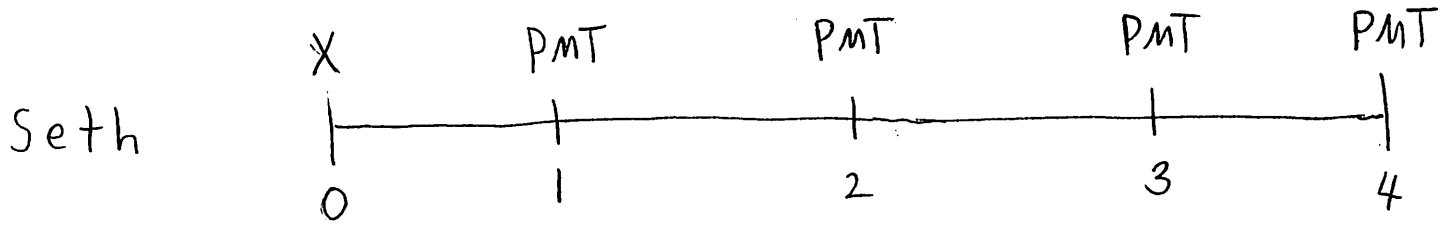
Solution #46



Borrows X at time 0 at $i = 8\%$

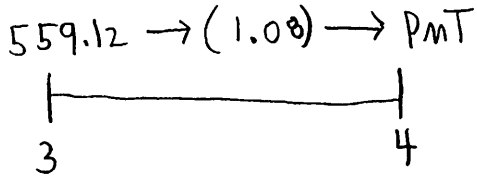
Repays with 4 equal PMTs at end of years 1–4

Goal: Calculate the principal repaid in the first PMT.

Plan: ① Find the level PMT using OB_3.

② Use PMT, n, i to find X.

③ Find principal paid in 1st level PMT.

① Given $OB_3 = 559.12$ ... 

Loan paid off by time 4

$PMT_4 =$ principal portion $+$ interest portion $= OB_3(1+i)$ to amortize loan down to 0.

$= OB_3 + OB_3 \cdot i = 559.12 + 559.12(.08)$

$= 603.85$

$PMT_4 = PMT_{1,2,3} = 603.85$

$\text{Principal}_K = PMT \cdot v^{(n-k+1)}$

n = total PMTs

K = pmt # interested in

$v = (1+i)^{-1}$

$\text{Principal}_4 = 603.85 \cdot v^{4-4+1}$

$= 559.12$

(2)

$$X = PMT\ a_{\overline{4}|.08} = 603.85\left(\frac{1-(1.08)^{-4}}{.08}\right)$$

$$X = 2000$$

Use Financial calculator:

Set calculator to END mode (PMTs occur at end of year)

PMT = 603.85 $\quad n=4 \quad i=8 \quad FV=0 \quad \overset{CPT}{PV} = -2000$

(3) $PMT - \underset{\text{portion } 1}{\text{interest}} = \underset{\text{portion } 1}{\text{Principal}}$

$603.85 - 2000(.08) = 443.85 \qquad A$

$$\text{Principal}_1 = PMT * V^{(n-K+1)}$$

$$= 603.85 * V^{(4-1+1)} = 443.85$$