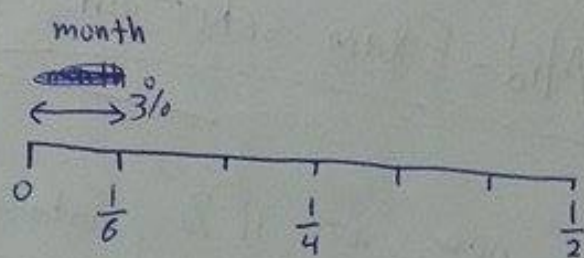


$$i = 3\% / \text{month}$$

$$i_{\text{semi}} = ?$$



nominal for quarter $\rightarrow i = 9\%$

nominal for semiannual $\rightarrow i = 18\%$

but we want the effective

$$i = \left(1 + \frac{0.03 \times 6}{6}\right)^6 - 1 = \underline{19.4\%} \quad \text{or} \quad i = \left(1 + \frac{0.18}{6}\right)^6 - 1 = \underline{19.4\%}$$

Question (3) :-

What is the annual nominal rate that achieves an effective interest rate of 15% by continuous compounding?

$$15\% = e^{rN} - 1$$

effective

$$e^{rN} = 1.15 \quad (N=1) \text{ for one year}$$

$$e^r = 1.15$$

$$r = \ln(1.15) = \underline{13.9\%}$$

Question (4):-

we have 5K to invest in a saving account, which of the following is the worse

(A) 12.7% per year compounded bimonthly

(B) ~~11.8% per year semiannually~~

(C) 12.3% effective per year

(D) 12.8% per year compounded monthly

(E) 11.8% per year compounded semiannually

(F) none of the above

invest $\rightarrow$ we want to get the highest

worse $\rightarrow$ the lowest value
answer is (E)

$$\left(1 + \frac{0.127}{6}\right)^6 - 1$$

$$\left(1 + \frac{0.118}{2}\right)^2 - 1$$

$$\left(1 + \frac{0.128}{12}\right)^{12} - 1$$

Question (5):-

a bicycle manufacturer has annual fixed costs of 2,000 and variable costs of 40 per bicycle, if the bicycle are sold for 90, what is the breakeven point

$$TR = PD = 90D$$

$$C_T = C_F + C_v = C_F + C_v D = 2000 + 40D$$

$$\text{breakeven point} \rightarrow TR = TC \rightarrow 90D = 2000 + 40D$$

$$\underline{D = 40}$$

Question (6):-

Costs for maintaining buildings over a 13 years period are expected to be 4.5k in year 1, increasing at the rate of 15% per year through year 13, at an interest rate of 15% per year, what is the present value of the _____ ?

geometric

$$F = i$$

$$P = A, N(P/F, i\%, 1) = 4.5K(13)(P/F, 15\%, 1) = 4.5K(13)(0.8696) = \underline{50,872 \$}$$

Question (7):-

what is the amount of interest earned on 900 for 8 years at 10.5%, simple interest per year ?

straight forward / $I = PN_i = (900)(8)(0.105) = \underline{756 \$}$

total payment = $P + I = 900 + 756 = \underline{1,656 \$}$
(if asked)

Question (8):-

you have borrowed 7.5k at interest rate of 10% and to be repaid in 4 equal payments, find the principal amount after the third year ?

Payment = -2,366 (A)

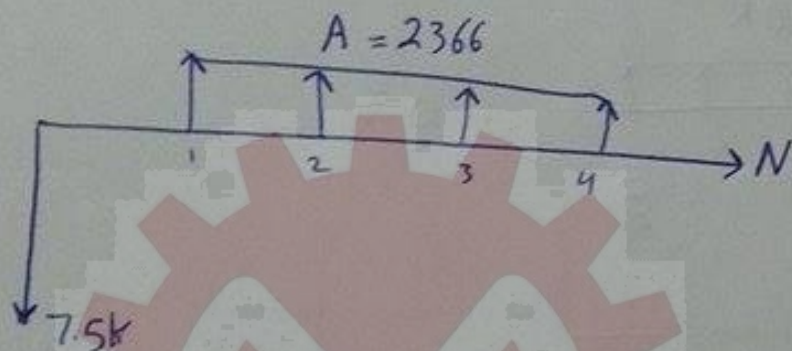
at the end of first year $\rightarrow 750$ (القسمة الأولى)

create a table $\rightarrow$ page (8)

Question (8) table

$$P = 7.5 \text{ k} \quad i = 10\% \quad N = 4 \quad (A = ?)$$

$$A = P(A/P, 10\%, 4) = 7.5 \text{ k} (0.3155) = \underline{\underline{2,366 \$}}$$



	Principal start of year	interest	Principal paid	Principal left
1	7,500	750	2,366	5,884
2	5,884	588.4	2,366	4106.4
3	4106.4	410.6	2,366	2151
4	2151	215.1	2,366	0

To find Principal left $\Rightarrow$ Principal left = $P_{\text{start of year}} + \text{interest} - P_{\text{paid}}$

Principal amount after the 3rd year = 2151 \$

Question (9):-

a loan offers a 5.25% rate per year compounded daily over 365 day per year, what is the effective annual rate?

$$i_{eff.} = \left(1 + \frac{0.0525}{365}\right)^{365} - 1 = \underline{\underline{5.39\%}}$$

Question (10):-

Credit card worst deal $\rightarrow$ the highest value

Question (11):-

if an investment 5 years ago has doubled, what is the annual interest per year?

Something X 2

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