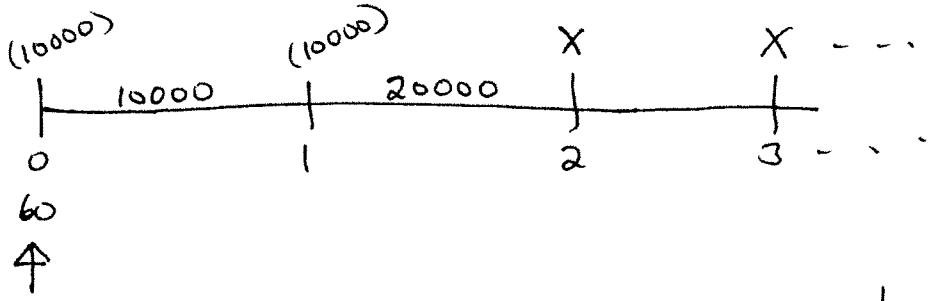
Solutions to MLCM356 Exercises

1)



$$EPV(P) = 10000 + 10000\, v\, {}_{1}p_{60} \qquad v = \frac{1}{1.06}$$

$$EPV(B) = 10000\, v\, q_{60} + 20000\, v^2\, {}_{1|1}q_{60} + {}_{2}E_{60} \cdot X\, \ddot{a}_{62}$$

$$q_{60} = .01376$$

$$q_{61} = .01501$$

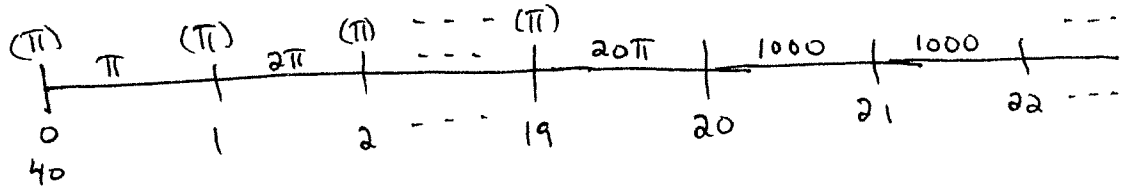
$${}_{1|1}q_{60} = p_{60} \cdot q_{61} = (.98624)(.01501)$$

$${}_{2}E_{60} = v^2 \cdot {}_{2}p_{60} = \frac{1}{(1.06)^2}(.98624)(.98499)$$

$$\ddot{a}_{62} = 10.6584$$

$$EPV(P) = EPV(B) \Longrightarrow X = 2052.18$$

2)



$$EPV(P) = EPV(B) \Longrightarrow \pi \underbrace{\ddot{a}_{40:\overline{20}|}}_{=11.362} = \pi \underbrace{(IA)^{1}_{40:\overline{20}|}}_{=1.849} + 1000\, {}_{20}E_{40} \cdot A_{60}$$

$${}_{20}E_{40} = v^{20} \cdot {}_{20}p_{40} = (1.05)^{-20}\, \frac{100-40-20}{100-40}$$

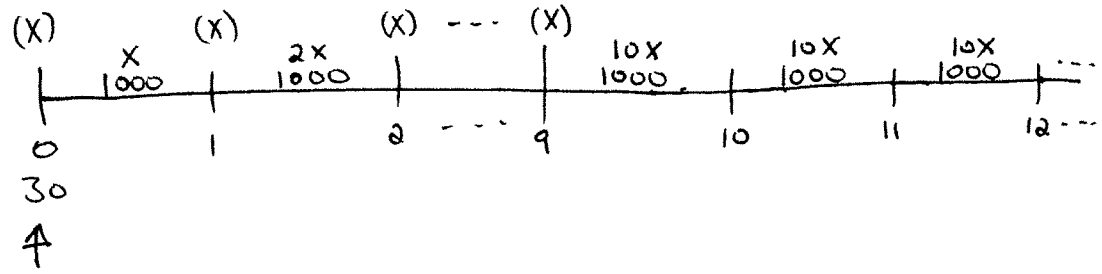
$$A_{60} = \frac{1}{100-60} \cdot a_{\overline{100-60|}} = \frac{1}{40} \cdot a_{\overline{40|}.05}$$

$$\therefore \quad \pi = 11.33$$

3) Bob: $Y\,\ddot{a}_{30:\overline{10}|} = 1000 A_{30}$

$$\Rightarrow Y = 13.17$$

Billy:



$$EPV(P) = X\,\ddot{a}_{30:\overline{10}|}$$

$$EPV(B) = 1000 A_{30} + X(IA)^{1}_{30:\overline{10}|} + 10X \cdot {}_{10|}A_{30}$$

$$\therefore X = \frac{1000 A_{30}}{\ddot{a}_{30:\overline{10}|} - (IA)^{1}_{30:\overline{10}|} - 10 \cdot {}_{10|}A_{30}} = 15.02$$

$$\therefore X - Y = 1.85$$