Correction TD2 :
Interêt simple et Escompte :

- Exercice 1 :

1) C_A = 1er capital A $\Rightarrow n_A = 3$ mois

C_B = 2ème capital B $\Rightarrow n_B = 4$ mois

$t = ?$

$$\begin{cases} I_A = I_B \\ C_A + C_B = 7000 \quad (1) \end{cases}$$

$$\begin{cases} I_A = C_A \times t \times \frac{3}{12} \\ I_B = C_B \times t \times \frac{4}{12} \end{cases} \Rightarrow 3C_A = 4C_B \quad (2)$$

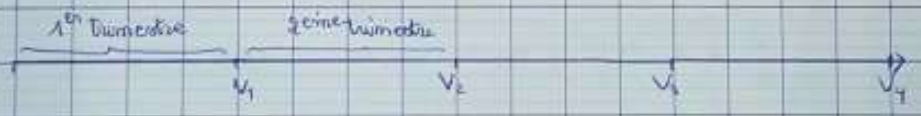
$$\Rightarrow \begin{cases} C_B = 7000 - C_A \\ 3C_A = 4(7000 - C_A) \end{cases} \Rightarrow 3C_A = 28000 - 4C_A$$

$\Rightarrow C_A = 4000$, $C_B = 3000$

2) $C_A \times n_A \times \frac{t}{12} = 60$

$$\Rightarrow t = \frac{60}{4000 \times \frac{3}{12}} = 6\%$$

Exercice 2 : X Pb comme traité ? , t ?



$V_1 = \frac{x}{4} + \text{Interêts}$, $V_3 = \frac{x}{4} + I_3$

$V_2 = \frac{x}{4} + I_2$, $V_4 = \frac{x}{4} + I_4$

$V_1 = a$

$V_2 = a - 225$

$V_3 = V_2 - 225 = a - 450$

$V_4 = V_3 - 225 = a - 675$

$V_1 + V_2 + V_3 + V_4 = 32250$

$a + (a - 450) + (a - 225) + (a - 675) = 32250$

$\Rightarrow a = 8400$ IND

- $V_1 = 8400$
- $V_2 = 8400 - 225 = 8175$
- $V_3 = 8400 - 450 = 7950$
- $V_4 = 8400 - 675 = 7725$

$V_1 = \frac{x}{4} + I_1 = 8400$

$\frac{x}{4} + x \times \frac{n}{4} = 8400$

$$\boxed{\frac{X}{4} + X_t \times \frac{1}{4} = 8400} \quad (1)$$

$V_2 = \frac{X}{4} + I_2$ avec $C_0 = (X - \frac{X}{4})$

$I_2 = (X - \frac{X}{4}) \cdot t \cdot \frac{n}{4}$

$V_2 = \frac{X}{4} + (X - \frac{X}{4}) t \frac{1}{4} = 8175 \quad (2)$

$(1) - (2) \begin{cases} X_t \times \frac{1}{4} - (X - \frac{X}{4}) \times t \times \frac{1}{4} = 225 \\ X \cdot \frac{t}{4} - \frac{Xt}{4} + \frac{Xt}{16} = 225 \end{cases}$

$\Rightarrow t \cdot \frac{X}{16} = 225$

$t \cdot X = 3600 \quad \Rightarrow X = \frac{3600}{T}$

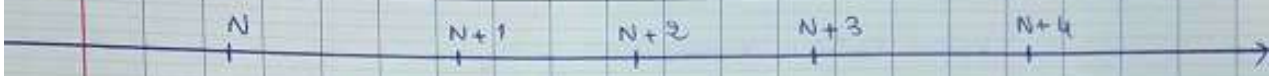
$(1) \frac{3600}{4T} + \frac{3600}{4} = 8400 \Rightarrow \frac{3600}{4T} = 7500$

$T = \frac{3600}{7500 \times 4} = 12\ \%$

$\frac{X}{4} + X \frac{0,12}{4} = 8400 \Rightarrow X = 30\,000$

- Serie 2: Interêt simple et escompte :

- Exercice 3:



1) Σ versement = 25 000 + (15 × 2000) = 55 000

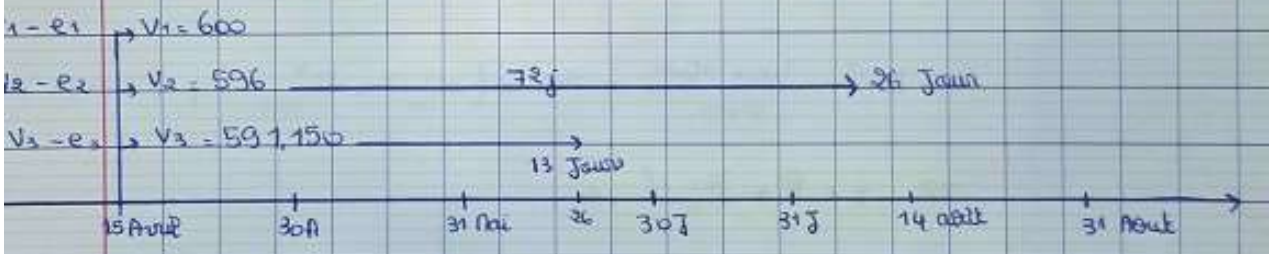
Interêt = 55 000 × 4 % × 4 = 8800

Prime = 6000

Σ totale = 55 000 + 8800 + 6000 = 69 800

2) t' = taux effectif ⇒ $t' = \frac{t}{1 - t \cdot n} = \frac{4\%}{1 - (4\% \times 4)} = 4{,}76\%$

- Exercice 4:



1) $a = V_2 - e_2$ et $a = V_3 - e_3$

$\Rightarrow V_2 - e_2 = V_3 - e_3$

$596 - \left(596 \times t \times \frac{72}{360}\right) = 591{,}150 - \left(591{,}150 \times t \times \frac{13}{360}\right)$

$\Rightarrow t = 4{,}95\%$

Somme remise par la banque : $a = 596 - \left(596 \times 4{,}95\% \times \frac{72}{360}\right) = 590$

2) $a = V_1 - e_1 = 590 \Rightarrow e_1 = 600 - 590 = 10$

$\Rightarrow 600 \times 4{,}95\% \times \frac{n}{360} = 10 \Rightarrow n = 121\text{ j}$ ⇒ Date 15/08

3) $a = \Sigma a_i \Rightarrow a = 1770$

$1791{,}650 - \left(1791{,}650 \times 4{,}95\% \times \frac{n}{360}\right) = 1770$

$\Rightarrow n = 88\text{ j}$

- Exercice 5 :

Taux de revient = $\frac{360 \times \text{agios}}{\text{Valeur nette} \times n}$ avec agios = e + c + TVA

Valeur Nette = V nominale - agios

Taux réel = $\frac{360 \times \text{agios}}{\text{Valeur Nominale} \times n} = \frac{360 \times (e + c + TVA)}{\text{Valeur Nominale}} =$

Agios = e + c + TVA

c : commissions fixes : ne dépendent pas de la durée

commissions variables : proportionnelles à la durée

1) Agios = e + c + TVA

V : Valeur Nominale

$\text{agios} = \underbrace{\frac{V \times t \times n}{360}}_{e} + \underbrace{\frac{V \times R \times n}{360}}_{\text{commission variable}} + \underbrace{Vxp}_{\text{commission fixe}} + TVA$

$\text{Taux Réel} = \frac{360 \times \text{agios}}{V \times n} = 360 \times \left[\frac{V \times t \times n}{360} + \frac{V \times R \times n}{360} + Vp + TVA\right] \times \frac{1}{V \cdot n}$

$TR = t + R + \frac{360 \times P}{n}$,o

$TR_A = 9,3 + 0,6 + \frac{360 \times 0,5}{n} = 9,9 + \frac{180}{n}$

$TR_B = 9,9 + 0,6 + \frac{360 \times 0,4}{n} = 10,5 + \frac{1,44}{n}$

1er cas : $TR_A = TR_B$

$9,9\% + \frac{1,8}{n} = 10,5\% + \frac{1,44}{n}$

$\frac{0,36}{n} = 0,6\%$

$\Rightarrow n = \frac{0,36}{0,6\%} = 60 j$

- Si $n = 60 j \rightarrow$ indifférence
- si $n > 60 j \rightarrow$ par exemple $n = 80 j$

$TR_A = 9,9\% + \frac{1,8}{80} = 12,15\%$

$TR_B = 10,5\% + \frac{1,44}{80} = 12,3\%$

on choisit la banque A car $TR_A < TR_B$.

2e cas : Si $n < 60 j$ par exemple $40 j$

$TR_A = 9,9\% + \frac{1,8}{40} = 14,4\%$

$TR_B = 10,5\% + \frac{1,44}{40} = 14,1\%$

$\Rightarrow TR_A > TR_B$

$\Rightarrow$ on choisit la banque B.