

# Tests 11 & 12 Key

$$1) \underbrace{{}_{15}AS}_{=1150} = 10000 v(.004) + {}_{16}CV v(.05) + .05(90) - 90 + \underbrace{{}_{16}AS v}_{=1320} (1 - .004 - .05)$$

$$\Rightarrow {}_{16}CV = 912.40$$

$$2) {}_9V = 115 = 1000 v_{.06}(.01) + 110 v_{.06}(.1) + 3 - 16 + {}_{10}V v_{.06} (1 - .01 - .1)$$

$$\Rightarrow {}_{10}V = 129$$

$$3) G^{(e)} = Pr_{10}(A-m, w, i, e) - \underbrace{Pr_{10}(E-m, w, i, e)}_{=0 \text{ since using gross premium reserves}}$$

$$\begin{aligned} \therefore G^{(e)} &= Pr_{10}(A-m, w, i, e) = ({}_9V + \pi - e)(1+i) - 1000 \ddot{a}_{79}^{(d)} - 110 \ddot{a}_{79}^{(w)} - {}_{10}V Pr_{79}^{(e)} \\ &= (115 + 16 - 5)(1.05) - 1000 \left(\frac{15}{1000}\right) - 110 \left(\frac{120}{1000}\right) - 129 \left(1 - \frac{135}{1000}\right) = -7.485 \text{ per policy} \\ &\quad \text{in force @ BOY} \end{aligned}$$

$$\therefore \text{total gain on all policies} = -7.485(1000) = -7485$$

$$4) G^w = Pr_{10} \left( \begin{matrix} A-w \\ E-m, i, e \end{matrix} \right) - Pr_{10}(E-m, w, i, e) \stackrel{\text{see}}{\#3} Pr \left( \begin{matrix} A-w \\ E-m, i, e \end{matrix} \right)$$

$$= (115 + 16 - 3)(1.06) - 1000(.01) - 110 \left(\frac{120}{1000}\right) - 129 \left(1 - .01 - \frac{120}{1000}\right)$$

$$= .25 \text{ per policy in force @ BOY}$$

$$\therefore \text{total gain on all policies} = .25(1000) = 250$$

$$5) G_{\{e,m\} \text{ after } \{w,i\}} = \underbrace{Pr_{10} \left( \begin{matrix} A-e,m \\ A-w,i \end{matrix} \right)}_{\substack{\text{see} \\ \#3} - 7.485} - Pr_{10} \left( \begin{matrix} E-e,m \\ A-w,i \end{matrix} \right)$$

$$Pr_{10} \left( \begin{matrix} E-e,m \\ A-w,i \end{matrix} \right) = (115 + 16 - 3)(1.05) - 1000(.01) - 110 \left( \frac{120}{1000} \right) - 129 \left( 1 - .01 - \frac{120}{1000} \right)$$

$$= -1.03$$

$$\therefore \text{per policy gain in this case} = -7.485 - (-1.03) = -6.455$$

$$\therefore \text{on all policies, gain in this case} = -6.455(1000) = -6455$$