

# Homework 1

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EX12.2

**Remark:**

Start withdraw on month = 9 and withdraw every 7 months for 40 times

$$\begin{aligned} \text{PVIFA}_{282} &= \frac{1}{1.01^9} + \frac{1}{1.01^{16}} + \cdots + \frac{1}{1.01^{282}} \\ \text{PVIFA}_{282} \times 1.01^7 &= \frac{1}{1.01^2} + \frac{1}{1.01^9} + \cdots + \frac{1}{1.01^{275}} \\ \text{PVIFA}_{282}(1.01^7 - 1) &= \frac{1}{1.01^2} - \frac{1}{1.01^{282}} \\ \text{PVIFA}_{282} &= 12.7517135903 \end{aligned}$$

$$\text{PV} = 12.7517135903 \times 1,000$$

$$\text{PV} = 12,751.7135903$$

EX13.1

**Remark:**

FVIFA from  $21^{st} \rightarrow 60^{th}$

PVIFA from  $61^{st} \rightarrow 81^{st}$

$$\begin{aligned}PVIFA_{61} &= \frac{1}{1.1} + \frac{1}{1.1^2} + \cdots + \frac{1}{1.1^{20}} \\PVIFA_{61} \times 1.1 &= 1 + \frac{1}{1.1} + \cdots + \frac{1}{1.1^{19}} \\PVIFA_{61}(1.1 - 1) &= 1 - \frac{1}{1.1^{20}} \\PVIFA_{61} &= 8.513563719758565\end{aligned}$$

$$PV_{61} = 8.513563719758565 \times 50,000$$

$$PV_{61} = 425,678.18598792824$$

$$\begin{aligned}FVIFA_{61} &= C \times (1.1 + 1.1^2 + \cdots + 1.1^{40}) \\ \frac{FVIFA_{61}}{1.1} &= C \times (1 + 1.1 + \cdots + 1.1^{40}) \\ FVIFA_{61}(1 - \frac{1}{1.1}) &= C \times (1.1^{40} - 1) \\ FVIFA_{61} &= C \times 486.85181125\end{aligned}$$

$$\begin{aligned}C &= \frac{FVIFA_{61}}{486.85181125} \\ C &= \frac{425,678.18598792824}{486.85181125} \\ C &= 874.3485720943456\end{aligned}$$

EX13.2

**Remark:**

FVIFA from  $24^{th} \rightarrow 60^{th}$  and Deposit every 2 years

PVIFA from  $61^{st} \rightarrow 82^{st}$  and Withdraw every half years

$$\begin{aligned}PVIFA_{21} &= \frac{1}{1.1} + \frac{1}{1.1^{0.5}} + \cdots + \frac{1}{1.1^{21}} \\PVIFA_{21} \times 1.1^{0.5} &= 1 + \frac{1}{1.1^{0.5}} + \cdots + \frac{1}{1.1^{21}} \\PVIFA_{21}(1.1^{0.5} - 1) &= 1 - \frac{1}{1.1^{21}} \\PVIFA_{21} &= 17.7195213879\end{aligned}$$

$$PV_{61} = 17.7195213879 \times 50,000$$

$$PV_{61} = 885,976.069394$$

$$\begin{aligned}FVIFA_{61} &= C \times (1.1 + 1.1^3 + \cdots + 1.1^{37}) \\FVIFA_{61} \times 1.1^2 &= C \times (1.1^3 + \cdots + 1.1^{39}) \\FVIFA_{61}(1.1^2 - 1) &= C \times (1.1^{39} - 1.1) \\FVIFA_{61} &= C \times 190.689418044\end{aligned}$$

$$\begin{aligned}C &= \frac{FVIFA_{61}}{190.689418044} \\C &= \frac{885,976.069394}{190.689418044} \\C &= 4646.17323018\end{aligned}$$