

# Solution # 82

Don age 50 subject to 2 decrements

(i) Mortality

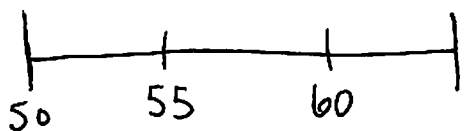
Associated single decrement follows  $l_x = 100 - x$   $0 \leq x \leq 100$

(ii) Leaving employment

$$\mu_{\text{mort}}^{(2)} = .05 \quad t \geq 0$$

Decrement (i)  $\Rightarrow$  DeMoivre, Decrement (ii)  $\Rightarrow$  Constant Force

Professor for at least 5, but less than 10 years



$${}_5P_{50}^{(\tau)} - {}_{10}P_{50}^{(\tau)}$$

$${}_tP_{50}^{(\tau)} = \prod_i {}_tP_{50}^{(i)}$$

$${}_5P_{50}^{(\tau)} = ({}_5P_{50}^{(1)}) ({}_5P_{50}^{(2)})$$

$${}_{10}P_{50}^{(\tau)} = ({}_{10}P_{50}^{(1)}) ({}_{10}P_{50}^{(2)})$$

$${}_5P_{50}^{(1)} = \left(1 - \frac{5}{50}\right) = .9$$

$${}_5P_{50}^{(2)} = e^{-.05(5)} = .7788$$

$${}_5P_{50}^{(\tau)} = .701$$

$${}_{10}P_{50}^{(1)} = \left(1 - \frac{10}{50}\right) = .8$$

$${}_{10}P_{50}^{(2)} = e^{-.05(10)} = .6065$$

$${}_{10}P_{50}^{(\tau)} = .4852$$

$$.701 - .4852 = .2157 \quad \boxed{A}$$