

7. Malcolm needs €400 per month, for 3 years, while he studies at college. What amount of money do his parents need to invest, at 6.6% p.a. compounded monthly, to provide the money that Malcolm needs?

$$R = \sqrt[n]{1+i} - 1$$

* If payments at start of each month
 ⇒ Series

$$S_n = \frac{a(1-r^n)}{1-r}$$

$$t = 3 \text{ year} \Rightarrow 36 \text{ months}$$

$$i = 6.6\% \text{ p.a.}$$

$$mER = R = \sqrt[12]{1.066} - 1 = 0.00534$$

$$T_1 + \frac{T_2}{(1.00534)^1} + \frac{T_3}{(1.00534)^2} + \dots + \frac{T_{36}}{(1.00534)^{35}}$$

$$a = 400 \quad R = 1/1.00534$$

$$S_{36} = \frac{400(1 - (\frac{1}{1.00534})^{36})}{1 - (\frac{1}{1.00534})}$$

$$= \text{€ } 13,138.63$$

(?)

* Book does not take this understanding

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$$\frac{T_1}{(1.00534)^1} + \frac{T_2}{(1.00534)^2} + \dots + \frac{T_{36}}{(1.00534)^{36}}$$

$$a = 400/1.00534 \quad R = 1/1.00534$$

$$S_{36} = \frac{\frac{400}{1.00534}(1 - (\frac{1}{1.00534})^{36})}{1 - (\frac{1}{1.00534})}$$

$$= \text{€ } 13,068.84 \quad \checkmark$$

7. Malcolm needs €400 per month, for 3 years, while he studies at college. What amount of money do his parents need to invest, at 6.6% p.a. compounded monthly, to provide the money that Malcolm needs?

OR

$$A = \frac{P(i)(1+i)^n}{(1+i)^n - 1}$$

$$P = A \left[\frac{(1+i)^n - 1}{i(1+i)^n} \right]$$

$$R = \sqrt[12]{1.066} - 1 = 0.00534$$

$$A = 400$$

$$n = 36$$

$$P = 400 \left[\frac{(1.00534)^{36} - 1}{(0.00534)(1.00534)^{36}} \right]$$

$$= € 13,068.84 \quad \checkmark$$

4. Your local car dealer offers you two different payment plans to buy a €15 000 car.

Plan A: A 10% discount on the price of the car and a loan on the balance at an annual rate of 9% for 5 years.

Plan B: No discount but a loan for the total price €15 000 at an annual rate of 3% for 5 years.

Which plan should you opt for?

Plan A

$$10\% \text{ of } € 15\,000 = € 1\,500$$

$$\text{LOAN} = € 15\,000 - 1\,500 = € 13\,500$$

$$i = 9\%$$

$$A = \frac{P(i)(1+i)^n}{(1+i)^n - 1}$$

↑ Payment

↙ Loan

$$A = \frac{13500 (0.09)(1.09)^5}{(1.09)^5 - 1}$$

$$\text{Payments} = € 3470$$

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Which plan should you opt for?

Plan B

$$A = \frac{P(i)(1+i)^n}{(1+i)^n - 1}$$

$$A = \frac{15000(0.03)(1.03)^5}{(1.03)^5 - 1}$$
$$= € 3,275$$

Comment : Plan B is better value .