General directions for students: whatever be the notes provided, everything must be copied in the Maths copy and then do the HOME WORK in the same copy.

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- **Amount = Principal + Interest**

$$\text{Simple Interest} = \frac{\text{Principal X Rate X Time}}{100}$$

FORMULAE FOR COMPOUND INTEREST

Let Amount = A, Principal = P, Rate of interest = r % p.a., no. of period = n years

When interest compounded yearly	When interest compounded half – yearly
$A = P(1 + \frac{r}{100})^n$	$A = P(1 + \frac{r/2}{100})^{2n}$

When interest compounded quarterly
$A = P(1 + \frac{r/4}{100})^{4n}$

Compound Interest = Amount – Principal

When the rates of interest for the successive fixed periods are r_1 %, r_2 %, r_3 %, ... , then
$A = P\left(1 + \frac{r_1}{100}\right)\left(1 + \frac{r_2}{100}\right)\left(1 + \frac{r_3}{100}\right)$ .....

EXERCISE – 8.3

2. Find the difference between the simple interest and compound interest on Rs. 4800 for 2 years at 5 % p.a. , compound interest being reckoned annually.

Solution: Here, P = Rs. 4800, r = 5 % p.a. n = 2 years(compounded annually)

$$\text{Simple Interest} = \frac{4800 \times 5 \times 2}{100} = \text{Rs. } 480$$

$$A = 4800\left(1 + \frac{5}{100}\right)^2 = 4800 \times \left(\frac{21}{20}\right)^2 = 4800 \times \frac{21}{20} \times \frac{21}{20} = \text{Rs. } 5292 \qquad \left[A = P\left(1 + \frac{r}{100}\right)^n\right]$$

$$\text{C.I.} = 5292 - 4800 = \text{Rs. } 492 \qquad [\text{Compound Interest} = \text{Amount} - \text{Principal}]$$

$$\text{Difference} = 492 - 480 = \text{Rs. } 12 \qquad \text{Ans.}$$

6. Mukesh borrowed Rs. 75000 from a bank. If the rate is 12 % p.a. , find the amount it would be paying after $1\frac{1}{2}$ years if the interest is

(i) compounded annually (ii) compounded half – yearly

Solution: Here, P = Rs. 75000, r = 12 % p.a. n = $1\frac{1}{2}$ years (compounded annually)

Amount for first year = $75000\left(1+\frac{12}{100}\right)^{1} = 75000 \times \frac{28}{25} = Rs.\ 84000$ $\left[A = P\left(1+\frac{r}{100}\right)^{n}\right]$

Principal for next half year = Rs. 84000

Interest for next half year = $\frac{84000 \times 12 \times 1}{100 \times 2} = Rs.\ 5040$

Amount at the end of $1\frac{1}{2}$ years = 84000 + 5040 = Rs. 89040 **Ans. (i)**

Here, P = Rs. 75000, r = 12 % p.a. n = $1\frac{1}{2}$ years (compounded half – yearly)

$\Rightarrow \frac{r}{2} = \frac{12}{2} = 6\ \%$, **2n (no. of conversion periods) = $2 * \frac{3}{2} = 3$**

$A = 75000(1+\frac{6}{100})^{3} = 75000\ (\frac{53}{50})^{3}$ $A = P(1+\frac{r/2}{100})^{2n}$

$= 75000 \times \frac{53}{50} \times \frac{53}{50} \times \frac{53}{50}$

$=$ **Rs. 89326.20** **Ans. (ii)**

13. Rs. 16000 invested at 10 % p.a. compounded semi – annually amounts to Rs. 18522. Find the time period of the investment.

Solution: Here, P = Rs. 16000, r = 10 % p.a. (compounded annually) A = Rs. 18522

$\Rightarrow \frac{r}{2} = \frac{10}{2} = 5\ \%$, **2n (no. of conversion periods)**

$18522 = 16000(1+\frac{5}{100})^{2n}$ $A = P(1+\frac{r/2}{100})^{2n}$

$\Rightarrow \quad \frac{18522}{16000} = \left(\frac{21}{20}\right)^{2n}$

$\Rightarrow \quad \left(\frac{21}{20}\right)^{3} = \left(\frac{21}{20}\right)^{2n}$

Comparing the exponents, $2n = 3 \Rightarrow n = \frac{3}{2} = 1\frac{1}{2}$ years **Ans.**

Check your progress

7. Find the amount and compound interest on Rs. 2500 in 2 years if the rates are 5 % and 6 % for successive years.

Solution: **Here,** **Principal** $= \text{Rs. } 2500$

Rate of interest for first year$(r_1) = 5\ \%$

Rate of interest for second year$(r_2) = 6\ \%$

$$A = 2500\left(1+\frac{5}{100}\right)\left(1+\frac{6}{100}\right) \qquad A = P\left(1+\frac{r_1}{100}\right)\left(1+\frac{r_2}{100}\right)$$

$$= 2500\left(\frac{21}{20}\right)\left(\frac{53}{50}\right) = \text{Rs. } 2782.50 \quad \text{Ans.}$$

$$CI = 2782.5 - 2500 = \text{Rs. } 282.50 \quad \text{Ans.}$$

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HOMEWORK **EXERCISE: 8.3**

QUESTION NUMBERS: 1 (i), (ii); 3, 5, 7, 10 and 12

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