

EXERCISE 10.1

1. (i) $75\% = \frac{75}{100} = \frac{3}{4}$

(ii) $0.25\% = \frac{0.25}{100} = \frac{25}{100} \times \frac{1}{100} = \frac{1}{400}$

(iii) $\frac{15}{2}\% = \frac{15}{2 \times 100} = \frac{3}{40}$

(iv) $140\% = \frac{140}{100} = \frac{7}{5}$

(v) $0.55\% = \frac{0.55}{100} = \frac{55}{10000} = \frac{11}{2000}$

2. (i) $12\% = \frac{12}{100} = \frac{3}{25} = 3 : 25$

(ii) $0.25\% = \frac{0.25}{100} = \frac{25}{100 \times 100} = \frac{1}{400} = 1 : 400$

(iii) $25\% = \frac{25}{100} = \frac{1}{4} = 1 : 4$

(iv) $26\% = \frac{26}{100} = \frac{13}{50} = 13 : 50$

(v) $13\frac{1}{3}\% = \frac{40}{3}\% = \frac{40}{3} \times \frac{1}{100} = \frac{2}{15} = 2 : 15$

3. (i) $125\% = \frac{125}{100} = 1.25$

(ii) $45\% = \frac{45}{100} = 0.45$

(iii) $2.5\% = \frac{2.5}{100} = 0.025$

(iv) $\frac{1}{4}\% = \frac{1}{4 \times 100} = \frac{1}{400} = \frac{1 \times 25}{400 \times 25} = \frac{25}{10000}$
 $= 0.0025$

(v) $6\frac{1}{4}\% = \frac{25}{4}\% = \frac{25}{4 \times 100}$
 $= \frac{25 \times 25}{400 \times 25} = \frac{625}{10000} = 0.0625$

4. (i) $70\% \text{ of } ₹500 = ₹\left(\frac{70}{100} \times 500\right) = ₹350$

(ii) $0.25\% \text{ of } 96 = \frac{0.25}{100} \times 96 = \frac{25 \times 96}{100 \times 100} = \frac{6}{25}$

(iii) $12\% \text{ of } 800 = \frac{12}{100} \times 800 = 96$

(iv) $6\frac{2}{3}\% \text{ of } 87 = \frac{20}{3}\% \text{ of } 87 = \frac{20^1}{1 \cancel{0} \times 100^1_5} \times \cancel{87}^{29}$
 $= \frac{29}{5} = 5\frac{4}{5}$

(v) $7.5\% \text{ of } 60 \text{ kg} = \frac{7.5}{100} \times 60 \text{ kg} = \left(\frac{75}{10 \times 100} \times 60\right) \text{ kg}$
 $= 4\frac{1}{2} \text{ kg}$

(vi) $9\% \text{ of } 6 \text{ litres} = \left(\frac{9}{100} \times 6\right) \text{ litres} = \frac{27}{50} \text{ litre.}$

5. (i) $x\% \text{ of } 125 \text{ is } 8.$

$$\Rightarrow \frac{x}{100} \times 125 = 8$$

$$\Rightarrow x = \frac{8 \times 100}{125} = \frac{32}{5} = 6\frac{2}{5}$$

Hence, the value of x is $6\frac{2}{5}$.

(ii) $x\% \text{ of } 1 \text{ kg is } 50 \text{ g.}$

$$\Rightarrow \frac{x}{100} \times 1 \text{ kg} = 50 \text{ g}$$

$$\Rightarrow \frac{x}{100} \times 1000 \text{ g} = 50 \text{ g} \quad (1 \text{ kg} = 1000 \text{ g})$$

$$\Rightarrow x = \frac{50 \times 100}{1000} = 5$$

Hence, the value of x is 5 .

(iii) $x\% \text{ of } 15200 \text{ is } 1824.$

$$\Rightarrow \frac{x}{100} \times 15200 = 1824$$

$$\Rightarrow x = \frac{1824 \times 100}{15200}$$

$$\Rightarrow x = 12$$

Hence, the value of x is 12 .

(iv) $x\%$ of 110 is 11.

$$\Rightarrow \frac{x}{100} \times 110 = 11$$

$$\Rightarrow x = \frac{11 \times 100}{110}$$

$$\Rightarrow x = 10.$$

Hence the value of x is 10.

(v) $x\%$ of ₹320 is ₹272.

$$\Rightarrow \frac{x}{100} \times ₹320 = ₹272$$

$$\Rightarrow x = \frac{272 \times 100}{320}$$

$$\Rightarrow x = 85$$

Hence, the value of x is 85.

$$6. \left(\frac{3}{4} \times 100\right)\% = (3 \times 25)\% = 75\%$$

$$7. (i) 0.65 = \frac{65}{100} \times 100\% = 65\%$$

$$(ii) 0.07 = \frac{7}{100} \times 100\% = 7\%$$

$$(iii) 0.3 = \frac{3}{10} \times 100\% = 30\%$$

8. (i) Let $x\%$ of 5 kg be 50 g.

$$\text{Then, } \frac{x}{100} \times 5 \text{ kg} = 50 \text{ g}$$

$$\Rightarrow \frac{x}{100} \times 5000 \text{ g} = 50 \text{ g}$$

$$\Rightarrow x = \frac{50 \times 100}{5000}$$

$$\Rightarrow x = 1$$

Hence, 1% of 5 kg is 50 g.

(ii) Let $x\%$ of 8.5 m is 17 m.

$$\text{Then, } \frac{x}{100} \times 8.5 \text{ m} = 17 \text{ m}$$

$$\Rightarrow x = \frac{17 \times 100}{8.5}$$

$$\Rightarrow x = 200$$

Hence, 200% of 8.5 m is 17 m.

9. Let $x\%$ of 2 days be 8 hours. Then,

$$\frac{x}{100} \times 2 \text{ days} = 8 \text{ hours}$$

$$\frac{x}{100} \times 48 \text{ hours} = 8 \text{ hours} \quad (\because 1 \text{ day} = 24 \text{ hours})$$

$$\Rightarrow x = \frac{8 \times 100}{48}$$

$$\Rightarrow x = \frac{50}{3} = 16\frac{2}{3}$$

Hence, $16\frac{2}{3}\%$ of 2 days is 8 hours.

$$\begin{aligned} 10. 15\% \text{ of ₹}75 &= ₹\left(\frac{15}{100} \times 75\right) \\ &= ₹\left(\frac{15 \times 75}{100}\right) = ₹\left(\frac{15 \times 3}{4}\right) = ₹\frac{45}{4} \\ &= ₹11.25 \end{aligned}$$

Hence, 15% less than ₹75 = ₹75 - ₹11.25
= ₹63.75.

$$11. 20\% \text{ of ₹}90 = ₹\left(\frac{20}{100} \times 90\right) = ₹18$$

Hence, 20% more than ₹90 = ₹90 + ₹18
= ₹108.

$$12. (i) 12\frac{1}{2}\% \text{ of } x = 600$$

$$\Rightarrow \frac{25}{2}\% \text{ of } x = 600$$

$$\Rightarrow \frac{25}{2 \times 100} \times x = 600$$

$$\Rightarrow x = \frac{600 \times 200}{25}$$

$$\Rightarrow x = 4800$$

Hence, the value of x is 4800.

$$(ii) 3.7\% \text{ of } x = 74$$

$$\Rightarrow \frac{3.7}{100} \text{ of } x = 74$$

$$\Rightarrow \frac{37}{10 \times 100} \times x = 74$$

$$\Rightarrow x = \frac{74 \times 1000}{37} = 2000$$

Hence, the value of x is 2000.

$$13. 6\% \text{ of } x = 84$$

$$\Rightarrow \frac{6}{100} \times x = 84$$

$$\Rightarrow x = \frac{84 \times 100}{6}$$

$$\Rightarrow x = 1400$$

Hence, the value of x is 1400.

$$14. \text{ Let the required number be } x.$$

Then,

$$40\% \text{ of } x = 8$$

$$\Rightarrow \frac{40}{100} \times x = 8$$

$$\Rightarrow x = \frac{8 \times 100}{40}$$

$$\Rightarrow x = 20$$

Hence, the number is 20.

15. Let the distance be x km. Then

$$3\frac{1}{3}\% \text{ of } x \text{ km} = 3 \text{ km}$$

$$\Rightarrow \frac{10}{3}\% \text{ of } x \text{ km} = 3 \text{ km}$$

$$\Rightarrow \frac{10}{3 \times 100} \times x = 3$$

$$\Rightarrow x = \frac{3 \times 3 \times 100}{10}$$

$$\Rightarrow x = 90$$

Hence, the distance is 90 km.

16. Let the money be ₹ x . Then

$$13\% \text{ of } ₹x = ₹156$$

$$\Rightarrow \frac{13}{100} \times ₹x = ₹156$$

$$\Rightarrow x = \left(\frac{156 \times 100}{13} \right)$$

$$\Rightarrow x = (12 \times 100)$$

$$\Rightarrow x = 1200$$

Hence, the money is ₹1200.

EXERCISE 10.2

1. Total number of cycle parts = 124

$$\text{Number of defective parts} = 8$$

$$\text{Percentage of defective parts} = \frac{8}{124} \times 100\%$$

$$= \frac{200}{31}\% = 6.45\%$$

Hence, there are 6.45% defective parts of cycle.

2. Total number of voters = 150

$$\text{Number of voters who did not cast their votes} = 9$$

$$\text{Percentage of voters who did not cast their votes}$$

$$= \frac{9}{150} \times 100\% \\ = 6\%$$

Hence, 6% of voters did not cast their votes.

3. Total number of students in the class = 40

$$\text{Number of absent students} = 8$$

$$\text{Number of present students} = 40 - 8 = 32$$

$$\text{Percentage of present students} = \frac{32}{40} \times 100 = 80\%$$

Hence, 80% students were present in the class.

4. Let population of a town be x .

Increase in population every year = 10.5% of x .

$$= \frac{10.5}{100} \times x$$

$$= \frac{105}{1000} \times x = \frac{21x}{200}$$

$$\text{Increased population} = x + \frac{21x}{200} = \frac{221x}{200}$$

Therefore,

$$\frac{221x}{200} = 795600$$

$$\Rightarrow x = \frac{795600 \times 200}{221}$$

$$\Rightarrow x = 72000$$

Hence, before a year the population of the town is 72000.

5. Let the maximum marks be x .

Then, passing marks = 36% of maximum marks

$$= \frac{36}{100} \times x$$

$$= \frac{36x}{100}$$

∴ He scores 109 marks and fails by 35 marks.

As per question,

$$\frac{36x}{100} = 109 + 35$$

$$\Rightarrow \frac{36x}{100} = 144$$

$$\Rightarrow x = \frac{144 \times 100}{36}$$

$$\Rightarrow x = 400$$

Hence, the maximum marks is 400.

6. Let the original price of the book be ₹ x .

Then, increase in price = 12% of ₹ x

$$= ₹ \frac{12}{100} \times x$$

$$= ₹ \frac{12x}{100}$$

$$\text{Increased price} = ₹ \left(x + \frac{12x}{100} \right) = ₹ \frac{112x}{100}$$

As per question,

$$\frac{112x}{100} = ₹145.60$$

$$\Rightarrow x = \left(\frac{145.60 \times 100}{112} \right)$$

$$\Rightarrow x = \left(\frac{14560}{112} \right)$$

$$\Rightarrow x = 130$$

Hence, the original price of the book is ₹130.

7. Let the original salary be ₹ x .

Increase in salary = 20% of ₹ x

$$= ₹ \left(\frac{20}{100} \times x \right)$$

$$= ₹ \frac{20x}{100}$$

$$\text{Increased salary} = ₹ \left(x + \frac{20x}{100} \right) = ₹ \frac{120x}{100}$$

Reduction in salary to restore the original salary

$$= ₹ \left(\frac{120x}{100} - x \right) = ₹ \frac{20x}{100}$$

Percentage of reduction

$$= \frac{₹ \frac{20x}{100}}{₹ \frac{120x}{100}} \times 100$$

$$= \frac{20}{120} \times 100\%$$

$$= \frac{100}{6}\% = \frac{50}{3}\%$$

$$= 16 \frac{2}{3}\%$$

Hence, the new salary should be reduced by $16 \frac{2}{3}\%$ to restore the original salary.

8. Let the total monthly income be ₹ x .

Spent on house rent = 20% of ₹ x

$$= \frac{20}{100} \times ₹x$$

$$= ₹ \frac{20x}{100} = ₹ \frac{x}{5}$$

$$\text{Remainder} = ₹ \left(x - \frac{x}{5} \right) = ₹ \frac{4x}{5}$$

Household expenses = 60% of ₹ $\frac{4x}{5}$

$$= ₹ \left(\frac{60}{100} \times \frac{4x}{5} \right) = ₹ \frac{12x}{25}$$

Now,

$$\text{Saving} = ₹ \left(\frac{4x}{5} - \frac{12x}{25} \right)$$

$$= ₹ \left(\frac{20x - 12x}{25} \right) = ₹ \frac{8x}{25}$$

∴ Saving = ₹2520

$$\Rightarrow ₹ \left(\frac{8x}{25} \right) = ₹2520$$

$$\Rightarrow \frac{8x}{25} = 2520$$

$$\Rightarrow x = \left(\frac{2520 \times 25}{8} \right)$$

$$x = 7875$$

Hence, total monthly income is ₹7875.

9. Out of 500, marks obtained by Anil = 375

$$\text{Out of 1, mark obtained by Anil} = \frac{375}{500}$$

$$\text{Out of 100, marks obtained by Anil} = \frac{375}{500} \times 100 = 75\%$$

Out of 600, marks obtained by Sunil = 420

$$\text{Out of 1, mark obtained by Sunil} = \frac{420}{600}$$

$$\text{Out of 100, marks obtained by Sunil} = \frac{420}{600} \times 100 = 70\%$$

Anil secured 75% marks and Sunil secured 70% marks.

Hence, Anil's performance is better than Sunil.

10. Total number of students = 1800

Number of girls = 40% of 1800

$$= \frac{40}{100} \times 1800$$

$$= 40 \times 18$$

$$= 720$$

Thus, the number of boys = 1800 - 720

$$= 1080$$

Hence, there are 1080 boys in the school.

11. Percentage marks = $\frac{45}{75} \times 100\%$

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

Hence, Mohnish obtained 60% marks in Mathematics.

12. Total income = ₹25000

Expenditure = ₹16500

Saving = ₹25000 - ₹16500 = ₹8500

$$\text{Percentage of saving} = \frac{₹8500}{₹25000} \times 100$$

$$= \frac{8500}{25000} \times 100\%$$

$$= \frac{850}{25}\% = 34\%$$

Hence, he saves 34% of his income.

13. Let the number be 100.

Increase in the number = 10%

$$\begin{aligned} \text{Increased number} &= 100 + \left(\frac{10}{100} \times 100\right) \\ &= 100 + 10 \\ &= 110 \end{aligned}$$

Now, decrease = 10% of 110

$$\begin{aligned} &= \frac{10}{100} \times 110 \\ &= 11 \end{aligned}$$

New number = 110 - 11 = 99

∴ The number is decreased.

Net decrease = 100 - 99 = 1

$$\text{Net decreased per cent} = \left(\frac{1}{100} \times 100\right)\% = 1\%$$

$$\left[\because \text{Percentage decrease} = \left(\frac{\text{decrease}}{\text{original value}} \times 100\right)\% \right]$$

14. Let the original price of a shirt be ₹x.

Reduce in price = 15% of ₹x

$$\begin{aligned} &= ₹\left(\frac{15}{100} \times x\right) \\ &= ₹\left(\frac{3x}{20}\right) \end{aligned}$$

According to question,

$$₹x - ₹\left(\frac{3x}{20}\right) = ₹123.25$$

$$\Rightarrow \frac{20x - 3x}{20} = 123.25$$

$$\Rightarrow \frac{17x}{20} = 123.25$$

$$\Rightarrow x = \frac{123.25 \times 20}{17}$$

$$\Rightarrow x = 145$$

Hence, the original price of a shirt is ₹145.

15. Let the price of sugar be ₹100 per kg.

Increase in price = 20%

Increased price = ₹100 + 20% of ₹100 = ₹120

In ₹120, she gets 1 kg of sugar.

In ₹1, she gets $\frac{1}{120}$ kg of sugar

In ₹100, she will get = $\frac{100}{120}$ kg = $\frac{5}{6}$ kg of sugar

Reduction in consumption = 1 kg - $\frac{5}{6}$ kg = $\frac{1}{6}$ kg

$$\begin{aligned} \text{Percentage reduction} &= \frac{1}{6} \times 100\% \\ &= \frac{100}{6}\% = \frac{50}{3}\% = 16\frac{2}{3}\%. \end{aligned}$$

Therefore, she must decrease her consumption by $16\frac{2}{3}\%$ so as not to increase her expenditure on it.

16. Let B's income be ₹100

$$\begin{aligned} \therefore \text{A's income} &= ₹100 + 20\% \text{ of } ₹100 \\ &= ₹100 + ₹20 = ₹120 \end{aligned}$$

Difference in salary = ₹120 - ₹100 = ₹20

$$\begin{aligned} \text{Required Percentage} &= \frac{20}{120} \times 100\% \\ &= \frac{100}{6}\% = 16\frac{2}{3}\% \end{aligned}$$

Hence, B's income is $16\frac{2}{3}\%$ less than that of A.

17. Let the total value of the land be ₹x.

$$\begin{aligned} \text{Commission on sale of the land} &= 6\% \text{ of } ₹x = \frac{6}{100} \times ₹x \\ &= ₹\frac{6x}{100} \end{aligned}$$

$$\Rightarrow ₹\left(\frac{6x}{100}\right) = ₹5688$$

$$\begin{aligned} \Rightarrow x &= \frac{5688 \times 100}{6} \\ x &= 94800 \end{aligned}$$

Hence, the total value of land is ₹94800.

18. Let the total amount of ore be 100 kg.

Quantity of copper = 18% of 100 kg

$$\begin{aligned} &= \left(\frac{18}{100} \times 100\right) \text{ kg} \\ &= 18 \text{ kg} \end{aligned}$$

Now,

If copper is 18 kg, then ore = 100 kg

$$\therefore \text{If copper is 1 kg, then ore} = \frac{100}{18} \text{ kg}$$

$$\begin{aligned} \therefore \text{If copper is 63 kg, then ore} &= \frac{100^{50}}{18^7} \times 63^7 \\ &= 50 \times 7 \\ &= 350 \text{ kg} \end{aligned}$$

Hence, 350 kg of ore contained 63 kg of copper.

19. Original value of car = ₹3,45,000
 Decrease in value for first year = 20% of ₹3,45,000

$$= ₹ \left(\frac{20}{100} \times 3,45,000 \right)$$

$$= ₹69,000$$

The value of car for next year = ₹(3,45,000 – 69,000)

$$= ₹2,76,000$$

Now, decrease in value of car for second year

$$= 20 \% \text{ of } ₹2,76,000$$

$$= ₹ \left(\frac{20}{100} \times 2,76,000 \right)$$

$$= ₹55,200$$

Hence, the value of car after 2 years

$$= ₹(2,76,000 – 55,200)$$

$$= ₹2,20,800.$$

EXERCISE 10.3

1. C.P. of a chair = ₹700

S.P. of a chair = ₹570

Since, S.P. < C.P.

$$\therefore \text{Loss} = \text{C.P.} - \text{S.P.}$$

$$= ₹700 - ₹570$$

$$= ₹130$$

$$\text{Now, loss per cent} = \left(\frac{\text{Loss}}{\text{C.P.}} \times 100 \right) \%$$

$$= \left(\frac{130}{700} \times 100 \right) \%$$

$$= \frac{130}{7} \% = 18\frac{4}{7} \%$$

Hence, loss per cent is $18\frac{4}{7} \%$.

2. C.P. of a sewing machine = ₹1250

Overhead expenses = ₹250

Effective cost price = ₹(1250 + 250) = ₹1500

S.P. of sewing machine = ₹1600

\therefore S.P. > C.P.

$$\therefore \text{Profit} = \text{S.P.} - \text{C.P.}$$

$$= ₹1600 - ₹1500$$

$$= ₹100$$

$$\text{Profit per cent} = \left(\frac{\text{Profit}}{\text{C.P.}} \times 100 \right) \%$$

$$= \left(\frac{100}{1500} \times 100 \right) \%$$

$$= \frac{100}{15} \% = \frac{20}{3} \%$$

$$= 6\frac{2}{3} \%$$

Hence, profit per cent is $6\frac{2}{3} \%$.

3. Let the cost price of each article be ₹x.

S.P. of 12 articles = C.P. of 16 articles = ₹16x

C.P. of 12 articles = 12x

Since, S.P. > C.P.

$$\therefore \text{Gain} = \text{S.P.} - \text{C.P.}$$

$$= ₹(16x - 12x)$$

$$= ₹4x$$

$$\text{Gain per cent} = \left(\frac{\text{Gain}}{\text{C.P.}} \times 100 \right) \%$$

$$= \left(\frac{4x}{12x} \times 100 \right) \%$$

$$= \frac{100}{3} \%$$

$$= 33\frac{1}{3} \%$$

Hence, gain is $33\frac{1}{3} \%$.

4. Let the C.P. of each pencil be ₹x.

Then,

S.P. of 10 pencils = C.P. of 12 pencils = ₹12x

C.P. of 10 pencils = ₹10x

Since, S.P. > C.P.

$$\therefore \text{Profit} = \text{S.P.} - \text{C.P.}$$

$$= ₹(12x - 10x)$$

$$= ₹2x$$

$$\text{Profit per cent} = \left(\frac{\text{Profit}}{\text{C.P.}} \times 100 \right) \%$$

$$= \left(\frac{2x}{10x} \times 100 \right) \%$$

$$= 20 \%$$

Hence, profit per cent is 20%.

5. Let the cost price be ₹100.

If it is sold at a loss of 5%,

then, S.P. = ₹(100 – 5) = ₹95

If it is sold at a profit of 7%.

Then, S.P. = ₹(100 + 7) = ₹107

Increase in actual gain = ₹(107 – 95) = ₹12

If gain is ₹12, then C.P. = ₹100

If gain is ₹1, then C.P. = ₹ $\frac{100}{12}$

If gain is ₹27, then C.P. = ₹ $\left(\frac{100}{12} \times 27\right)$
= ₹225

Hence, the C.P. of watch is ₹225.

6. C.P. of an article = ₹1960

$$\text{Profit per cent} = \left(\frac{\text{Profit}}{\text{C.P.}} \times 100\right)\%$$

$$10 = \frac{\text{Profit}}{1960} \times 100$$

$$\Rightarrow \text{Profit} = \frac{1960 \times 10}{100}$$

$$\Rightarrow \text{Profit} = ₹196$$

Thus, S.P. = C.P. + Profit = ₹1960 + ₹196 = ₹2156.

7. C.P. of a table = ₹1250.

$$\text{Loss}\% = \left(\frac{\text{Loss}}{\text{C.P.}} \times 100\right)\%$$

$$15 = \left(\frac{\text{Loss}}{1250} \times 100\right)$$

$$\Rightarrow \text{Loss} = \frac{15 \times 1250}{100}$$

$$\Rightarrow \text{Loss} = ₹187.50$$

Hence, S.P. of the table = C.P. - Loss

$$= ₹1250 - ₹187.50$$

$$= ₹1062.50$$

Hence, S.P. of a table is ₹1062.50.

8. S.P. of flower vase = ₹600

Gain % = 15%

We have,

$$\text{C.P.} = \left\{ \frac{\text{S.P.} \times 100}{(100 + \text{gain}\%)} \right\}$$

$$= ₹ \left\{ \frac{600 \times 100}{(100 + 15)} \right\}$$

$$= ₹ \left(\frac{60000}{115} \right)$$

$$\text{C.P.} = ₹521.74$$

Hence, the cost price of a flower vase is ₹521.74.

9. Let the cost price be ₹x.

$$\text{Loss} = 20\% \text{ of } ₹x = ₹ \left(\frac{20x}{100} \right) = ₹ \frac{x}{5}$$

But, it make a loss of ₹90.

$$\Rightarrow ₹ \frac{x}{5} = ₹90$$

$$\Rightarrow x = ₹450$$

$$\text{S.P.} = \text{C.P.} - \text{Loss}$$

$$\text{S.P.} = ₹(450 - 90) = ₹360$$

$$(i) \quad \text{S.P.} = ₹360$$

$$(ii) \quad \text{C.P.} = ₹450.$$

10. S.P. of an article = ₹1600

Loss = 20%

We have,

$$\text{C.P.} = \left\{ \frac{\text{S.P.} \times 100}{100 - \text{loss}\%} \right\}$$

$$= ₹ \left(\frac{1600 \times 100}{100 - 20} \right)$$

$$= ₹ \left(\frac{160000}{80} \right)$$

$$\text{C.P.} = ₹2000$$

Now, required gain = 20%

$$\therefore \text{S.P.} = \left\{ \frac{\text{C.P.} \times (100 + \text{Gain}\%)}{100} \right\}$$

$$= ₹ \left\{ \frac{2000 \times (100 + 20)}{100} \right\}$$

$$= ₹\{20 \times 120\}$$

$$= ₹2400$$

Hence, he should sell the article for ₹2400 to make a gain of 20%.

11. Let C.P. of a watch be ₹x.

$$\text{Gain} = \frac{1}{6} \text{ of C.P.}$$

$$= \frac{1}{6} \times ₹x = ₹ \left(\frac{x}{6} \right)$$

Now, S.P. = C.P. + Gain

$$₹1505 = ₹ \left(x + \frac{x}{6} \right)$$

$$\Rightarrow \frac{7x}{6} = 1505$$

$$\Rightarrow x = \frac{1505 \times 6}{7}$$

$$\Rightarrow x = 1290$$

Hence, the C.P. of the watch is ₹1290.

12. Let the S.P. of one dozen pencils be ₹x.

The S.P. of 8 dozen pencils = ₹8x

∴ Gain = S.P. of one dozen pencils

∴ Gain = ₹x

Then, C.P. of 8 dozen pencils = S.P. - Gain

$$\text{C.P.} = ₹(8x - x) = ₹7x$$

$$\begin{aligned}\text{Now, Gain \%} &= \left(\frac{\text{Gain}}{\text{C.P.}} \times 100 \right) \% \\ &= \left(\frac{x}{7x} \times 100 \right) \% \\ &= \frac{100}{7} \% = 14\frac{2}{7} \%\end{aligned}$$

$$\text{Hence, Gain \%} = 14\frac{2}{7} \%$$

13. C.P. of lemons = ₹600

∴ $\frac{3}{4}$ of lemons sold at a loss of 20%.

$$\text{C.P. of } \frac{3}{4} \text{ of lemons} = \frac{3}{4} \times ₹600 = ₹450$$

$$\text{Then, Loss} = ₹ \left(\frac{20}{100} \times 450 \right)$$

$$\text{Loss} = ₹90$$

And remaining lemons sold at a gain of 20%.

$$\text{Then, C.P. of remaining lemons} = ₹600 - ₹450 = ₹150$$

$$\text{Gain} = ₹(20\% \times 150)$$

$$= ₹ \left(\frac{20}{100} \times 150 \right)$$

$$= ₹30$$

$$\text{Now, S.P. of lemons} = ₹(600 - 90 + 30)$$

$$= ₹540$$

Now, for whole transaction.

$$\text{C.P.} > \text{S.P.}$$

Therefore, Loss = C.P. - S.P.

$$= ₹(600 - 540)$$

$$= ₹60$$

$$\text{Loss \%} = \left(\frac{\text{Loss}}{\text{C.P.}} \times 100 \right)$$

$$= \left(\frac{60}{600} \times 100 \right) \%$$

$$= 10 \%$$

Hence, he lose 10% on the whole transaction.

14. S.P. = ₹8050, Gain % = 15%

Then,

$$\text{C.P.} = \left\{ \frac{\text{S.P.} \times 100}{100 + \text{Gain \%}} \right\}$$

$$= ₹ \left\{ \frac{8050 \times 100}{(100 + 15)} \right\}$$

$$= ₹ \left(\frac{8050 \times 100}{115} \right)$$

$$\text{C.P.} = ₹7000$$

For a profit of 10%.

Then,

$$\text{S.P.} = \left\{ \frac{\text{C.P.} \times (100 + \text{Gain \%})}{100} \right\}$$

$$\text{S.P.} = ₹ \left\{ \frac{7000 \times (100 + 10)}{100} \right\}$$

$$= ₹ \left(\frac{7000 \times 110}{100} \right)$$

$$\text{S.P.} = ₹7700$$

Hence, new selling price is ₹7700.

15. C.P. of machine = ₹3750

Overhead expenses = ₹250

Effective C.P. = ₹(3750 + 250)

$$= ₹4000$$

Gain = ₹40

$$\text{Gain \%} = \left(\frac{\text{Gain}}{\text{C.P.}} \times 100 \right) \%$$

$$= \left(\frac{40}{4000} \times 100 \right) \%$$

$$= 1 \%$$

Hence, gain per cent is 1%.

16. S.P. = ₹3600, Profit = 20%

Then,

$$\text{C.P.} = \left\{ \frac{\text{S.P.} \times 100}{(100 + \text{Gain \%})} \right\}$$

$$= ₹ \left\{ \frac{3600 \times 100}{(100 + 20)} \right\}$$

$$= ₹ \left(\frac{360000}{120} \right)$$

$$\text{C.P.} = ₹3000$$

If he sold the article for ₹4000.

i.e., S.P. = ₹4000

Then, Gain = S.P. - C.P.

$$= ₹(4000 - 3000)$$

$$= ₹1000$$

$$\therefore \text{Gain \%} = \left(\frac{1000}{3000} \times 100 \right) \%$$

$$= \left(\frac{1000}{30} \right) \%$$

$$= 33\frac{1}{3} \%$$

Hence, gain% would be $33\frac{1}{3} \%$.

EXERCISE 10.4

1. Principal (P) = ₹1800, Time (T) = 2 years
Rate (R) = 12% per annum

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{1800 \times 12 \times 2}{100} \right) \\ &= ₹(18 \times 12 \times 2) = ₹432 \end{aligned}$$

Hence, interest is ₹432.

2. P = ₹5600, T = 3 years, R = 12% per annum

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{5600 \times 12 \times 3}{100} \right) \\ &= ₹(56 \times 12 \times 3) \end{aligned}$$

$$\text{S.I.} = ₹2016$$

Now, Amount = Principal + Interest
= ₹(5600 + 2016)
= ₹7616

Hence, he will pay ₹7616 after 3 years.

3. P = ₹3800, R = $14\frac{1}{2}\%$ = $\frac{29}{2}\%$ per annum,

$$T = 2\frac{1}{2} \text{ years} = \frac{5}{2} \text{ years}$$

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{3800 \times \frac{29}{2} \times \frac{5}{2}}{100} \right) \end{aligned}$$

$$= ₹ \left(\frac{3800 \times 29 \times 5}{100 \times 4} \right)$$

$$= ₹ \left(\frac{38 \times 29 \times 5}{4} \right)$$

$$\text{S.I.} = ₹1377.50$$

Now, Amount = Principal + Interest
= ₹(3800 + 1377.50)
= ₹5177.50

Hence, he paid ₹5177.50 after $2\frac{1}{2}$ years.

4. \therefore Principal = Amount – Interest
= ₹3600 – ₹200
Principal = ₹3400

5. P = ₹15000, R = 16% per annum,

$$T = 3\frac{1}{2} \text{ years} = \frac{7}{2} \text{ years}$$

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{15000 \times 16 \times 7}{100 \times 2} \right) \end{aligned}$$

$$\text{S.I.} = ₹8400$$

Now, Amount = Principal + Interest
= ₹(15000 + 8400)
= ₹23400

Hence, he paid ₹23400 after $3\frac{1}{2}$ years.

6. P = ₹7500, R = 15% per annum,

$$T = 5\frac{3}{4} \text{ years} = \frac{23}{4} \text{ years}$$

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{7500 \times 15 \times 23}{100 \times 4} \right) \end{aligned}$$

$$\text{S.I.} = ₹6468.75$$

\therefore Amount = Principal + Interest
= ₹(7500 + 6468.75)
= ₹13968.75

Hence, Surabhi will get an amount of ₹13968.75.

7. P = ₹6500, R = 9% per annum

$$\text{Interest for 1 year} = ₹ \left(\frac{6500 \times 9 \times 1}{100} \right)$$

$$= ₹(65 \times 9) = ₹585$$

$$\text{Amount after 1 year} = ₹(6500 + 585)$$

$$= ₹7085$$

\therefore Priyanka withdrew ₹1250 after 1 year. Therefore,

$$\text{Balance amount} = ₹(7085 - 1250)$$

$$= ₹5835$$

Now, interest for next two years on balance amount

$$= ₹ \left(\frac{5835 \times 9 \times 2}{100} \right)$$

$$= ₹1050.30$$

Hence, the amount after 3 years = ₹(5835 + 1050.30)
= ₹6885.30

8. $P = ₹17000$, $R = 12\%$ par annum, $T = 1$ year

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{17000 \times 12 \times 1}{100} \right) \end{aligned}$$

$$\text{S.I.} = ₹2040$$

Income tax deduction = 30% of S.I.

$$\begin{aligned} &= ₹ \left(\frac{30}{100} \times 2040 \right) \\ &= ₹612 \end{aligned}$$

Hence, the net annual income

$$\begin{aligned} &= ₹(2040 - 612) \\ &= ₹1428 \end{aligned}$$

Hence, the net annual income is ₹1428.

9. Let the principal be ₹P.

$R = 10\%$ per annum, $T = 5$ years

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$\text{S.I.} = ₹ \frac{P \times 10 \times 5}{100} = ₹ \frac{P}{2}$$

Amount = Principal + Interest

$$₹3600 = ₹ \left(P + \frac{P}{2} \right)$$

$$\Rightarrow \frac{3P}{2} = 3600$$

$$\Rightarrow P = \frac{3600 \times 2}{3}$$

$$P = 2400$$

Hence, the principal is ₹2400.

10. $P = ₹1200$, $R = 8\%$ per annum, $T = ?$

$$\therefore \text{Amount} = 2P = ₹2400$$

$$\begin{aligned} \therefore \text{Interest} &= \text{Amount} - \text{Principal} \\ &= ₹(2400 - 1200) \\ &= ₹1200 \end{aligned}$$

$$\text{Now, Interest} = \frac{P \times R \times T}{100}$$

$$1200 = \frac{1200 \times 8 \times T}{100}$$

$$\Rightarrow T = \frac{100}{8} = 12 \frac{1}{2} \text{ years}$$

Hence, after $12 \frac{1}{2}$ years the amount will double itself.

11. $R = 10\%$ per annum, $T = 6$ years

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$2160 = \frac{P \times 10 \times 6}{100}$$

$$\Rightarrow P = \frac{2160 \times 100}{10 \times 6}$$

$$P = ₹3600$$

Hence, principal is ₹3600.

12. Let the sum be ₹P.

$T = 5$ years, $R = 10\%$ per annum

$$\text{S.I.} = \frac{P \times 10 \times 5}{100} = ₹ \frac{P}{2}$$

Now, $T = 4$ years, $R = 16\%$ p.a

$$\text{S.I.} = \frac{P \times 16 \times 4}{100} = ₹ \frac{16P}{25}$$

$$\text{Now, } \frac{P}{2} = \frac{16P}{25} - 196$$

$$\Rightarrow \frac{16P}{25} - \frac{P}{2} = 196$$

$$\Rightarrow \frac{32P - 25P}{50} = 196$$

$$\Rightarrow \frac{7P}{50} = 196$$

$$\Rightarrow P = \frac{196 \times 50}{7}$$

$$\Rightarrow P = 28 \times 50$$

$$\Rightarrow P = 1400$$

Hence, the principal amount is ₹1400.

13. $P = ₹1200$, $A = ₹1600$, $T = 6$ years, $R = ?$

$$\therefore \text{Interest} = \text{Amount} - \text{Principal}$$

$$\text{Interest} = ₹(1600 - 1200) = ₹400$$

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$\Rightarrow 400 = \frac{1200 \times R \times 6}{100}$$

$$\Rightarrow R = \frac{400 \times 100}{1200 \times 6}$$

$$= \frac{400}{72} = \frac{50}{9}$$

$$\therefore R = 5 \frac{5}{9} \% \text{ per annum}$$

Hence, rate of interest is $5 \frac{5}{9} \%$ per annum.

14. $P = ₹12300$, $R = 10\%$ per annum, Amount = ₹18450 $T = ?$

$$\begin{aligned} \text{Interest} &= \text{Amount} - \text{Principal} \\ &= ₹(18450 - 12300) \\ &= ₹6150 \end{aligned}$$

Also,

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ 6150 &= \frac{12300 \times 10 \times T}{100} \end{aligned}$$

$$\Rightarrow T = \frac{6150 \times 100}{12300 \times 10} = \frac{615}{123}$$

$$T = 5 \text{ years}$$

Hence, ₹12300 will amount to ₹18450 at 10% per annum in 5 years.

15. $P = ₹5000$, $R = 16\%$ per annum, $T = 2$ years

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ &= ₹ \left(\frac{5000 \times 16 \times 2}{100} \right) \\ &= ₹(50 \times 16 \times 2) \\ \text{S.I.} &= ₹1600 \end{aligned}$$

$$\begin{aligned} \therefore \text{Amount} &= \text{Principal} + \text{Interest} \\ &= ₹(5000 + 1600) = ₹6600 \end{aligned}$$

MULTIPLE CHOICE QUESTIONS

1. 40% of ₹750 = ₹ $\left(\frac{40}{100} \times 750 \right) = ₹300$

Hence, option (c) is correct.

2. Let the total number of students be x .

$$\begin{aligned} \text{Then, number of girls} &= 40\% \text{ of } x \\ &= \frac{40}{100} \times x \\ &= \frac{40x}{100} \end{aligned}$$

$$\text{But, } \frac{40x}{100} = 150$$

$$\Rightarrow x = \frac{150 \times 100}{40}$$

$$\Rightarrow x = 375$$

Total number of students is 375.

Thus, the number of boys = $375 - 150 = 225$

Hence, option (a) is correct.

3. Let the marked price be ₹ x .

Discount = 25% of ₹ x

$$= ₹ \left(\frac{25}{100} \times x \right) = ₹ \left(\frac{x}{4} \right)$$

$$\begin{aligned} \text{Selling price of the shirt} &= ₹ \left(x - \frac{x}{4} \right) \\ &= ₹ \left(\frac{3x}{4} \right) \end{aligned}$$

$$\Rightarrow ₹ \frac{3x}{4} = ₹609$$

$$\begin{aligned} \Rightarrow x &= \frac{609 \times 4}{3} \\ &= 203 \times 4 = 812 \end{aligned}$$

The marked price of the shirt = ₹812

Hence, option (b) is correct.

4. Let the number be x .

As per question,

$$(42\% \text{ of } x) + 29 = x$$

$$\Rightarrow \left(\frac{42}{100} \times x \right) + 29 = x$$

$$\Rightarrow x - \frac{42x}{100} = 29$$

$$\Rightarrow \frac{58x}{100} = 29$$

$$\Rightarrow x = \frac{2900}{58}$$

$$x = 50$$

The number is 50.

Hence, option (b) is correct.

5. $x\%$ of ₹75 is ₹9.

$$\text{Then, } \left(\frac{x}{100} \times 75 \right) = 9$$

$$\Rightarrow x = \frac{900}{75}$$

$$x = 12$$

Hence, option (a) is correct.

6. Let the number be x .

$$12\% \text{ of } x = \frac{12}{100} \times x = \frac{3x}{25}$$

$$8\% \text{ of } x = \frac{8}{100} \times x = \frac{2x}{25}$$

As per question,

$$\frac{3x}{25} = \frac{2x}{25} + 20$$

$$\frac{3x}{25} - \frac{2x}{25} = 20$$

$$\frac{x}{25} = 20$$

$$x = 500$$

Hence, option (d) is correct.

7. Let the original price be ₹ x .

$$\begin{aligned} \text{Reduction in value} &= 8\% \text{ of } ₹x = ₹\left(\frac{8}{100} \times x\right) \\ &= ₹\frac{8x}{100} \end{aligned}$$

$$\text{New value} = ₹\left(x - \frac{8x}{100}\right) = ₹\frac{92x}{100}$$

As per question,

$$₹\left(\frac{92x}{100}\right) = ₹115$$

$$\Rightarrow \frac{92x}{100} = 115$$

$$\begin{aligned} \Rightarrow x &= \frac{115 \times 100}{92} \\ x &= 125 \end{aligned}$$

Hence, option (a) is correct.

8. Let maximum marks be x .

Passing marks = 33% of x

$$\begin{aligned} &= \frac{33}{100} \times x \\ &= \frac{33x}{100} \end{aligned}$$

As per question

$$\frac{33x}{100} = 140 + 25$$

$$\Rightarrow \frac{33x}{100} = 165$$

$$\Rightarrow x = \frac{165 \times 100}{33}$$

$$\Rightarrow x = 500$$

Hence, option (b) is correct.

9. Let principal be ₹ P . Then, amount is 3 P .

$$\begin{aligned} \therefore \text{Interest} &= \text{Amount} - \text{Principal} \\ &= 3P - P \\ &= 2P \end{aligned}$$

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$2P = \frac{P \times R \times 10}{100}$$

$$\Rightarrow 2 = \frac{R}{10}$$

$$\Rightarrow R = 20\% \text{ per annum}$$

Hence, option (c) is correct.

10. Let the number be x . Then

$$x + (20\% \text{ of } x) = 54$$

$$\Rightarrow x + \frac{20x}{100} = 54$$

$$\Rightarrow x + \frac{x}{5} = 54$$

$$\Rightarrow \frac{6x}{5} = 54$$

$$\Rightarrow x = \frac{54 \times 5}{6} = 9 \times 5$$

$$x = 45$$

Hence, option (b) is correct.

11. 92% of the total examines passed.

i.e., 8% of the total examines failed

$$\therefore 8\% \text{ of } x = 24$$

$$\Rightarrow \frac{8}{100} \times x = 24 \Rightarrow x = \frac{24 \times 100}{8} = 300$$

Hence, option (d) is correct.

12. Let the total number of pens be x .

As per question,

$$x = 60\% \text{ of } x + 120$$

$$\Rightarrow x = \frac{60x}{100} + 120$$

$$\Rightarrow x - \frac{6x}{10} = 120$$

$$\Rightarrow \frac{4x}{10} = 120$$

$$\Rightarrow x = \frac{1200}{4} = 300$$

Hence, option (a) is correct.

MENTAL MATHS CORNER

Fill in the blanks:

1. The ratio 3 : 5 as percentage is 60%.

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

2. $\frac{6}{8}$ as percentage is 75%.

$$\therefore \frac{6}{8} = \frac{6}{8} \times 100\% = 75\%$$

3. $6\frac{2}{3}\%$ expressed as fraction is $\frac{1}{15}$.

$$\therefore 6\frac{2}{3}\% = \frac{20}{3} \times \frac{1}{100} = \frac{1}{15}$$

4. If $x\%$ of 25 is 8, then x is equal to **32**.

$$\therefore x\% \text{ of } 25 = 8$$

$$\Rightarrow \frac{x}{100} \times 25 = 8$$

$$\Rightarrow \frac{x}{4} = 8$$

$$\Rightarrow x = 32$$

5. The simple interest of ₹600 at 6% per annum for 5 months is ₹15.

$$\therefore P = ₹600, R = 6\% \text{ p.a.}, T = 5 \text{ months} = \frac{5}{12} \text{ year}$$

$$\begin{aligned} \text{Interest} &= ₹ \frac{600 \times 6 \times 5}{100 \times 12} \quad \left(\text{S.I.} = \frac{P \times R \times T}{100} \right) \\ &= ₹15 \end{aligned}$$

6. A number decreased by 35% gives 39, then the number is **60**.

$$\therefore \text{Let the number be } x.$$

$$\text{Decrease in number} = 35\% \text{ of } x$$

$$= \frac{35x}{100}$$

Therefore,

$$\Rightarrow x - \frac{35x}{100} = 39$$

$$\Rightarrow \frac{65x}{100} = 39$$

$$\Rightarrow x = \frac{3900}{65}$$

$$\Rightarrow x = 60$$

7. By selling a book for ₹100, a man gains ₹25.

$$\text{His gain \% is } 33\frac{1}{3}\%.$$

$$\begin{aligned} \therefore \text{C.P.} &= \text{S.P.} - \text{Gain} \\ &= ₹(100 - 25) \\ \text{C.P.} &= ₹75 \end{aligned}$$

$$\begin{aligned} \therefore \text{Gain \%} &= \left(\frac{\text{Gain}}{\text{C.P.}} \times 100 \right) \% \\ &= \left(\frac{25}{75} \times 100 \right) \% \\ &= 33\frac{1}{3}\% \end{aligned}$$

8. By increasing the salary of a man by 20% it becomes ₹18000, his original salary is ₹15000.

Let the original salary be ₹ x . Then

Increase in salary = 20% of ₹ x

$$= ₹ \left(\frac{20}{100} \times x \right) = ₹ \frac{20x}{100}$$

$$\text{New salary} = ₹ \left(x + \frac{20x}{100} \right) = ₹ \left(\frac{6x}{5} \right)$$

$$\text{But, } ₹18000 = ₹ \left(\frac{6x}{5} \right)$$

$$\Rightarrow x = \frac{18000 \times 5}{6}$$

$$x = 15000$$

Thus, original salary is ₹15000.

9. A man buys an article for ₹40 and sells it as ₹60, his gain % is **50%**.

$$\begin{aligned} \text{Gain} &= \text{S.P.} - \text{C.P.} \\ &= ₹(60 - 40) = ₹20 \end{aligned}$$

$$\text{Gain \%} = \left(\frac{20}{40} \times 100 \right) \% = 50\%$$

10. 5% of a number is 6, then the number is **120**.

Let the number be x . Then,

$$5\% \text{ of } x = 6$$

$$\Rightarrow \frac{5x}{100} = 6$$

$$\Rightarrow x = \frac{6 \times 100}{5}$$

$$\Rightarrow x = 120$$

REVIEW EXERCISE

1. Let the money that boy had be ₹ x initially.

Money spent = 45% of ₹ x

$$= ₹ \left(\frac{45}{100} \times x \right)$$

$$= ₹ \frac{9x}{20}$$

$$\text{Left money} = ₹ \left(x - \frac{9x}{20} \right)$$

$$= ₹ \left(\frac{20x - 9x}{20} \right)$$

$$\Rightarrow = ₹ \frac{11x}{20}$$

Therefore,

$$\Rightarrow ₹ \left(\frac{11x}{20} \right) = ₹176$$

$$\Rightarrow x = \frac{176 \times 20}{11} = 16 \times 20$$

$$x = 320$$

Hence, he had ₹320.

2. S.P. for T.V. set = ₹7200, Loss % = 25%

Then,

$$\begin{aligned} \text{C.P.} &= \left\{ \frac{\text{S.P.} \times 100}{(100 - \text{Loss}\%)} \right\} \\ &= ₹ \left(\frac{7200 \times 100}{100 - 25} \right) \\ &= ₹ \left(\frac{7200 \times 100}{75} \right) \end{aligned}$$

$$\text{C.P.} = ₹9600$$

For a gain of 25%.

$$\text{S.P.} = ₹ \left\{ \frac{\text{C.P.} \times (100 + \text{Gain}\%)}{100} \right\}$$

$$\begin{aligned} \text{S.P.} &= ₹ \left\{ \frac{9600 \times (100 + 25)}{100} \right\} \\ &= ₹(96 \times 125) \end{aligned}$$

$$\text{S.P.} = ₹12000$$

Hence, he must sell for ₹12000 to make a gain of 25%.

3. Number of boys in a school = 60%
Number of girls in a school = (100 - 60)% = 40%

Let total number of students be x .

Therefore,

$$40\% \text{ of } x = 360$$

$$\Rightarrow \frac{40}{100} \times x = 360$$

$$\Rightarrow x = \frac{360 \times 100}{40}$$

$$\Rightarrow x = 900$$

Hence, number of boys = 900 - 360 = 540.

4. Original population = 25000
Decrease percentage in population

$$= \left(\frac{25000 - 24500}{25000} \times 100 \right) \%$$

$$\left[\because \text{Decrease}\% = \left(\frac{\text{Decrease}}{\text{Original value}} \times 100 \right) \% \right]$$

$$= \left(\frac{500}{25000} \times 100 \right) \%$$

$$= \frac{50000}{25000} \% = 2\%$$

5. C.P. for a T.V. set = ₹12000, Profit = 20%, then

$$\text{S.P.} = \left\{ \frac{\text{C.P.} \times (100 + \text{Profit}\%)}{100} \right\}$$

$$= ₹ \left\{ \frac{12000 \times (100 + 20)}{100} \right\}$$

$$= ₹ \left\{ \frac{12000 \times 120}{100} \right\}$$

$$\text{S.P.} = ₹14400$$

Hence, selling price of a T.V. set is ₹14400

6. **I Watch:**

$$\text{S.P.} = ₹780, \text{ Gain} = 20\%$$

$$\text{C.P.} = \left\{ \frac{\text{S.P.} \times 100}{(100 + \text{Gain}\%)} \right\}$$

$$= ₹ \left(\frac{780 \times 100}{100 + 20} \right)$$

$$= ₹ \left(\frac{780 \times 100}{120} \right)$$

$$\text{C.P.} = ₹650$$

- II Watch:**

$$\text{S.P.} = ₹780, \text{ Loss} = 20\%$$

$$\text{C.P.} = \left\{ \frac{\text{S.P.} \times 100}{(100 - \text{Loss}\%)} \right\}$$

$$= ₹ \left(\frac{780 \times 100}{100 - 20} \right)$$

$$= ₹ \left(\frac{78000}{80} \right)$$

$$\text{C.P.} = ₹975$$

Now,

$$\begin{aligned} \text{Total C.P.} &= ₹(650 + 975) \\ &= ₹1625 \end{aligned}$$

$$\text{Total S.P.} = ₹1560$$

\therefore

$$\text{S.P.} < \text{C.P.}$$

\therefore

$$\text{Loss} = \text{C.P.} - \text{S.P.}$$

$$= ₹(1625 - 1560)$$

$$\text{Loss} = ₹65$$

\therefore

$$\text{Loss}\% = \left(\frac{65}{1625} \times 100 \right)$$

$$\text{Loss} = 4\%$$

7. Let the sum borrowed by Riya be ₹P.

R = 5%, p.a., T = 2 years

$$\text{S.I.} = \frac{P \times 5 \times 2}{100} = \frac{P}{10}$$

Now, Interest + Amount = Principal

$$P + \frac{P}{10} = ₹1732.50$$

$$\Rightarrow \frac{11P}{10} = ₹1732.50$$

$$\Rightarrow P = ₹ \frac{17325}{11}$$

$$\Rightarrow P = ₹1575$$

Hence, she borrowed ₹1575.

8. Let sum be ₹P. Then

Amount = 2P

∴ Amount = Principal + Interest

Interest = 2P - P = P

Now,
$$\text{S.I.} = \frac{P \times 10 \times R}{100}$$

$$\Rightarrow P = \frac{P \times R}{10}$$

$$\Rightarrow R = 10\%$$

Hence, the rate of interest is 10% p.a.

9. Let the original salary of a bank clerk be ₹x.

Increase in salary = 10% of ₹x

$$= ₹ \left(\frac{10}{100} \times x \right) = ₹ \frac{x}{10}$$

$$\therefore \text{New salary} = ₹ \left(x + \frac{x}{10} \right) = ₹ \frac{11x}{10}$$

Therefore,

$$\Rightarrow ₹ \frac{11x}{10} = ₹8503$$

$$\Rightarrow x = \frac{85030}{11}$$

$$\Rightarrow x = 7730$$

Hence, the original salary is ₹7730.

10. C.P. of an article = ₹1315

Overhead expenses = ₹45

Effective C.P. = ₹(1315 + 45) = ₹1360, Gain = 15%

$$\text{S.P.} = ₹ \left\{ \frac{\text{C.P.} \times (100 + \text{Gain \%})}{100} \right\}$$

$$= ₹ \left\{ \frac{1360 \times (100 + 15)}{100} \right\}$$

$$= ₹ \left(\frac{1360 \times 115}{100} \right)$$

$$\text{S.P.} = ₹1564$$

11. P = ₹6950, S.I. = ₹347.50, T = 5 months = $\frac{5}{12}$ year, R = ?

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$347.50 = \frac{6950 \times R \times 5}{100 \times 12}$$

$$R = \frac{347.50 \times 100 \times 12}{6950 \times 5}$$

$$R = 12\%$$

Hence, the rate of interest is 12% per annum.

HOTS QUESTIONS

1. Marks obtained by Rohit in Mathematics = 64% of 100

$$= \frac{64}{100} \times 100$$

$$= 64$$

Marks obtained by Mohit in Mathematics = 80% of 100

$$= \frac{80}{100} \times 100$$

$$= 80$$

Let marks obtained by Shobhit be x.

Average marks of three students = 76% of 100

$$= \frac{76}{100} \times 100 = 76$$

∴ Average marks of three out of 100 = 76

Now,
$$\text{Average marks} = \frac{64 + 80 + x}{3}$$

$$\Rightarrow 76 = \frac{144 + x}{3}$$

$$\Rightarrow x = 228 - 144$$

$$x = 84$$

Hence, Shobhit scored 84 marks out of 100 i.e. 84%.

2. Let the sum be ₹x.

For 5 years :

R = 8% p.a., T = 5 years

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{x \times 8 \times 5}{100} = \frac{2x}{5}$$

For 3 years and 4 months :

R = 18% p.a., T = 3 years 4 months

$$= (3 \times 12 + 4) \text{ months}$$

$$= \frac{40}{12} \text{ years}$$

$$= \frac{10}{3} \text{ years}$$

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{x \times 18 \times 10}{100 \times 3} = \frac{3x}{5}$$

Now, as per question,

$$\frac{3x}{5} - 200 = \frac{2x}{5}$$

$$\Rightarrow \frac{3x}{5} - \frac{2x}{5} = 200$$

$$\Rightarrow \frac{x}{5} = 200$$

$$\Rightarrow x = 200 \times 5$$

$$\Rightarrow x = 1000$$

Hence, the sum is ₹1000.

VALUE BASED QUESTION SUMMATIVE ASSESSMENT

Let C.P. be ₹x.

∴ Marked price = ₹x + (25% of ₹x)

$$= ₹ \left(x + \frac{25}{100} \times x \right)$$

$$= ₹ \left(x + \frac{x}{4} \right)$$

$$\text{Marked price} = ₹ \left(\frac{5x}{4} \right)$$

Discount = 10% of marked price

$$= \frac{10}{100} \times ₹ \left(\frac{5x}{4} \right)$$

$$= ₹ \left(\frac{10}{100} \times \frac{5x}{4} \right) = ₹ \left(\frac{x}{8} \right)$$

Therefore, S.P. = Marked price – Discount

$$= ₹ \left(\frac{5x}{4} - \frac{x}{8} \right)$$

$$= ₹ \left(\frac{10x - x}{8} \right)$$

$$\text{S.P.} = ₹ \left(\frac{9x}{8} \right)$$

∴ S.P. > C.P.

∴ Profit = S.P. – C.P.

$$= ₹ \left(\frac{9x}{8} - x \right) = ₹ \left(\frac{x}{8} \right)$$

$$\text{Profit \%} = \left(\frac{\text{Profit}}{\text{C.P.}} \times 100 \right) \%$$

$$= \left(\frac{\frac{x}{8}}{x} \times 100 \right) \%$$

$$= \left(\frac{1}{8} \times 100 \right) \% = 12 \frac{1}{2} \%$$

Hence, Tradesmen profit $12 \frac{1}{2} \%$.

No, the Tradesmen did not showing **honesty** in his transaction.

He misguide the customer.