

Solution of exercises serie 02

Exercise n° 1

V / Determination of the simple interest earned

$$SI = PRT \quad P = 1000€$$

$$R = 8\% = 0,08$$

$$T = 2 \text{ years.}$$

$$SI = 1000 \times 2 \times 0,08 = \underline{160}$$

Exercise n° 2 : Calculation of the simple amount.

$$P = 200000 \text{ AD}$$

$$R = 4 \text{ years } 9 \text{ months}$$

$$R = 10\% = 0,1$$

$$SA = P(1 + RT)$$

$$= 200000(1 + 0,1 \times 4,75)$$

$$= 200000(1 + 0,475)$$

$$= 200000 \times 1,475$$

$$= 295000 \text{ AD}$$

Exercise n° 3 Calculation of the compound amount.

$$CA = P \left(1 + \frac{r}{m}\right)^{mT}$$

$$P_1 = 90000$$

$$r_1 = 12\% = 0,12 \quad r_2 = 12\% = 0,12$$

$$m_1 = 12 \text{ months (monthly)} \quad m_2 = 4 \text{ quarterly}$$

$$t_1 = 4 \text{ years}$$

$$t_2 = 3 \text{ years } 3 \text{ months} = 3 + \frac{3}{12} = 3 + 0,25 = 3,25$$

$$CA_1 = P_1 \left(1 + \frac{r_1}{m_1}\right)^{m_1 T} = 90000 \left(1 + \frac{0,12}{12}\right)^{4 \times 12}$$

$$= 90000(1 + 0,01)^{48}$$

$$= 145100,34$$

$$CA_2 = P_2 \left(1 + \frac{r_2}{m_2}\right)^{m_2 T} \quad / \quad P_2 = 145100,34$$

$$CA_2 = 145100,34 \left(1 + \frac{0,12}{4}\right)^{4 \times 3,25} = 213084,74$$

Exercise n° 4 1/ $CA = P \left(1 + \frac{r}{m}\right)^{mT}$ / $m = 2$
 $T = 5 \text{ years}$
 $P = 2000 \text{ €}$
 $CA = 3500 \text{ €}$

$$CA = 2000 \left(1 + \frac{r}{2}\right)^{2 \times 5}$$

$$3500 = 2000 \left(1 + \frac{r}{2}\right)^{10}$$

$$\frac{3500}{2000} = \left(1 + \frac{r}{2}\right)^{10}$$

$$\frac{35}{20} = \left(1 + \frac{r}{2}\right)^{10}$$

$$1,75 = \left(1 + \frac{r}{2}\right)^{10}$$

$$(1,75)^{\frac{1}{10}} = 1 + \frac{r}{2}$$

$$\frac{r}{2} = (1,75)^{\frac{1}{10}} - 1$$

$$\approx 1,057 - 1 = 0,057$$

The rate
 Compounded $\Rightarrow r = 0,057 \times 2 \approx 0,115 = 11,5\%$

2/ Calculate of the original principal =

$$CA = P \left(1 + \frac{r}{m}\right)^{mT} / r = 5\% = 0,05$$

$$m = 4$$

$$T = 27 \text{ month} = 27 \times \frac{1}{12} = 2,25$$

$$CA = 1000 \text{ €}$$

$$1000 = P \left(1 + \frac{0,05}{4}\right)^{4 \times 2,25}$$

$$1000 = P (1,0125)^9$$

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$$P = \frac{1000}{(1,0125)^9} = \frac{1000}{1,118} \approx 894,45 \text{ €}$$