1 - .995 = .005$$

2. Given ${}_8p_{30} = .855$ and ${}_4p_{34} = .9$, determine ${}_4p_{30}$.

$${}_8P_{30} = {}_4P_{30} \cdot {}_4P_{34} \Rightarrow .855 = {}_4P_{30} (.9) \Rightarrow {}_4P_{30} = .95$$

3. Given ${}_{10}q_{50} = .1$ and ${}_{15}p_{50} = .82$, determine ${}_{10|5}q_{50}$.

$${}_{10|5}q_{50} = {}_{15}q_{50} - {}_{10}q_{50} \quad {}_{15}q_{50} = 1 - {}_{15}p_{50} = 1 - .82 = .18$$

$$\Rightarrow {}_{10|5}q_{50} = .18 - .1 = .08$$

4. Given ${}_t p_x = (.9)^t$, determine $\overset{\circ}{e}_x$.

$$\overset{\circ}{e}_x = \int_0^{\infty} {}_t p_x dt = \int_0^{\infty} (.9)^t dt = \frac{(.9)^t}{\ln(.9)} \Big|_0^{\infty} = \frac{-1}{\ln(.9)}$$

5. Given $e_{60} = 24.5$ and $e_{61} = 24$, determine q_{60} .

$$e_{60} = P_{60} (1 + e_{61}) \Rightarrow 24.5 = P_{60} (25)$$

$$\Rightarrow P_{60} = .98 \Rightarrow q_{60} = .02$$