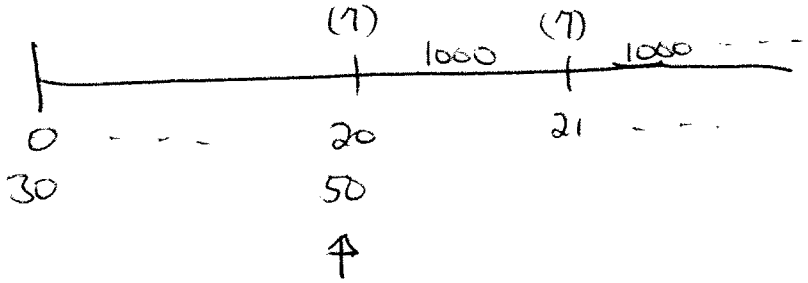
Solutions to MLCM4S2 Exercises

1)



$$ {}_{20}V = 1000\,A_{50} - 7\,\ddot{a}_{50} $$

$$ \underline{\underline{\text{ILT}}}\ 249.05 - 7(13.2668) $$

$$ = 156.18 $$

2) $A = {}_9V = 5000\,\bar{A}_{x+9} - 225\,\bar{a}_{x+9:\overline{1}|}$

$\bar{A}_{x+9} \overset{CF}{=} \frac{\mu}{\mu+\delta} = \frac{2}{6} = 1/3$

$\bar{a}_{x+9:\overline{1}|} = \bar{a}_{x+9} - {}_1E_x \cdot \bar{a}_{x+10}$

$\bar{a}_{x+9} \overset{CF}{=} \frac{1}{\mu+\delta} \overset{CF}{=} \bar{a}_{x+10} = \frac{1}{.06}$

${}_1E_x \overset{CF}{=} e^{-1(\mu+\delta)} = e^{-.06}$

$\therefore\ A = {}_9V = 5000\left(\frac{1}{3}\right) - 225\left[\frac{1}{.06}\left(1 - e^{-.06}\right)\right] = 1448.28$

$B = {}_{10}V = 5000\,\bar{A}_{x+10}$ (no more premiums after age $x+10$)

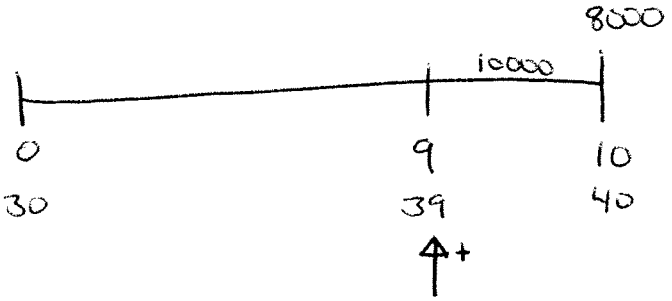
$\therefore\ B = 5000\left(\frac{1}{3}\right) = 1666.67$

$\therefore\ \frac{A}{B} \approx .869$

3)

(a) ${}_{10}V = 8000$

(b)



${}_{9+}V = ?$

Remark: ${}_{9}V$ includes the premium at age 39

${}_{9+}V$ does not

$$\therefore {}_{9+}V = 10000\, v\, {}_{1}q_{39} + 8000\, v\, {}_{1}p_{39}$$

$$\overset{\text{ELT}}{=} \frac{10000}{1.06}(.0026) + \frac{8000}{1.06}(.9974) = 7552.08$$

4) (See Video Solution)

(a) 43.96

(b) 16020