



**Q6.** Arif took a loan of Rs.80,000 from a bank. If the rate of interest is 10% per annum, find the difference in amounts he would be paying after  $1\frac{1}{2}$  years if the interest is:

(i) compounded annually.

(ii) compounded half yearly.

**Ans. (i)** Here, Principal (P) = Rs. 80,000, Time ( $n$ ) =  $1\frac{1}{2}$  years, Rate of interest (R) = 10%

$$\text{Amount for 1 year (A)} = P \left(1 + \frac{R}{100}\right)^n$$

$$= 80000 \left(1 + \frac{10}{100}\right)^1$$

$$= 80000 \left(1 + \frac{1}{10}\right)^1$$

$$= 80000 \left(\frac{11}{10}\right)^1$$

$$= \text{Rs. } 88,000$$

$$\text{Interest for } \frac{1}{2} \text{ year} = \frac{88000 \times 10 \times 1}{100 \times 2}$$

$$= \text{Rs. } 4,400$$

$$\text{Total amount} = \text{Rs. } 88,000 + \text{Rs. } 4,400 = \text{Rs. } 92,400$$

**(ii)** Here, Principal (P) = Rs.80,000,

Time ( $n$ ) =  $1\frac{1}{2}$  year = 3 year (compounded half yearly)

Rate of interest (R) = 10% = 5% (compounded half yearly)

$$\text{Amount (A)} = P \left( 1 + \frac{R}{100} \right)^n$$

$$= 80000 \left( 1 + \frac{5}{100} \right)^3$$

$$= 80000 \left( 1 + \frac{1}{20} \right)^3$$

$$= 80000 \left( \frac{21}{20} \right)^3$$

$$= 80000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$$= \text{Rs. } 92,610$$

Difference in amounts

$$= \text{Rs. } 92,610 - \text{Rs. } 92,400 = \text{Rs. } 210$$

**Q7.** Maria invested Rs.8,000 in a business. She would be paid interest at 5% per annum compounded annually. Find:

(i) The amount credited against her name at the end of the second year.

(ii) The interest for the third year.

**Ans. (i)** Here, Principal (P) = Rs. 8000, Rate of

Interest (R) = 5%, Time ( $n$ ) = 2 years

$$\text{Amount (A)} = P \left( 1 + \frac{R}{100} \right)^n$$

$$= 8000 \left( 1 + \frac{5}{100} \right)^2$$

$$= 8000 \left( 1 + \frac{1}{20} \right)^2$$

$$= 8000 \left( \frac{21}{20} \right)^2$$

$$= 8000 \times \frac{21}{20} \times \frac{21}{20}$$

$$= \text{Rs. } 8,820$$

(ii) Here, Principal (P) = Rs. 8000, Rate of Interest (R) = 5%, Time ( $n$ ) = 3 years

$$\text{Amount (A)} = P \left( 1 + \frac{R}{100} \right)^n$$

$$= 8000 \left( 1 + \frac{5}{100} \right)^3$$

$$= 8000 \left( 1 + \frac{1}{20} \right)^3$$

$$= 8000 \left( \frac{21}{20} \right)^3$$

$$= 8000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$$= \text{Rs. } 9,261$$

$$\text{Interest for 3<sup>rd</sup> year} = A - P$$

$$= \text{Rs. } 9,261 - \text{Rs. } 8,820 = \text{Rs. } 441$$

**Q8.** Find the amount and the compound interest on Rs.10,000 for  $1\frac{1}{2}$  years at 10% per annum, compounded half yearly.

Would this interest be more than the interest he would get if it was compounded annually?

**Ans.** Here, Principal (P) = Rs. 10000, Rate of Interest (R) = 10% = 5% (compounded half yearly)

Time ( $n$ ) =  $1\frac{1}{2}$  years = 3 years (compounded half yearly)

$$\text{Amount (A)} = P \left( 1 + \frac{R}{100} \right)^n$$

$$= 10000 \left( 1 + \frac{5}{100} \right)^3$$

$$= 10000 \left( 1 + \frac{1}{20} \right)^3$$

$$= 10000 \left( \frac{21}{20} \right)^3$$

$$= 10000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$$= \text{Rs. } 11,576.25$$

$$\text{Compound Interest (C.I.)} = A - P$$

$$= \text{Rs. } 11,576.25 - \text{Rs. } 10,000 = \text{Rs. } 1,576.25$$

If it is compounded annually, then

Here, Principal (P) = Rs. 10000, Rate of Interest (R)

$$= 10\%, \text{ Time } (n) = 1\frac{1}{2} \text{ years}$$

$$\text{Amount (A) for 1 year} = P \left(1 + \frac{R}{100}\right)^n$$

$$= 10000 \left(1 + \frac{10}{100}\right)^1$$

$$= 10000 \left(1 + \frac{1}{10}\right)^1$$

$$= 10000 \left(\frac{11}{10}\right)^1$$

$$= 10000 \times \frac{11}{10}$$

$$= \text{Rs. } 11,000$$

$$\text{Interest for } \frac{1}{2} \text{ year} = \frac{11000 \times 1 \times 10}{2 \times 100} = \text{Rs. } 550$$

$$\therefore \text{Total amount} = \text{Rs. } 11,000 + \text{Rs. } 550$$

$$= \text{Rs. } 11,550$$

$$\text{Now, C.I.} = A - P = \text{Rs. } 11,550 - \text{Rs. } 10,000$$

$$= \text{Rs. } 1,550$$

Yes, interest Rs. 1,576.25 is more than Rs. 1,550.

**Q9.** Find the amount which Ram will get on Rs.4,096, if he gave it for 18 months at  $12\frac{1}{2}\%$  per annum, interest being compounded half yearly.

**Ans.** Here, Principal (P) = Rs. 4096,

$$\text{Rate of Interest (R)} = 12\frac{1}{2} = \frac{25}{2} \%$$

$$= \frac{25}{4} \% \text{ (compounded half yearly)}$$

$$\text{Time } (n) = 18 \text{ months} = 1\frac{1}{2} \text{ years} = 3 \text{ years}$$

(compounded half yearly)

Amount (A) =

$$P \left( 1 + \frac{R}{100} \right)^n$$

$$= 4096 \left( 1 + \frac{25}{4 \times 100} \right)^3$$

$$= 4096 \left( 1 + \frac{1}{4 \times 4} \right)^3$$

$$= 4096 \left( \frac{17}{16} \right)^3$$

$$= 4096 \times \frac{17}{16} \times \frac{17}{16} \times \frac{17}{16}$$

$$= \text{Rs. } 4,913$$

**Q10.** The population of a place increased to 54,000 in 2003 at a rate of 5% per annum.

(i) Find the population in 2001.

(ii) What would be its population in 2005?

**Ans. (i)** Here,  $A_{2003} = \text{Rs. } 54,000$ ,  $R = 5\%$ ,  $n = 2$  years

Population would be less in 2001 than 2003 in two years.

Here population is increasing.

$$\therefore A_{2003} = P_{2001} \left(1 + \frac{R}{100}\right)^n$$

$$\Rightarrow 54000 = P_{2001} \left(1 + \frac{5}{100}\right)^2$$

$$\Rightarrow 54000 = P_{2001} \left(1 + \frac{1}{20}\right)^2$$

$$\Rightarrow 54000 = P_{2001} \left(\frac{21}{20}\right)^2$$

$$\Rightarrow 54000 = P_{2001} \times \frac{21}{20} \times \frac{21}{20}$$

$$\Rightarrow P_{2001} = \frac{54000 \times 20 \times 20}{21 \times 21}$$

$$\Rightarrow P_{2001} = 48,980 \text{ (approx.)}$$

**(ii)** According to question, population is increasing.  
Therefore population in 2005,

$$A_{2005} = P \left(1 + \frac{R}{100}\right)^n$$

$$= 54000 \left(1 + \frac{5}{100}\right)^2$$

$$= 54000 \left(1 + \frac{1}{20}\right)^2$$

$$= 54000 \left(\frac{21}{20}\right)^2$$

$$= 54000 \times \frac{21}{20} \times \frac{21}{20}$$

$$= 59,535$$

Hence population in 2005 would be 59,535.

**Q11.** In a laboratory, the count of bacteria in a certain experiment was increasing at the rate of 2.5% per hour. Find the bacteria at the end of 2 hours if the count was initially 5,06,000.

**Ans.** Here, Principal (P) = 5,06,000, Rate of Interest

(R) = 2.5%, Time  $(n) = 2$  hours

After 2 hours, number of bacteria,

$$\text{Amount (A)} = P \left( 1 + \frac{R}{100} \right)^n$$

$$= 506000 \left( 1 + \frac{2.5}{100} \right)^2$$

$$= 506000 \left( 1 + \frac{25}{1000} \right)^2$$

$$= 506000 \left( 1 + \frac{1}{40} \right)^2$$

$$= 506000 \left( \frac{41}{40} \right)^2$$

$$= 506000 \times \frac{41}{40} \times \frac{41}{40}$$

$$= 5,31,616.25$$



Hence, number of bacteria after two hours are 531616 (approx.).

**Q12.** A scooter was bought at Rs. 42,000. Its value depreciated at the rate of 8% per annum. Find its value after one year.

**Ans.** Here, Principal (P) = Rs. 42,000, Rate of Interest (R) = 8%, Time ( $n$ ) = 1 years

$$\text{Amount (A)} = P \left(1 - \frac{R}{100}\right)^n$$

$$= 42000 \left(1 - \frac{8}{100}\right)^1$$

$$= 42000 \left(1 + \frac{2}{25}\right)^1$$

$$= 42000 \left(\frac{27}{25}\right)^1$$

$$= 42000 \times \frac{27}{25}$$

$$= \text{Rs. } 38,640$$

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