STEPPING STONE
SCHOOL (HIGH)

CLASS : VIII

Subject: Mathematics **Date:10/6/2020**

Topic: Compound Interest **Time Limit:40mins**

Worksheet No. :16

[Copy the questions and solve them on a sheet of paper date wise. Keep the worksheets ready in a file to be submitted on the opening day.]

EXAMPLE 7. *A certain sum amounts to ₹ 72900 in 2 years at 8% per annum compound interest compounded annually. Find the sum.*

Solution Let the sum be ₹ 100. Then,

$$\text{amount} = ₹\left\{100 \times \left(1 + \frac{8}{100}\right)^2\right\}$$

$$= ₹\left(100 \times \frac{27}{25} \times \frac{27}{25}\right) = ₹\left(\frac{2916}{25}\right).$$

If the amount is $₹ \frac{2916}{25}$ then the sum = ₹ 100.

If the amount is ₹ 72900 then the sum $= ₹\left(100 \times \frac{25}{2916} \times 72900\right) = ₹ 62500.$

Hence, the required sum is ₹ 62500.

EXAMPLE 8. *At what rate per cent per annum will a sum of* ₹ 6250 *amount to* ₹ 7840 *in* 2 *years, compounded annually?*

Solution Let the required rate be $R\%$ per annum.

Here, $A = ₹\ 7840$, $P = ₹\ 6250$ and $n = 2$ years.

Using the formula $A = P\left(1+\frac{R}{100}\right)^n$, we get

$$7840 = 6250\times\left(1+\frac{R}{100}\right)^2$$

$$\Rightarrow \left(1+\frac{R}{100}\right)^2 = \frac{7840}{6250} = \frac{784}{625} = \left(\frac{28}{25}\right)^2$$

$$\Rightarrow \left(1+\frac{R}{100}\right) = \frac{28}{25}$$

$$\Rightarrow \frac{R}{100} = \left(\frac{28}{25}-1\right) = \frac{3}{25}$$

$$\Rightarrow R = \left(\frac{3}{25}\times 100\right) = 12.$$

Hence, the required rate is 12% per annum.

EXAMPLE 9. *In what time will* ₹ 1000 *amount to* ₹ 1331 *at* 10% *per annum, compounded annually?*

Solution Let the required time be n years. Then,

$$\text{amount} = ₹\left\{1000\times\left(1+\frac{10}{100}\right)^n\right\} = ₹\left\{1000\times\left(\frac{11}{10}\right)^n\right\}.$$

$$\therefore\ 1000\times\left(\frac{11}{10}\right)^n = 1331 \quad [\because \text{amount} = ₹\ 1331\ (\text{given})]$$

$$\Rightarrow \left(\frac{11}{10}\right)^n = \frac{1331}{1000} = \frac{11\times11\times11}{10\times10\times10} = \left(\frac{11}{10}\right)^3$$

$$\Rightarrow \left(\frac{11}{10}\right)^n = \left(\frac{11}{10}\right)^3$$

$$\Rightarrow n = 3.$$

Thus, $n = 3$.

Hence, the required time is 3 years.

EXAMPLE 10. *The population of a town was* 176400 *in the year* 2009. *It increases at the rate of* 5% *per annum.*

(i) What would be its population in the year 2011?

(ii) What was its population in the year 2007?

Solution Population in the year 2009 = 176400.

Rate of increase = 5% per annum.

(i) Population in the year 2011 = population after 2 years

$$= \left\{176400 \times \left(1 + \frac{5}{100}\right)^2\right\}$$

$$= \left(176400 \times \frac{21}{20} \times \frac{21}{20}\right) = 194481.$$

Hence, the population of the town in 2011 would be 194481.

(ii) Let the population in the year 2007 be x. Then,

$$\text{population in 2009} = x\left(1 + \frac{5}{100}\right)^2$$

$$= \left(x \times \frac{21}{20} \times \frac{21}{20}\right) = \frac{441x}{400}.$$

$$\therefore \quad \frac{441x}{400} = 176400 \quad \Rightarrow \quad x = \left(176400 \times \frac{400}{441}\right) = 160000.$$

Hence, the population of the town in 2007 was 160000.

EXAMPLE 11. *In a certain experiment the count of bacteria was increasing at the rate of 2.5% per hour. Initially, the count was 512000. Find the bacteria at the end of 2 hours.*

Solution Bacteria at the end of 2 hours $= \left\{512000 \times \left(1 + \frac{5}{2 \times 100}\right)^2\right\}$

$$= \left(512000 \times \frac{41}{40} \times \frac{41}{40}\right) = 537920.$$

Hence, the bacteria at the end of 2 hours = 537920.

Note: For decrease (or depreciated value), we use the formula:

$$\textbf{Decreased value (or depreciated value)} = P\left(1 - \frac{R}{100}\right)^n.$$

EXAMPLE 12. *The population of a town 2 years ago was 62500. Due to migration to cities it decreases every year at the rate of 4% per annum. Find its present population.*

Solution Population 2 years ago = 62500.

Rate of decrease = 4% per annum.

$$\therefore \quad \text{present population} = 62500 \times \left(1 - \frac{4}{100}\right)^2$$

$$= \left(62500 \times \frac{24}{25} \times \frac{24}{25}\right) = 57600.$$

Hence, the present population of the town is 57600.

EXAMPLE 13. *A motorcycle is bought at ₹ 160000. Its value depreciates at the rate of 10% per annum. Find its value after (i) 1 year, (ii) 2 years.*

Solution (i) Value of the motorcycle after 1 year

$$= ₹\left\{160000 \times \left(1 - \frac{10}{100}\right)\right\}$$

$$= ₹\left(160000 \times \frac{9}{10}\right) = ₹\ 144000.$$

$\therefore$ value after 1 year = ₹ 144000.

(ii) Value of the motorcycle after 2 years

$$= ₹\left\{160000 \times \left(1 - \frac{10}{100}\right)^2\right\}$$

$$= ₹\left(160000 \times \frac{9}{10} \times \frac{9}{10}\right) = ₹\ 129600$$

$\therefore$ value after 2 years = ₹ 129600.

1) **Subhalaxmi took loan of Rs 18000 from surya finance to purchase a TV set. If the company charges compound intrest at 12% per annum during the first year and 12 ½% per annum during the second year, haw much will see have to pay after 2 years?**
2) **Neha borrowed Rs 24000 from the state bank of India to buy a scooter. If the rate of intrest be 10^ per annum compounded annually, what payment will se have to make after 2 years 3 months? Hint. 2 year 3 months= 21/4 years**
3) **The simple intrest of the sum of money for 2 years at 8% per annum is Rs 240. What will be the compound intrest on the sum at the same rate and for the same period?**
4) **The difference between the compound intrest and the simple intrest on a certain sum of 2 years 6%per annum is Rs 90. Find the sum.**
5) **The difference between the compound intrest and the simple intrest on a certain sum for 3 years 10% per annum is Rs 93. Find the sum**
6) **A sun of money amounts to Rs 10240 for 2 years at 6 2/3% per annum, compounded annually. Find the sum.**
7) **What sum of money will amount to Rs 21296 i 3 years at 10%per annum, compounded annually?**
8) **At what rate per cent annum will Rs 4000 amount to Rs 4410 in 2 years when compounded annualy?**