Chapter 8. Comparing Quantities

Question 1

Convert the following ratios into percentage
a) 5:4
b) 3:5

Solution:

a) 5:4

$$\frac{5}{4} \times \frac{25}{25} = \frac{125}{100} = 125\%$$

b) 3:5

$$\frac{3}{5} \times \frac{20}{20} = \frac{60}{100} = 60\%$$

Question 2

The marked price of a ceilling fan is Rs. 1250 and the shopkeeper allows a discount of 6% on it. Find selling price of a fan.

Solution:

Marked price = Rs. 1250

Discount = 6% of MP

$$= Rs. \; 1250 \times \frac{6}{100} = Rs.75$$

SP = MP - Discount

= Rs. 1250 - 75 = Rs. 1175.

Question 3

Sahana sells two watches for Rs. 1955 each gaining 15% on one and losing 15% on the other. Find her gain or loss percent in the whole transaction.

Solution:

CP = Rs. 1955. Gain = 15%

$$SP = 1955 \times \frac{115}{100} = Rs. \, 2248.25$$

CP = Rs. 1955

$$SP = 1955 \times \frac{85}{100} = Rs. \, 1661.75$$

CP = Rs. 1955 + Rs. 1955 = Rs. 3910

SP = Rs. 2248.25 + Rs. 1661.75 = 3910

CP > SP Loss of Rs(3990 - 3910) = Rs. 80 = 2%

Loss percent = 2%.

Question 4

By selling a T-shirt Rs. 216, a shopkeeper, loss 4%. What will be the actual price of a T-shirt?

Solution:

CP = 216, loss = 4%

$$\textbf{loss} = 216 \times \frac{4}{100} = Rs. 8.64$$

Actual cost to a T-shirt = Rs. 216 + Rs. 8.64

= Rs. 224.64.

Question 5

Mohan bought a CD for Rs. 750 and sold it for Rs. 875. Find his gain percent?

Solution:

CP = 750. SP = Rs. 875

Since, SP > CP Mohan makes a gain.

Gain = Rs(875 - 750) = Rs. 125

$$gain \, \% = \left(\frac{125}{750} \times 100 \right) \% = 16\frac{2}{3}\%$$

Question 6

Ravi purchased a table for Rs. 1260 and due to some scratches on its top, he had to sell it for Rs. 1197. Find his loss %.

Solution:

CP = Rs. 1260, SP = Rs. 1197

SP < CP, Ravi makes a loss.

The loss = Rs(1260 - 1197) = Rs. 63.

$$\text{Loss\%} = \left(\frac{63}{1260} \times 100\right)\% = 5\%$$

Question 7

Ravi purchased an old scooter for Rs. 12000 and spent Rs. 2850 on its overhanling. Then he sold it to his friend for Rs. 13860. How much percent did he gain or loss?

Solution:

Purchase price = Rs. 12000, overheads = Rs. 2850

Total cost price = Rs(12000 + 2850) = 14850

SP = Rs. 13860

loss = Rs(14850 - 13860) = Rs. 990

$$\text{Loss\%} = \left(\frac{990}{14850} \times 100\right)\% = 6\frac{2}{3}\%$$

Question 8

Find the compound interest on Rs. 25000 for 3 years at 6% per annum compounded annually.

Solution:

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

$$A = Rs.\ 25000\left(1 + \frac{6}{100}\right)^3 = Rs.25000 \times \left(\frac{106}{100}\right)^3$$

$$= 25000 \times \frac{53}{50} \times \frac{53}{50} \times \frac{53}{50} = 29775.40$$

$$CI = A - P = Rs.4775.40$$

Question 9

Find the amount and the compound interest on Rs. 2500 for 2 years at 10% per annum compounded annually.

Solution:

P = Rs. 2500

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

Amount = $Rs.2500 \times \left(1 + \frac{10}{100}\right)^2$

$= 2500 \times \left(\frac{110}{100}\right)^2 = 2500 \times \frac{11}{10} \times \frac{11}{10}$

$= Rs.3025$

C.I = A - P = Rs. 3025 - 2500 = Rs. 525.

Question 10

Find the compound interest on Rs. 5000 for 1 year at 8% per annum compounded half-yearly.

Solution:

Interest for half year = 4%, n = 1 year = 2 half years

$$= Rs.5000 \times \left(1 + \frac{4}{100}\right)^2$$

$$= 5000 \times \frac{104}{100} \times \frac{104}{100} = Rs.5408$$

CI = A - P = 5408 - 5000 = Rs. 408.

Question 11

Find the amount and the interest on Rs. 16000 for 3 years at 5% per annum compounded annually.

Solution:

$$Amount = 16000 \times \left(1 + \frac{5}{100}\right)^3$$

$$= 16000 \times \left(\frac{105}{100}\right)^3 = 16000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$Amount = 18522$

$C.I = A - P = Rs.2522$

Question 12

A sum of money amounts to Rs. 11910.16 in $1\frac{1}{2}$ years at 12% per annum interest being compounded semi annually. Find the sum.

Solution:

A = 11910.16

Rate of interest $= \dfrac{12}{2} = 6\%, n = 3$

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

$$P\left(1 + \frac{6}{100}\right)^3 = 11910.16$$

$$P\left(1 + \frac{3}{50}\right)^3 = 11910.16$$

$$P \times \frac{53}{50} \times \frac{53}{50} \times \frac{53}{50} = 11910.16$$

$$P = 11910.16 \times \frac{50}{53} \times \frac{50}{53} \times \frac{50}{53}$$

$$= \frac{4.24 \times 125000}{53} = \frac{530000}{53} = Rs.\,10000$$

Question 13

The population of a village is 50000. It increases by 5% every year. Find the population at the end of 2 years.

Solution:

P = 50,000, r = 5%, n = 2

$$A = P\left(1 + \frac{r}{100}\right)^n = 50000\left(1 + \frac{5}{100}\right)^2$$

$$= 50000 \times \frac{21}{20} \times \frac{21}{20}$$

After 2 years the population is = 55125.

Question 14

The population of a city increases by 4% of what it had been at the beginning of each year. If the population in 1997 had been 6760000, find the population of the city in (i) 1999 (ii) 1995.

Solution:

(i) Population in 1999 $= 6760000 \times \left(1 + \dfrac{4}{100}\right)^2$

$$= 6760000 \times \left(1 + \dfrac{1}{25}\right)^2$$

$$= 6760000 \times \dfrac{26}{25} \times \dfrac{26}{25} = 7311616$$

(ii) For $n = 1997 - 1995 = 2$ years

$$P\left(1 + \dfrac{r}{100}\right)^n = 6760000$$

$$P\left(1 + \dfrac{4}{100}\right)^2 = 6760000$$

$$P\left(\dfrac{26}{25}\right)^2 = 6760000$$

$$P = 6760000 \times \left(\dfrac{25}{26}\right)^2$$

$$= 6760000 \times \dfrac{625}{676} = 6250000$$

Question 15

Find the compound interest on Rs. 6400 for 2 years compounded annually at $7\dfrac{1}{2}$% per annum.

Solution:

$$A = Rs.\ 6400 \times \left(1 + \dfrac{15}{200}\right)^2 = 6400\left(\dfrac{215}{200}\right)^2$$

$$= 6400 \times \dfrac{43}{40} \times \dfrac{43}{40} = Rs.7396$$

$$C.I. = A.P = 7396 - 6400 = Rs.996$$

Question 16

Find the compound interest on Rs. 15625 for $1\frac{1}{2}$ years at 8% per annum when compounded half-yearly.

Solution:

4% per half year time $= 1\frac{1}{2}$ year $= 3$ half $-$ year

$$A = 15625 \times \left(1 + \frac{4}{100}\right)^3$$

$$= 15625 \times \frac{26}{25} \times \frac{26}{25} \times \frac{26}{25} = Rs.17576$$

$CI = 17576 - 15625 = Rs.1951$

Question 17

Find the compound interest on Rs. 160000 for 2 years at 10% per annum when compounded semi-annually.

Solution:

Rate = 10% per annum = 5% per half-year

Time = 2 years = 4 half-years

$$A = 160000 \times \left(1 + \frac{5}{100}\right)^4 = 160000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$$= Rs.194481$$

$CI = A - P = 194481 - 160000 = Rs.34481$

Question 18

Find the compound interest on Rs. 125000 for 9 months at 8% per annum compounded quarterly.

Solution:

9 months = 3 quaterly

$$A = 125000 \times \left(1 + \frac{2}{100}\right)^3$$

$$= 125000 \times \frac{51}{50} \times \frac{51}{50} \times \frac{51}{50} = Rs.132651$$

$C.I = A - P = Rs.132651 - 125000 = Rs.7651$

Question 19

The population of a town 2 years ago was 62500. Since some persons migrate to different cities the number of people decreases every year at the rate of 4% per annum. Find its present population.

Solution:

$$\text{Present population} = 62500 \times \left(1 - \frac{4}{100}\right)^2$$
$$= 62500 \times \frac{24}{25} \times \frac{24}{25} = 57600$$

Question 20

The present population of a town is 12500 and it is increasing at the rate of 8% per annum. What will be the population of the town after 2 years?

Solution:

$$\text{Population after 2 years} = 12500 \times \left(1 + \frac{8}{100}\right)^2$$
$$= 12500 \times \left(\frac{108}{100}\right)^2$$
$$= 12500 \times \frac{27}{25} \times \frac{27}{25}$$
$$= 14580$$