

Aptitude Practice

Percentage

Profit and Loss

Discount

Percentage

Normal method

R₂
2800

① 50% of 2800 = ?

$$\frac{50}{100} \times 2800 \\ = 50 \times 28 \\ = 1400$$

② 10% of 2800

$$\frac{10}{100} \times 2800 = ? \\ = 280$$

③ 30% of 2800 = ?

$$\frac{30}{100} \times 2800 = ? \\ = 30 \times 28 \\ = 840$$

mind calculation

① 50% = 1400 ($\because \frac{2800}{2} = 1400$)

② 10% = 280 ($\because 2800 = 280.0$)

1% = 28 ($\because 2800 = 28.00$)

③ 30% = $280 \times 3 = \boxed{840}$

($10\% \times 3 = 30\%$, $\therefore 1\% = 28$)

5% = 140 ($\because 10\% = 280, \frac{280}{2} = 140$)

20% = 560 ($\because 10\% = 280, 280 \times 2 = 560$)

35% = 980 ($\because 30\% + 5\% = 980$)

\downarrow \downarrow

$10\% \times 3$ $10\% = 280$

\downarrow \downarrow

280×3 $.5\% = \frac{280}{2} = 140$

$840 + 140 = \boxed{980}$

Note $x\% \text{ of } y = y\% \text{ of } x$

Eg. $\underline{36\%}$ of $\underline{50} = ?$
 \swarrow \nwarrow
interchange

$x\% \text{ of } y = y\% \text{ of } x$
 $= \boxed{18}$

⑥ $\frac{36}{100} \times \frac{50}{100} = \boxed{18}$

20% of 96 = ?

$\frac{9.6}{100} \times 2$

$10\% = 9.6$

$10\% \times 2 = 9.6 \times 2$
 $= \boxed{19.2}$

⑥ $\frac{20}{100} \times \frac{96}{100} = \boxed{19.2}$

① If $50\% \text{ of } P = 25\% \text{ of } Q$, then $P = x\% \text{ of } Q$. find x

$$\rightarrow 50\% \text{ of } P = 25\% \text{ of } Q$$

$$\rightarrow \frac{P}{2} = \frac{Q}{4}$$

$$2P = 1Q$$

$$P = \frac{Q}{2}$$

$$P = x\% \text{ of } Q$$

$$\frac{P}{x} = \frac{Q}{\frac{100}{50}}$$

$$x = 50$$

② If $20\% \text{ of } (P+Q) = 50\% \text{ of } (P-Q)$, then find $(P:Q)$

$$\rightarrow 2P\% \text{ of } (P+Q) = 5P\% \text{ of } (P-Q)$$

$$2(P+Q) = 5(P-Q)$$

$$2P + 2Q = 5P - 5Q$$

$$2Q + 5Q = 5P - 2P$$

$$7Q = 3P$$

$$\frac{P}{Q} = \frac{7}{3} \Rightarrow P:Q = 7:3$$

③ If $90\% \text{ of } A = 30\% \text{ of } B$ and $B = 2x\% \text{ of } A$, then the value of x is,

$$\rightarrow \frac{90}{3}P\% \text{ of } A = \frac{30}{1}P\% \text{ of } B$$

$$3A = B$$

$$A = \frac{B}{3}$$

$$B = 2x\% \text{ of } A$$

$$B = \frac{2x}{100} \times \frac{A}{3}$$

$$1 = \frac{x}{150}$$

$$x = 150$$

④ If 40% of $(A+B)$ = 60% of $(A-B)$ then $\frac{2A-3B}{A+B} = ?$

$\rightarrow 40\% \text{ of } (A+B) = 60\% \text{ of } (A-B)$

$$\frac{4}{2}(A+B) = \frac{6}{3}(A-B)$$

$$2A+2B = 3A-3B$$

$$2B+3B = 3A-2A$$

$$\boxed{5B = A}$$

$$\frac{2A-3B}{A+B} = ?$$

$$\frac{2(5B)-3B}{5B+B}$$

$$\frac{10B-3B}{6B} = \frac{7B}{6B} = \boxed{\frac{7}{6}}$$

⑤ If 20% of a is equal to 80% of b , then

$\frac{b+a}{b-a}$ is equal to,

$$\rightarrow 20\% \text{ of } a = 80\% \text{ of } b \quad \left| \frac{b+4b}{b-4b} = \frac{5b}{3b} = \boxed{\frac{5}{3}} \right.$$

$$\boxed{a = 4b}$$

⑥ If 20% of $(A+B)$ = 50% of B , then the value $\frac{2A-B}{2A+B}$ is,

$\rightarrow 20\% \text{ of } (A+B) = 50\% \text{ of } B$

$$2(A+B) = 5B$$

$$2A+2B = 5B$$

$$2A = 5B - 2B$$

$$2A = 3B$$

$$\boxed{A = \frac{3B}{2}}$$

$$\frac{2A-B}{2A+B} = ?$$

$$\frac{2\left[\frac{3B}{2}\right] - B}{2\left[\frac{3B}{2}\right] + B} \Rightarrow \frac{2B}{5B} = \boxed{\frac{2}{5}}$$

⑦ If x is 20% less than y , then find the value of $\frac{y-x}{y}$ and $\frac{x}{x-y}$

$$\rightarrow \begin{array}{cc} x & y \\ 80 & 100 \\ \frac{100-80}{10}, \frac{80}{80-100} & \\ \cancel{\frac{20}{10}} & , \cancel{\frac{80}{-20}} \\ 1/5 & , -4 \end{array}$$

⑧ If 8% of $x = 4\%$ of y then 20% of x is,

$$\rightarrow \frac{8\%}{2} \times x = 4\% \times y \quad \left| \begin{array}{l} \text{20 \% of } x \\ 20\% \times \left[\frac{y}{x} \right] \\ 10 \% \text{ of } y \end{array} \right.$$

⑨ If $60^2\%$ of $A = 30^3\%$ of B , $B = 40\%$ of C , $C = x\%$ of A , then the value of x is,

$$\rightarrow \begin{array}{l} 2A = B \\ xA = \frac{100^2}{5} \times C \\ A = \frac{C}{5} \end{array} \quad \left| \begin{array}{l} x = \frac{x}{100} \times \frac{C}{5} \\ (x = 50\%) \end{array} \right.$$

* What Percentage formula

① x is what percentage of $y = \frac{x}{y} \times 100$

what percentage of x is $y = \frac{y}{x} \times 100$

② x is what percentage more or less than y .
 $= \frac{x-y}{y} \times 100$ (exceed)

y is what percentage more or less than x .
 $= \frac{y-x}{x} \times 100$ (exceed)

① If x is 10% more than y , then by what percent is y less than x ?

→ $\begin{array}{c} x \\ 110 \\ \downarrow \\ y \\ 100 \end{array}$ formula ②
 $\frac{y-x}{x} \times 100$

$$\frac{100-110}{110} \times 100 = \frac{-10}{110} \times 100 = \boxed{-\frac{100}{11}}$$

$$\frac{100}{11} \text{ less, } \textcircled{m} \quad g \frac{1}{11} \%$$

② If A's height is 10% more than B's height, by how much percent less is B's height than that of A?

$$\rightarrow \begin{array}{cc} A & B \\ 110 & 100 \end{array}$$

formula ②

$$= \frac{B-A}{A} \times 100 \Rightarrow \frac{100-110}{110} \times 100 \Rightarrow \frac{-10}{110} \times 100 = -\frac{100}{11} = \left(-9\frac{1}{11} \right) \% \text{ less}$$

③ B got 20% marks less than A what percent marks did A got more than B?

$$\rightarrow \begin{array}{cc} A & B \\ 100 & 80 \end{array}$$

formula ②

$$= \frac{A-B}{B} \times 100$$

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

$$= \frac{20}{80} \times 100 = 25$$

$$= 25\%$$

④ If x earning 25% more than y , what percent less does y earn than x ?

$$\rightarrow \begin{array}{cc} x & y \\ (125) & (100) \end{array} \quad \text{formula ②}$$

$$= \frac{y - x}{x} \times 100$$

$$= \frac{100 - 125}{125} \times 100$$

$$= \frac{-25}{125} \times 100 = \boxed{20\% \text{ less}}$$

⑤ Two numbers are respectively $12\left(\frac{1}{2}\right)\%$ and 25% more than a third number. The first number is what percentage of second number is,

$$\rightarrow \begin{array}{ccc} 1^{\text{st}} & 2^{\text{nd}} & 3^{\text{rd}} \\ \hline 12\frac{1}{2}\% & 25\% & (100) \end{array} \quad \text{formula ①}$$

$12\frac{1}{2}\% = 25\%$

$\frac{25\% \text{ of } 100}{2} = \frac{25 \times 100}{200} = \frac{25}{2}$

$100 + \frac{25}{2} = \boxed{125}$

$\frac{225}{125} \times 100 = \frac{225 \times 100}{125 \times 2} = \boxed{90\%}$

⑥ Two numbers are less than a third number by 30% and 37% resp. The percent by which the second number is less than the first is,

$$\rightarrow \begin{array}{ccc} 1^{\text{st}} & 2^{\text{nd}} & 3^{\text{rd}} \\ \hline (70) & (63) & (100) \\ (100 - 30) & (100 - 37) & \end{array}$$

$\frac{2^{\text{nd}} - 1^{\text{st}}}{1^{\text{st}}} \times 100 = \frac{63 - 70}{70} \times 100 = \boxed{-10\% \text{ less}}$

Based on Salary

Based Value

$$100 \text{ Rs} \quad \textcircled{or} \quad 100\%$$

① Radha spends 40% of her salary on food, 20% on house rent, 10% on entertainment and 10% on conveyance. If her savings at the end of a month are Rs 1500, then her salary per month (in Rs) is,

$$\rightarrow \frac{100\%}{\text{Salary}} \quad \underbrace{100\% - 40\% - 20\% - 10\% - 10\%}_{\text{Spends}}$$

Base value

$$\begin{aligned} 100\% - 80\% &= 20\% \\ &\therefore 20\% = 1500 \end{aligned}$$

$$100\% = x$$

$$x \times \cancel{20\%} = 1500 \times \cancel{20\%} \quad \cancel{5}$$

$$\frac{\text{Salary}}{100\%} = \boxed{x = 7500}$$

② Kishan spends 30% of his salary on food and donates 3% in charitable Trust. He spends Rs 2310 on these two items, then total salary for that month is,

$$\rightarrow \frac{100\%}{\text{Salary}} \quad \frac{30\% \rightarrow \text{food}}{3\% \rightarrow \text{trust}} \quad \underline{33\% \text{ (Spends)}}$$

$$33\% = 2310$$

$$100\% = x$$

$$33 \times x = 2310 \times \frac{100}{33}$$

$$\boxed{x = 7000}$$

③ Mr. X spends 35% of his salary on food & 5% of his salary on children education. In January 2011, he spent Rs 17600 on these two items. His salary for that month is,
 \rightarrow (60%)
 Base value
salary

$$60\% \times x = 17600$$

$$60\% = x$$

$$x = 44000$$

35% \rightarrow food
 5% \rightarrow education
 40%

④ Keshav spent Rs 55475 on his birthday party, Rs 28525 on buying home appliances and remaining 25% of the total amount he had as cash with him. What was the total amount?

$$\rightarrow \begin{array}{r} 55475 \\ 28525 \\ \hline 75\% = 84000 \end{array}$$

$25\% = \text{savings}$

$$75\% = 84000$$

$$100\% = x$$

$$75\% x = 84000 \times 100$$

$$x = 112000$$

⑤ Ms. Sujata invests 7% i.e. Rs 2710, of her monthly salary in mutual fund. Later she invests 18% of her monthly salary in recurring deposits. Also, she invests 6% of her salary on NSC's. What is the total annual amount invested by ms. Sujata?

$$\rightarrow 7\% x = 2710$$

$$100\% x = x$$

$$x = 31000$$

\hookrightarrow salary
 100%
 $\hookrightarrow 7\% + 18\% + 6\%$

9610
 $\frac{1}{12}$ months
 (115320)

$731\% \quad 18\% = 31000$
 $31\% = x$
 $x = 310 \times 31$
 $x = 9610$

⑥ Mr. X spends 20% of his monthly income on household expenditure. Out of the remaining 25%, he spends on children's education, 15% on transport, 15% on transport, 15% on medicine and 10% on entertainment. He is left with Rs 9800 after incurring all these expenditures. What is his monthly income?

$$\begin{array}{c}
 \text{→ Base bcz remaining is ave} \\
 \text{Rs 100 } \xrightarrow[100\%]{\quad x \quad} \left\{ \begin{array}{l} -20 \quad \text{Rs 100} \\ -52 \quad \text{Rs 80} \\ 28\% \end{array} \right. \\
 \downarrow \quad \downarrow \quad \downarrow \\
 \hookrightarrow 20\% \text{ of } 100 = 20 \text{ Rs} \\
 \hookrightarrow 65\% \text{ of } 80 = \frac{65 \times 80}{100} = 52 \text{ Rs} \\
 \boxed{x = 35,000}
 \end{array}$$

⑦ A man spends 40% of his monthly salary on food and one-third of the remaining on transport. If he saves Rs 4500 per month, which is equal to half the balance after spending on food and transport, his monthly salary is,

→ stat qd que \Rightarrow remaining $\frac{1}{2}$ of base salary 100% of it

Rs 100 stat

$$\begin{array}{c}
 \text{Rs 100} \\
 \downarrow \\
 \hookrightarrow 40\% \text{ of } 100 = (40) \\
 \text{Rs 60} \\
 \downarrow \\
 \text{Rs } 60 \times \frac{20}{3} = (20 \text{ Rs}) \\
 \downarrow \\
 \text{Rs } 40 \rightarrow \text{half the balance} \Rightarrow \text{Rs } 20
 \end{array}
 \quad
 \begin{array}{c}
 \text{assume as } 20 \text{ as } (20\%) \\
 \downarrow \\
 20\% = 4500 \\
 100\% = x \\
 \boxed{x = 22500}
 \end{array}
 \quad
 \begin{array}{c}
 \text{20\%} = 4500 \\
 \downarrow \\
 100\% = x \\
 (\because 100\% \text{ for calc. monthly salary})
 \end{array}$$

⑧ A person gave 20% of his income to his elder son, 30% of the remaining to the younger son and 10% of the balance, he donated to a trust. He is left with Rs 10080. His income was,

$$\begin{array}{c}
 \rightarrow \text{Rs } 100 \\
 | \quad \hookrightarrow 20\% \text{ of } 100 = (20) \\
 | \\
 \text{Rs } 80 \\
 | \quad \hookrightarrow 30\% \text{ of } 80 = (24) \\
 | \\
 \text{Rs } 56 \\
 | \quad \hookrightarrow 10\% \text{ of } 56 = (5.6) \\
 | \\
 \text{Rs } 50.4 \\
 | \quad \xrightarrow{\text{Savings } \%} \quad \frac{50.4}{100\%} = x \\
 | \quad \xrightarrow{2} \quad \frac{50.4}{2} = x \\
 | \quad \boxed{x = 25.200}
 \end{array}$$

⑨ The monthly salaries of A and B together amount to Rs 40000. A spends 85% of his salary and B, 95% of his salary. If now their savings are the same, then the salary (in Rs.) of A is,

$$\begin{array}{ccc}
 \rightarrow & \text{A} & \text{B} \\
 & \frac{15}{100} \times x & = (40,000 - x) \times \frac{5}{100} \\
 & 3x & = 40,000 - x \\
 & 4x & = 40,000 \\
 & \boxed{x = 10,000} & \\
 & \therefore \text{A} & \text{B} \\
 & 10,000 & 40,000 - 10,000 \\
 & & (30,000)
 \end{array}$$

(10) Vipul decided to donate 12% of his salary to an orphanage. On the day of donation, he changed his mind and donated Rs 2400 which was 125% of what he had decided earlier. How much Vipul's salary.

$\rightarrow x \rightarrow \text{salary}$

$$125\% \text{ of } 12\% \text{ of } x = 2400$$

$$\begin{array}{r} \underline{125} \\ \times \underline{125} \\ \hline 625 \\ 250 \\ \hline 15625 \end{array} \quad x x = 2500$$

$x = 200 \times 20 \times 4$

$x = 16000$

Based on votes

- ① candidate - I got 5000 votes and won the election.
 - ② candidate - I won the election by a majority of 5000 votes.

Note

- * Majority
- * By } winner - loser

* Total votes enrolled
→ 100%.

- ① Two person contested an election of parliament. The winning candidate secured 57% of total votes polled and won by a majority of 42000. The total number of votes polled is,

$$\rightarrow \text{Winner \%} \quad \text{Loser \%} \quad \text{Total votes}$$

$$57\%. \quad 43\%. \quad 100\% \leftarrow \begin{matrix} \text{base value} \\ \text{assumed} \end{matrix}$$

majority = Win \% - Loser %.
 $= 57\% - 43\% = 14\%$

$$\begin{aligned} 14x &= 42,000 \\ 100x &= x \\ 14x &= 42,000 \times 100 \\ x &= \frac{42,000 \times 100}{14} \end{aligned}$$

② In a election , a candidate secured 40% of the votes but is defeated by the only other candidate by a majority of 298 votes . find the total number of votes recorded .

→ Base value loser winner
Total votes % . 40% ~ 60%.

$$100\% = 298$$

$$\begin{aligned}100\% &= x \\x &= \frac{298 \times 100}{298} = 1490\end{aligned}$$

③ In a election between two candidates , one get 72% of the total votes . If the total votes are 8200 by how many votes did the winner win the election ?

→ Total votes winner loser
Base value 72% ~ 28%
100% 44%

$$100\% = 8200$$

$$44\% = x$$

$$44\% \times x = 8200 \times 44$$

$$x = 3608$$

④ In an election between two candidates, the candidate getting 60% of the votes polled is elected by a majority of 14000 votes. The number of votes polled by the winning candidate is,

→ Total votes enrolled

100%

base value

W.V. L.V.
 $60\% \sim 40\%$
 $\underbrace{60\%}_{20\%} \underbrace{40\%}_{20\%}$

$$20\% = 14000$$

$$60\% = x$$

$$\frac{x}{60\%} = \frac{14000}{20\%}$$

$$x = 42000$$

⑤ In an election, three candidates contested. The first candidate got 40% votes and the second got 36% votes. If the total numbers of votes polled were 36000, find the numbers of votes got by the third candidate.

→ Total votes

100%

base value

$\frac{1st}{40\%}$	$\frac{2nd}{36\%}$	$\frac{3rd}{x\%} \leftarrow 24$	$\frac{40}{76} - \frac{36}{76} = \frac{4}{76}$
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$$100\% = 36000$$

$$24\% = x$$

$$\frac{x}{24\%} = \frac{36000}{4\%}$$

$$x = 360 \times 24$$

$$x = 8640$$

Invalid votes

⑥ In a college election between two candidates, 10% of the votes cast are invalid. The winner gets 70% of the valid votes and defeats the loser by 1800 votes. How many votes were totally cast?

→ Total votes

$$\begin{array}{c} 100\% \\ \text{---} \\ = \end{array}$$

$$10\% \text{ invalid} \quad \boxed{90\% \text{ valid}}$$

winner
70% of 90%

$$\frac{70}{100} \times 90 = \boxed{63\%}$$

$$63\% - 27\% =$$

$$\boxed{36\%}$$

90% valid ~ 63% winner

$$\boxed{27\% \text{ losers}}$$

$$36\% = 1800$$

$$100\% = x$$

$$x = \frac{1800 \times 100}{36\%} \Rightarrow \boxed{x = 5000}$$

⑦ 8% of the voters in an election did not cast their votes. In this election, there were only two candidates. The winner by obtaining 48% of the total votes defeated his contestant by 1100 votes. The total number of voters in the election was

→ Total votes

$$\begin{array}{c} 100\% \\ \text{---} \\ = 8\% \text{ not cast} = 92\% \end{array}$$

$\overbrace{\begin{array}{c} 48\% \\ \text{---} \\ = \end{array}}^{win} \sim \overbrace{\begin{array}{c} 44\% \\ \text{---} \\ = \end{array}}^{loser}$

$$4\% = 1100$$

$$100\% = x$$

$$x = \frac{1100 \times 100}{4\%} = \boxed{27,500}$$

⑧ In an assembly election, a candidate got 55% of the total valid votes. 2% of the total votes were declared invalid. If the total number of voters is 104000, then the number of valid votes polled in favour of the candidate.

→ Total votes

$$100\% - 2\% = 98\% \text{ valid votes}$$

55% of 98%

$$\left(\frac{55 \times 98}{100} \right) \% \Rightarrow \boxed{53.9\%} \text{ winner}$$

$$53.9\% = 1,04,000$$

$$53.9\% = x$$

$$x = 539 \times 10^4$$

$$539 \times (100 + 4)$$

$$\begin{array}{r} 53900 \\ 2156 \\ \hline 56056 \end{array}$$

Based on marks

① In an examination, there were 1000 boys and 800 girls. 60% of the boys and 50% of the girls passed. Find the percent of the candidates failed?

$$\rightarrow \begin{array}{ll} 1000 (\text{B}) & 800 (\text{G}) \\ | & | \\ 60\% \text{ Passed} & 50\% \text{ Passed} \\ 40\% \text{ failed} & 50\% \text{ failed} \end{array}$$

$$\Rightarrow 400 (\text{B}) + 400 (\text{G}) = 800 \text{ (failed)}$$

$$\Rightarrow \frac{800}{1800} \times 100\% = 44.44\%$$

$$\begin{array}{r} 1000 \\ + 800 \\ \hline 1800 \end{array}$$

② In an examination, a candidate must score 40% marks to pass. A candidate, who gets 220 marks, fails by 20 marks. What are the maximum marks for the examination?

$$\rightarrow \begin{array}{ll} \text{pass} & \underline{\text{candidate}} \\ 40\% & 220 \\ & + 20 \\ & \hline 240 \end{array} \leftarrow \text{min passing marks}$$

$$40\% = 240$$

$$100\% = x$$

$$100\% = 240 \times \frac{100}{40}$$

$$x = 600 \rightarrow \text{max. marks for exam}$$

③ For an examination, it is required to get 36% of maximum marks to pass. A student got 113 marks and failed by 85 marks. The maximum marks for the examination are,

$$\rightarrow \begin{array}{l} \text{Pass} \\ \text{mark} \end{array} \quad \begin{array}{c} 113 \\ 85 \\ \hline 198 \end{array} \quad \begin{array}{l} \text{min pass} \\ \text{marks} \end{array} \quad \begin{array}{l} 36\% = 198 \\ 100\% = x \\ x \times 36 = 198 \times 100 \\ x = 550 \end{array}$$

④ A student has to obtain 33% of total marks to pass. He got 25% of total marks failed by 40 marks. The number of total marks is,

$$\rightarrow \begin{array}{l} \text{Pass} \\ \text{mark} \end{array} \quad \begin{array}{l} 33\% \sim 25\% \\ \hline 40 \end{array} \quad \begin{array}{l} 8\% = 40 \\ 100\% = x \\ 8x = 40 \times 100 \\ x = 500 \end{array}$$

⑤ In an examination, 80% of the boys passed in English and 85% passed in mathematics, while 75% passed in both. If 45 boys failed in both. The number of boys who sat for the examination was.

$$\rightarrow 80\% (\text{E}) + 85\% (\text{M}) - 75\% (\text{EM}) \\ = 90\% (\text{Boys}) \text{ passed}$$

$$100\% - 90\% = 10\% \text{ fail}$$
$$10\% = 45$$
$$100\% = x$$
$$x = 45 \times \frac{100}{10}$$
$$= 450$$

⑥ In an examination, 65% of the students passed in mathematics, 48% passed in physics and 30% passed in both. How much % of students failed in both the subjects.

$$\rightarrow 65\% + 48\% - 30\%$$

$$100\% - 83\% \text{ Passed}$$

$\underbrace{}_{17\% \text{ failed}}$

⑦ In an examination 70% of the candidates passed in English. 80% passed in mathematics. 10% failed in both the subjects. If 144 candidates passed in both, the total numbers of candidates were,

$$\rightarrow 100\% = 70\% + 80\% - 2x + 10\%$$
$$x = 160\% - 100\% \quad \begin{matrix} \text{S.P.T.} \\ \text{Total} \end{matrix} = 144$$
$$2x = 60\% \quad x = 24$$
$$(x = 240)$$

⑧ In an examination, a student who gets 20% of the maximum marks fails by 5 marks. Another student who scores 30% of the maximum marks gets 20 marks more than the pass marks. The necessary percentage required for passing is,

$$\rightarrow 20\% \sim 30\% = 10\%$$
$$\leftarrow 5 \quad 20 \rightarrow = 25 \quad (20\% \text{ of } 250)$$
$$10\% = 25 \quad \begin{matrix} 10 \\ \text{Total} \end{matrix} \times \frac{5}{250} \quad \text{Pass \%} = \frac{\text{Pass mark}}{\text{Total mark}} \times 100$$
$$100\% = x \quad x = 25 \times 100$$
$$x = \frac{25 \times 100}{10} \quad = \frac{55}{825} \times 100$$
$$\boxed{x = 250} \quad \boxed{22\%}$$

$\overline{\overline{55 \text{ passing marks}}}$

⑨ In an examination, there are three subjects of 100 marks each. A student scored 60% in the first subject and 80% in the second subject. He scored 70% in aggregate. His percentage of marks in the third subject is,

$$\rightarrow \frac{S_1}{100} + \frac{S_2}{100} + \frac{S_3}{100} = 300 \quad 70\% \text{ of } 300 \\ 60\% + 80\% + x = 70\% \quad \frac{70}{100} \times 300 = 210 \\ \Downarrow \quad \Downarrow \quad \Downarrow \\ 60 + 80 + x = 210 \\ 2x = 210 - 80 - 60 \\ 2x = 70$$

(2x = 70)

Profit and Loss

Gain/Profit same

Note

$$\begin{array}{c} \text{100} \\ \hline \text{C.P} \\ \text{105} \\ \hline \text{S.P} \end{array}$$
$$\begin{array}{c} \text{95} \\ \hline \text{S.P} \end{array}$$

①

$$\begin{aligned} \text{Profit} &= \text{SP} - \text{CP} \\ &= 105 - 100 \\ &= 5 \end{aligned}$$

$$\begin{aligned} \text{Loss} &= \text{CP} - \text{SP} \\ &= 100 - 95 \\ &= 5 \end{aligned}$$

②

$$\text{Profit \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$$

$$\text{Loss \%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100$$

③

$$\frac{\text{Profit \%} + 100}{100} = \frac{\text{SP}}{\text{CP}}$$

$$\frac{\text{Profit \%} - 100}{100} = \frac{\text{CP}}{\text{SP}}$$

Fundamentals

① Krish buys a watch for ₹ 350 and sell it for ₹ 392. Find out his % of profit?

$$\rightarrow \text{CP} = 350, \text{SP} = 392$$

$$\text{Profit \%} = \frac{42}{350} \times 100$$

$$\begin{array}{r} 392 \text{ SP} \\ - 350 \text{ CP} \\ \hline 42 \end{array}$$

Profit % = 12 %

② Ramu purchased a bicycle for ₹ 5200 spent ₹ 800 on its repairs. He had to sell it for ₹ 5500. find out his profit or loss percent.

$$\rightarrow CP = 5200 + 800 \leftarrow \text{repair}$$

$$CP = \underline{\underline{6000}} \quad \} \text{Total CP}$$

$$SP = \underline{\underline{5500}}$$

$$\text{Loss \%} = \frac{500}{6000} \times 100$$

$$= \frac{25}{3}\% \Rightarrow \boxed{8\frac{1}{3}\%}$$

③ A man buys 10 articles for ₹ 8 and sell them at ₹ 1.25 per article. His gain percent is,

$$\rightarrow CP(10) = \underline{\underline{8}}$$

$$SP(10) = 10 \times 1.25$$

$$= 12.5$$

$$= \boxed{\text{Avg } 56\frac{1}{4}\%}$$

$$\text{Profit \%} = \frac{4.5}{8} \times 100 = \frac{12.5}{4.5}$$

$$= \frac{45}{88} \times 100$$

$$= \frac{450}{8} = \boxed{\frac{225}{4}\%}$$

④ Balu sold his Scooter for ₹ 10500 at a gain of 5%. Find out the cost price of the scooter.

$$\rightarrow SP = 10,500$$

$$\text{Profit \%} = 5\%$$

$$CP = ?$$

$$\frac{SP}{CP} = \left(\frac{100 + P\%}{100} \right)$$

Assumed CP

$$100\% + 5\% = 105\%$$

$$105\% = 10,500$$

$$100\% = x$$

$$x = \frac{10500 \times 100}{105}$$

$$(x = 10,000)$$

$$\frac{10500}{x} = \frac{100 + 5}{100}$$

$$x = \frac{10500 \times 100}{105}$$

$$x = 10,000$$

⑤ A watch is sold for ₹ 880 at a loss of 20%. What is the cost price of the watch?

$\rightarrow S.P = 880$ $\frac{S.P}{C.P} = \frac{100 - L\%}{100}$

$L\% = 20\%$ $\frac{880}{x} = \frac{100 - 20}{100}$

$C.P = ?$ $x = \frac{880 \times 100}{80}$

Q.E.D.

(Q) $100\% - 20\% = 80\%$

$80\% = 880$

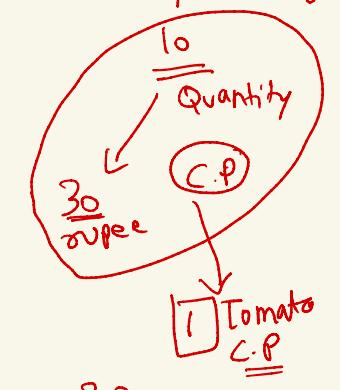
$100\% = x$

$x = \frac{880 \times 100}{80}$

$= 1100$

$x = 1100$

Quantity Change Concept



$$C.P = \frac{30}{10} = \text{Rs } 3$$

$$S.P = \frac{20}{8} = 2.5$$

Purchase (C.P) = Rs 3
and sell (S.P) = Rs 2.5
then it is a LOSS

① A man bought pencil at the rate of 6 for Rs 9 and sold them at the rate of 4 for Rs 6. His gain in the transaction is,

$$\rightarrow C.P \Rightarrow \frac{6}{\text{pencil}} \Rightarrow \frac{4}{\text{Rs } 3} \Rightarrow \frac{4}{6} = \frac{2}{3}$$

$$S.P \Rightarrow \frac{4}{\text{pencil}} \Rightarrow \frac{6}{\text{Rs } 9} \Rightarrow \frac{6}{4} = \frac{3}{2}$$

$$\text{Profit \%} = \frac{\frac{3}{2} - \frac{2}{3}}{\frac{2}{3}} \times 100$$

$$P\% = \frac{9-4}{6} \times 100$$

$$P\% = \frac{5}{6} \times \frac{3}{2} \times 100 = 125$$

$\boxed{\text{Profit \%} = 125\%}$

② If balls are bought 12 for Rs 10 and sold at 10 for Rs 12. What is the gain or loss %?

$$\rightarrow \text{CP} = \frac{12}{\text{balls}} \rightarrow 10 \Rightarrow \frac{10}{12} \Rightarrow \frac{5}{6} \Rightarrow 0.8 \quad \left. \begin{array}{l} \text{(C.P) S.P } \cancel{\text{at cost}} \neq \cancel{\text{at}} \\ \text{Profit } \cancel{\text{at cost}}. \end{array} \right\}$$

$$\text{SP} = \frac{10}{\text{balls}} \rightarrow 12 \Rightarrow \frac{12}{10} \Rightarrow \frac{6}{5} \Rightarrow 1.2$$

$$\text{Profit \%} = \frac{\frac{6}{5} - \frac{5}{6}}{\frac{5}{6}} \times 100 \quad \left| \begin{array}{l} \text{P.L.} = \frac{11}{30} \times \frac{6}{5} \times 100 \\ \text{P.L.} = 44 \% \end{array} \right.$$

Lcm(S,P)
130

$$= \frac{36 - 25}{20} \times 100$$

③ 4 lemons were bought at Rs 3.5 lemon were sold at Rs 4. What was the gain or loss percent?

$$\rightarrow \text{C.P} \Rightarrow \frac{4}{\text{lemons}} \Rightarrow \frac{3.5}{\text{Rs}} \Rightarrow \frac{3}{4} \Rightarrow 0\% \text{ loss}$$

$$\text{S.P} \Rightarrow \frac{4}{\text{lemons}} \Rightarrow \frac{4}{\text{Rs}} \Rightarrow \frac{4}{5} \Rightarrow 0\% \text{ profit}$$

. dont do this
if CP and SP are
get same

$$\text{Profit/Loss \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$$

$$= \frac{\frac{4}{5} - \frac{3.5}{4}}{\frac{3.5}{4}} \times 100$$

$$= \frac{\frac{16 - 15}{20}}{\frac{3}{4}} \times 100$$

$$= \frac{1}{20} \times \frac{4}{3} \times 100$$

$$= \frac{100}{15}$$

= 6.67 %
Profit %

No Profit No Loss

- ① Ramesh bought two horses for 1200 each. He sells one at 10% profit and other with 10% loss. find the total profit or loss %. in the transaction. (note: No Profit, No loss)
- ② Ramesh sold two horses for 1200 each. He sells one at a profit of 10% and other with 10% loss. find the total profit or loss %. in the transaction.
- ③ Ramesh bought two horses for 1200. He sells one at a profit of 10%. and other at a loss of 10%. find the total profit or loss %.

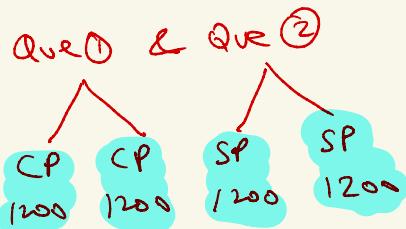
Que① & Que③

each

$$\frac{H_1}{1200} \quad \frac{H_2}{1200}$$

$$C.P = \underline{\underline{H_1 + H_2}} = 1200$$

CP 2400



- ④ Ramesh bought two horses for 1200 each. He sells one at 10% profit and other with 5% loss. find the total profit or loss %. in the transaction.

$$\rightarrow \begin{array}{ccc} 1200 & 1200 & \\ \downarrow 10\% & \downarrow 5\% & \\ 120 & 60 & \\ + \frac{120}{1320} & & \\ \hline SP_1 & SP_2 & \\ \hline \underline{\underline{SP_1 + SP_2}} & & \\ \underline{\underline{= 2460}} & & \\ S.P & & \end{array} \Rightarrow 1200 + 120 = \underline{\underline{2400}}$$

$$\frac{2400}{CP}$$

$$P.I. = \frac{SP - CP}{CP} \times 100$$

$$= \frac{60}{2400} \times 100$$

Profit = 2.5%.

→ 1200 1200

$\downarrow 10\%$ $\downarrow -5\%$

120 -60

Add 60

Profit

Note if (-60) then it is loss %.

Always Loss

① Ramesh sold two horses for 12000 each. He sells one at 20% profit and other with 4% loss. Find the total profit or loss % in the transaction.

→ If C.P is not given then it always

$$\begin{cases} \text{G.I.} = x \\ \text{96.I.} = 24000 \end{cases}$$

$$\text{Loss I.} = \frac{x^2}{100}$$

$$\therefore \frac{(20)^2}{100} \Rightarrow \text{Loss 4.I.}$$

$$\begin{aligned} \text{If } x &= 24000 \times 4\% \\ \text{Loss} \quad x &= 1000 \end{aligned}$$

$$\begin{array}{ccc} \text{SP} & & \text{Q} \\ 24000 & & x \\ +1000 & & \\ \hline 25000 & & \end{array}$$

$$25000 - 24000 = 1000$$

↓
4.I.

② Ramesh sold two books for 12,000 each. He sells one at 20% profit and other with 4% loss. Find the total profit or loss in the transaction?

$$\begin{cases} \text{CP} \\ 100\% \end{cases}$$

$$120\% = 12000$$

$$100\% = x$$

$$x = \frac{12000 \times 100}{120}$$

$$96\% = 12000$$

$$100\% = x$$

$$x = \frac{12000 \times 125}{96}$$

Two books

$$\underline{12000}$$

$$\underline{12000}$$

$$\underline{\underline{24000}}$$

(SP)

SP - CP

$$\text{Profit} = 1500$$

$$x = \frac{10000}{\text{CP}_1}$$

$$x = \frac{12500}{\text{CP}_2}$$

22500
(CP)

$$\text{Profit \%} = \frac{1500}{\text{C.P}} \times 100 \Rightarrow \frac{1500}{22500} \times 100 \Rightarrow 6.66\%$$

⇒ 6.66%

Without Each

① The cost of two watches is Rs 840. If by selling one at a profit of 16% and other at a loss of 12%, there is no loss or no gain in the transaction then the cost price of each watch is,

$$\rightarrow w_1 + w_2 = 840$$

$$\begin{array}{c} \boxed{x} \quad \boxed{840-x} \\ \boxed{SP = CP} \end{array}$$

$$x \times \frac{116}{100} + (840-x) \times \frac{88}{100} = 840$$

$$\frac{116x}{100} + \frac{840 \times 88}{100} - \frac{88x}{100} = 840$$

$$116x + (840 \times 88) - 88x = 840 \times 100$$

$$28x = 840 \times 100 - 840 \times 88$$

$$28x = 840 (12)$$

$$x = \frac{840 \times 12}{28}$$

$$\boxed{x = 360}$$

② A shopkeeper buys two fans for 3120. He sold one of them at a profit of 36% and other at a loss of 15%. He found that each fan sold for the same price. What is the cost price of each fan?

$$\rightarrow 3120$$

$$\begin{array}{c} \boxed{x} \quad \boxed{(3120-x)} \\ \begin{array}{c} 3120 \\ - 1200 \\ \hline 1920 \end{array} \end{array}$$

$$\boxed{SP_1 = SP_2}$$

$$x \times \frac{136}{100} = (3120-x) \times \frac{85}{100}$$

$$136x = 3120 \times 85 - 85x$$

$$136x + 85x = 3120 \times 85$$

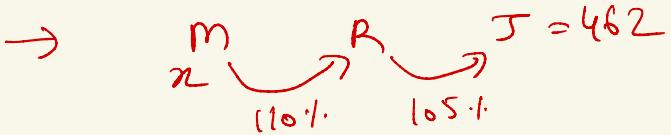
$$221x = 3120 \times 85$$

$$x = \frac{3120 \times 85}{221}$$

$$\boxed{x = 1200}$$

Consecutive Sale

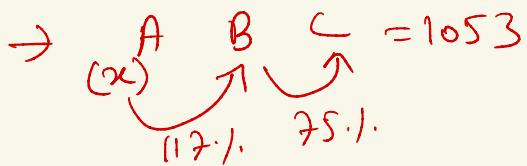
① Mohit sells a bicycle to Rohit at a gain of 10% and Rohit again sells it to Jyoti at a profit of 5%. If Jyoti pays Rs 462 to Rohit, what is the cost price of the bicycle for Mohit?



$$x \times \frac{110}{100} \times \frac{105}{100} = 462$$

$$x = \frac{462 \times 100 \times 100}{110 \times 105} = \boxed{400}$$

② Person A sells a book to person B at a gain of 17% and B sells it to person C at a gain of 17% and B sells it to person C at a loss of 25%. If C pays ₹1,053 to B, then what is the CP of the book to A?



$$x \times \frac{117}{100} \times \frac{75}{100} = 1053$$

$$x = \frac{353 \times 100 \times 100}{117 \times 75} = \boxed{1200}$$

$$\boxed{x = 1200}$$

③ 'A' sells an article to 'B' at a gain of 20%. and 'B' sells it to 'C' at a gain of 10% and 'C' sells it to 'D' at a gain of $12\left(\frac{1}{2}\right)\%$. If 'D' pays Rs 29.70 what did it cost to 'A'?

$$\rightarrow x \times \frac{120}{100} \times \frac{110}{100} \times \frac{225}{200} = 29.70$$

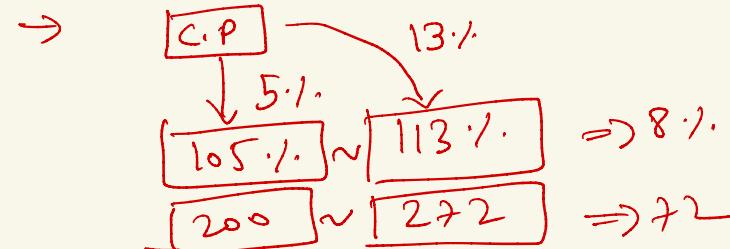
$$\begin{aligned} 12\frac{1}{2}\% &= \frac{25}{2}\% \\ &= 100 + \frac{25}{2}\% \\ &= \frac{225}{2}\% \end{aligned}$$

$$\begin{aligned} x &= \frac{29.70 \times 100 \times 100 \times 200}{225} \\ &\Rightarrow \frac{29.70 \times 100 \times 225}{2} \\ &= \frac{29.70 \times 2}{27} = \boxed{20} \end{aligned}$$

$$\boxed{\frac{225}{200}}$$

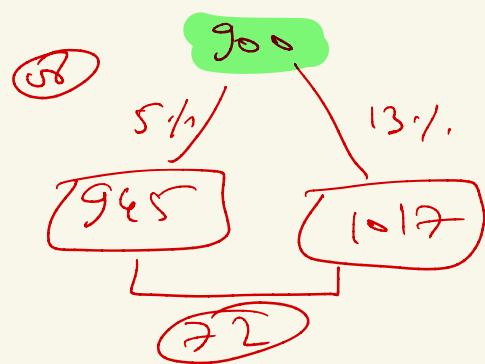
More or Less

① Vijay sold a watch at a gain of 5%. Had he sold it for Rs 72 more, he would have gained 13%. Find out the cost price of the watch?



assumed value

$$\begin{aligned} 8\% &= 72 \\ 100\% &= x \\ x &= \frac{72 \times 100}{8} \\ x &= 900 \end{aligned}$$



② Raju sells a watch at 5% profit. Had he sold it for ₹ 24 more; he would have gained 11%. Find the cost price of the watch.

$$\rightarrow \begin{array}{l} \text{CP} \\ \text{S.P.} \quad \text{111%} \\ 105\% \quad 100\% = x \\ \boxed{24} \end{array} \quad \begin{array}{l} \text{S.P.} = 24 \\ 100\% = x \\ \boxed{x = 400} \end{array}$$

③ A shopkeeper sells an article at a gain of 10%. Had he sold it at a loss of 20% its selling price would have been ₹ 180 less. What is the cost price of the article?

$$\rightarrow \begin{array}{l} \text{CP} \\ +10\% \\ 110\% \sim 80\% \end{array} \quad \begin{array}{l} -20\% \\ \rightarrow 20\% = 180 \\ 100\% = x \\ \boxed{x = 600} \end{array}$$

"X" C.P. = "y" S.P.

① If 3 toys are sold at the cost price of 4 toys of the same kind, the profit % will be,

$$\rightarrow \begin{array}{l} \boxed{4 \text{ toy C.P.} = x} \Rightarrow 1 \text{ toy C.P.} = \frac{x}{4} \\ \boxed{3 \text{ toy S.P.} = x} \Rightarrow 1 \text{ toy S.P.} = \frac{x}{3} \end{array}$$

$$\begin{aligned} \text{P.I.} &= \frac{x}{3} - \frac{x}{4} \\ &\times 100 \\ &\frac{x}{9} \end{aligned}$$

$$= \frac{4x - 3x}{12} \times \frac{1}{x} \times 100$$

$$\begin{aligned} &= \frac{x}{12} \times \frac{4}{x} \times 100 \\ &= \frac{100}{3} \\ &= 33.\overline{33}\% \\ &= 33\frac{1}{3}\% \end{aligned}$$

② The cost price of 15 tables is equal to the selling price of 20 tables. Find the profit or loss percent.

$$\rightarrow \begin{aligned} 15 \text{ C.P.} &= x \Rightarrow \text{C.P.} = \frac{x}{15} \\ 20 \text{ C.P.} &= x \Rightarrow \text{S.P.} = \frac{x}{20} \end{aligned}$$

$$\begin{aligned} &= \frac{\frac{x}{20} - \frac{x}{15}}{\frac{x}{15}} \times 100 \\ &= \frac{3x - 4x}{60} \times \frac{15}{x} \times 100 \end{aligned}$$

$$\begin{aligned} &= -\frac{x}{60} \times \frac{15}{x} \times 100 \\ &= -25\% \quad \text{loss} \end{aligned}$$

Remaining Quantity

① A person bought 50 pens for Rs 50 each. He sold 40 of them at a loss of 5%. He wants to gain 10% on the whole. Then his gain % on the remaining pens should be?

$$\rightarrow \begin{aligned} ① \quad 50 \times 50 &= 2500 + 250 \\ \text{pens} \quad \text{As each} &= 2750 \\ &\qquad\qquad\qquad \begin{array}{l} 2500 \\ \hline 250 \\ 10\% \end{array} \end{aligned}$$

$$\begin{aligned} ② \quad 40 \times 50 &= 2000 \\ \text{pens As} &= 2000 - 100 \\ &= 1900 \end{aligned}$$

$$④ \quad \text{remaining } 10 \text{ pens}$$

$$③ \quad \begin{array}{r} 2750 \\ - 1900 \\ \hline 850 \end{array}$$

$$⑤ \quad 10 \times 50 = 500$$

C.P.

$$\begin{aligned} ⑤ \quad \text{gain \%} &= \frac{350}{500} \times 100 \\ &= 70\% \end{aligned}$$

$$\begin{array}{r} 850 \rightarrow \text{S.P} \\ - 500 \rightarrow \text{C.P} \\ \hline 350 \end{array}$$

Steps 1, 2, 3, 4, 5

② A man purchased 150 pens at the rate of 12 per pen. He sold 50 pens at a gain of 10%. The percentage gain at which he must sell the remaining pens so as to gain 15% on the whole article is,

$$\rightarrow 150 \times 12 = 1800$$

$$50 \times 12 = 600$$

$$100 \times 12 = 1200$$

$$\frac{1410}{-1200} \quad \frac{210}{1200}$$

$$\begin{array}{r} 1800 \\ + 270 \\ \hline 2070 \end{array}$$

$$\begin{array}{r} 600 \\ + 60 \\ \hline 660 \end{array}$$

$$\begin{array}{r} 2070 \\ - 660 \\ \hline 1410 \end{array} \leftarrow \text{S.P.}$$

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

$$\text{gain \%} = \frac{210}{1200} \times 100\%$$

$$= 17.5\%$$

Quintals

① A trader had 1200 kg of rice. He sold a part of it at 5% profit and the rest at 11% profit, so that he made a total profit of 7%. How much (in kg) rice did he sell at 5% profit?

→

$$\begin{array}{ccccccc}
 & 1200 & & & & & \\
 & \swarrow x & \searrow (1200-x) & & & & \\
 x \times \frac{105}{100} + (1200-x) \times \frac{111}{100} & = & 1200 \times \frac{107}{100} & & & & \\
 105x + (1200 \times 111 - 111x) & = & 1200 \times 107 & & & & \\
 -6x = 1200 \times 107 - 1200 \times 111 & & & & & & \\
 -6x = 1200 (107 - 111) & & & & & & \\
 \cancel{-6}x = 1200 \cancel{(4)} & & & & & & \\
 \boxed{x = 800} & & & & & &
 \end{array}$$

② A trader had 22 quintals of rice. He sold a part of it at 23% profit and the rest at 33% profit, so that he made a total profit of 27%. How much rice did he sell at 33% profit?

→ 1 quintal = 100 kg

22 quintals = 2200 kg

$$\begin{array}{r}
 2200 \\
 -1320 \\
 \hline
 880 \text{ kg}
 \end{array}$$

$$\begin{array}{ccc}
 \textcircled{x} & & \textcircled{2200-x} \\
 23\% & & 33\%
 \end{array}$$

$$x \times \frac{123}{100} + (2200-x) \times \frac{133}{100} = 2200 \times \frac{127}{100}$$

$$123x + (2200 \times 133 - 133x) = 2200 \times 127$$

$$-10x = 2200 \times 127 - 2200 \times 133$$

$$\cancel{-10}x = 2200 \cancel{(-6)}$$

$$\boxed{x = 1320}$$

Dishonest

① A dishonest shopkeeper sell his articles at Rs 46/kg which costs him Rs 50/kg. But while selling he uses false weight and gives only 800 gm instead of 1kg. What is his profit percentage?

$$\rightarrow C.P = 50 \text{ /kg}$$

$$1000 \text{ gm} = 1 \text{ kg}$$

$$S.P = 800 \text{ gm} = 46$$

convert
gram
into
kg

$$\begin{aligned} \xrightarrow{\text{kg}} \quad 1 \text{ gm} &= \frac{46}{8 \times 1000} \times 1000 \\ &= \frac{460}{8} \end{aligned}$$

$$S.P = 57.5 \text{ kg}$$

$$\begin{aligned} \text{Profit \%} &= \frac{57.5 - 50}{50} \times 100 \\ &= \frac{7.5}{50} \times 100 \end{aligned}$$

$$= 15\%$$

② A dishonest shopkeeper sells sugar at ₹ 18/kg, which he had bought at ₹ 15/kg, and he gives 800 gm instead of 1000 gm. Find his actual profit percentage.

$$\rightarrow C.P (1 \text{ kg}) = 15$$

$$S.P (800 \text{ gm}) = 18$$

convert
gram
into
kg

$$\begin{aligned} \xrightarrow{\text{kg}} \quad 18 &= \frac{18}{8 \times 1000} \times 1000 \\ &= \frac{180}{8} 22.5 \\ &= 22.5 \\ &\underline{\underline{S.P}} \end{aligned}$$

$$\text{Profit \%} = \frac{22.5 - 15}{15} \times 100$$

$$= \frac{7.5}{15} \times 100$$

$$= 50\%$$

Discount

(M.P = marked price, S.P = selling price)

$$\text{Discount} = M.P - S.P$$

$$\text{Discount \%} = \frac{M.P - S.P}{M.P} \times 100$$

$$S.P. = M.P. \left\{ \frac{100 - D}{100} \right\}$$

$$M.P. = \frac{100 \times S.P.}{(100 - D)}$$

Never care about
Cost Price

Single Equivalent Discount

Successive Discount \rightarrow Single Eq. discount

↓
Value

- ① Trad. method
- ② Normal method
- ③ formula method

$$(a+b-\frac{ab}{100})$$

↓
Percentage

formula

$$\left[a+b - \frac{ab}{100} \right]$$

① Book Price = 200

Seller's succ. discount = 10% & 5%
SP = ?

Trad. method *

$$Rs 200$$

$$\Rightarrow 10\% \text{ of } 200 = Rs 20$$

$$\Rightarrow 5\% \text{ of } 180$$

$$= Rs 9$$

Total
Discount
Value
= 29

$$20+9=29$$

$$180 - 9 = 171 \text{ S.P.}$$

Normal method **

$$200 \times \frac{90}{100} \times \frac{95}{100} = ?$$

$$\Rightarrow [171] \text{ Rs}$$

$$\begin{array}{r} 200 \\ -171 \\ \hline 29 \end{array} \text{ Rs}$$

Formula method ***

$$\Rightarrow \left\{ a+b - \frac{ab}{100} \right\}$$

$$\Rightarrow 10+5 - \frac{50}{100}$$

$$\Rightarrow 15 - 0.5$$

$\Rightarrow [14.5\%]$. single Eq. discount percentage

$$200 \times \frac{14.5}{100} = [29]$$

discount
value

② The marked price of an article is Rs 500. It is sold at successive discounts of 20% and 10%. The selling price of the article is,

$$\rightarrow M.P = 500$$

Normal

$$500 \times \frac{80}{100} \times \frac{90}{100}$$

$$\Rightarrow 40 \times 9$$

$$\Rightarrow 360 \text{ S.P.}$$

formula

$$(20 + 10 - \frac{20 \times 10}{100})$$

$$30 - 2 \Rightarrow 28\%$$

single eq. discount %.

$$100\% - 28\% = 72\%$$

$$\Rightarrow 500 \times \frac{72}{100} = 360$$

③ An item is marked for Rs. 240 for sale. If two successive discounts of 10% and 5% are allowed on the sale price, the selling price of the article is,

$$\rightarrow M.P = 240$$

Normal

$$240 \times \frac{90}{100} \times \frac{95}{100}$$

$$\Rightarrow \frac{12 \times 9 \times 19}{10}$$

$$\Rightarrow 205.2$$

Percentage formula

$$(10 + 5 - \frac{50}{100})$$

$$\Rightarrow (15 - 0.5)$$

$$\Rightarrow 14.5\%$$

single eq. discount %.

$$100\% - 14.5\% = 85.5\%$$

$$\Rightarrow 240 \times \frac{85.5}{100} \Rightarrow 205.2$$

④ A single Discount equivalent to successive discounts of 10%, 20%, and 25% is,

$$\rightarrow \begin{matrix} 10\% \\ a \end{matrix} \quad \begin{matrix} 20\% \\ b \end{matrix} \quad \begin{matrix} 25\% \\ c \end{matrix}$$

$$\Rightarrow \left(a+b - \frac{ab}{100} \right)$$

$$\Rightarrow \left(10+20 - \frac{200}{100} \right)$$

$$\Rightarrow 30 - 2 = \boxed{28\%}$$

$$\begin{matrix} 28\% \\ a \end{matrix} \quad \begin{matrix} 25\% \\ b \end{matrix}$$

$$\Rightarrow \left(a+b - \frac{ab}{100} \right)$$

$$\Rightarrow (28 + 25 - 7)$$

$$\Rightarrow 53 - 7$$

$$\Rightarrow \boxed{46\%}$$

Single Equivalent Discount %.

Finding Unknown Value (Find M.P or Discount)

① The marked Price of a watch is Rs 800. A shopkeeper gives you two successive discounts and sells the watch at Rs 612. If the first discount is 10%, the second discount is,

$$\rightarrow \text{M.P} = 800, \quad \begin{matrix} 10\% \\ x\% \end{matrix} \quad \underline{\underline{612}}$$

$$800 \times \frac{90}{100} \times \frac{100-x}{100} = 612$$

$$100-x = \frac{612 \times 100}{800 \times 90}$$

$$100-x = 85$$

$$x = 100 - 85$$

$$\boxed{x = 15\%}$$

② The price of a clock is Rs 160. The customer buys it for Rs 122.40 after two successive discounts. If the second discount is 15%, then the first discount is,
 $\rightarrow \text{M.P} = 160 \quad \underline{\text{2nd}} \quad \underline{15\%} \quad \underline{122.40}$

$$160 \times \frac{100-x}{100} \times \frac{85}{100} = 122.40$$

$$100-x = \frac{122.40 \times 100}{100 \times 85}$$

$$100-x = 90$$

$$\boxed{x = 10\%}$$

③ The marked price of a piano was Rs 15000. The customer buys it for Rs 9720 after three successive discounts of 20%, 10%, and x%. resp. on it. Then the 3rd discount is,

$$\rightarrow 15000 \times \frac{80}{100} \times \frac{90}{100} \times \frac{100-x}{100} = 9720$$

$$100-x = \frac{9720 \times 100}{15000 \times 8 \times 9} \Rightarrow 100-x = 90$$

$$\boxed{x = 10}$$

④ A book was sold for Rs 6300 after giving two successive discounts of $12\left(\frac{1}{2}\right)\%$. and 10%. find the marked price?

$$\rightarrow x \times \left[\frac{100-25}{100} \right] \times \frac{90}{100} = 6300$$

$$\boxed{12\frac{1}{2} = \frac{25}{2}}$$

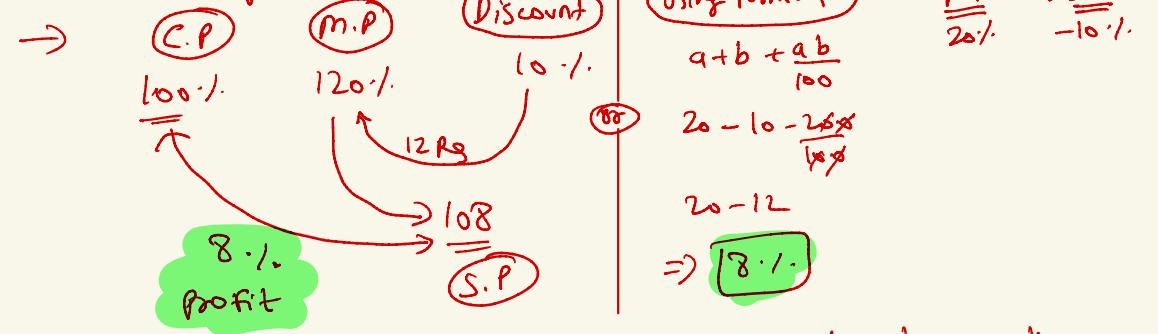
$$x \times \frac{75}{100} \times \frac{90}{100} = 6300$$

$$x = \frac{6300 \times 100 \times 4}{9 \times 25} \Rightarrow$$

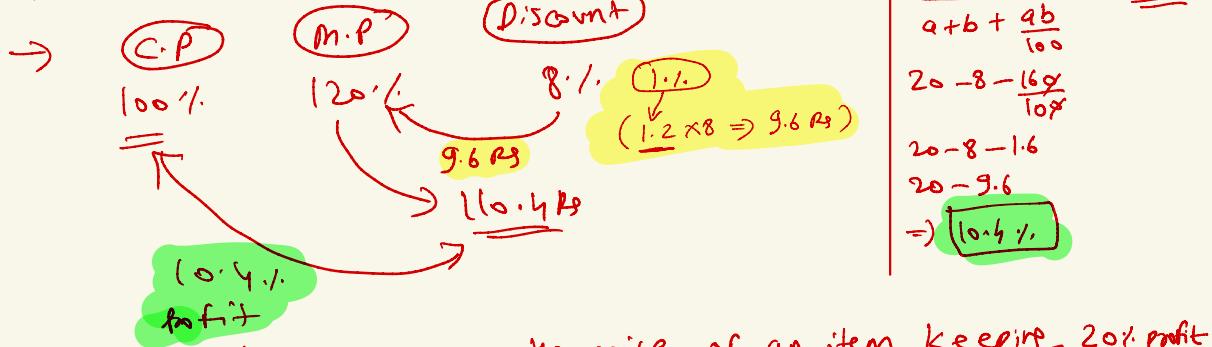
$$\boxed{x = 8000}$$

Profit & Loss Percentage

① A shopkeeper marks his watch at 20% above the cost price and allows the purchaser a discount of 10% for cash buying. what profit percent does he make?



② A trade-man marks his goods at 20% above the cost price. He allows his customers a discount of 8% on marked price. find out profit percent -



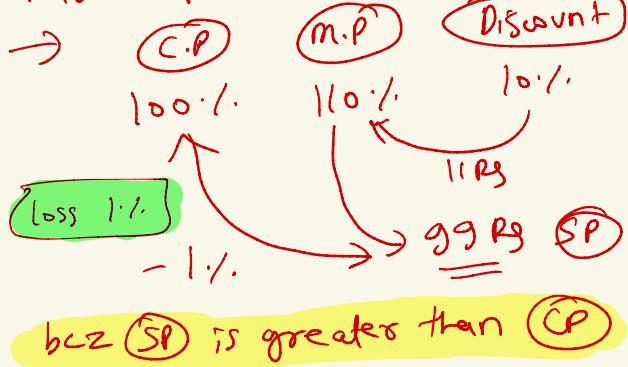
③ A shopkeeper marks the price of an item keeping 20% profit. If he offers a discount of $12\left(\frac{1}{2}\right)\%$. on the marked price, his gain percentage is,

$$\rightarrow a+b-\frac{ab}{100}$$

$$20 - \frac{25}{2} - \frac{(20)(25)}{100 \cdot 10}$$

$$20 - 12.5 - 2.5 \Rightarrow 20 - 15 \Rightarrow 5\%$$

Q) A trade-man marks his goods 10% above the cost price. If he allows his customers 10% discount on the marked price, how much profit or loss does he make?



formula $MP = 10\%$
 $Discount = -10\%$

or $a + b - \frac{ab}{100}$

$10 - 10 - \frac{10 \times 10}{100}$
 $10 - 10 - 1$
 $10 - 11$
 $\Rightarrow [-1\%]$ loss

How much Hike?

Q) To gain 8% after allowing a discount of 10% by what percent cost price should be hiked in the list price?

→ $\begin{matrix} L-4 & CP & MP & Dis & P/L \\ 100\% & 20\% & 10\% & ? & ? \end{matrix}$ ← Previous lesson P & L%.

How much Hike $\begin{matrix} L-5 & CP & MP & Dis & P/L \\ 100\% & ? & 10\% & 8\% & ? \end{matrix}$

Take Discount
always (-ve)
in formula

$$a + b + \frac{ab}{100} = P/L \%$$

$$x - 10 - \frac{10x}{100} = 8 \%$$

$$100x - 1000 - 10x = 800$$

$$90x = 1800$$

$$\boxed{x = 20\%}$$

② A merchant allows a discount of 10% on marked price for the cash payment. To make a profit of 17%, he must mark his goods higher than their cost price by?

$$\rightarrow \frac{CP}{100\%} \quad \frac{MP}{?} \quad \frac{\text{Discount}}{10\%} \quad \frac{\text{Profit}}{17\%}$$

$$a+b + \frac{ab}{100} = p\%$$

-10 bcz Discount always negative

$$x - 10 - \frac{10x}{100} = 17$$

$$100x - 1000 - 10x = 1700$$

$$90x = 2700$$

$$x = 30\%$$

③ A merchant purchased a watch for Rs 450 and fixed its list price in such a way that after allowing a discount of 10%, he earns a profit of 20%. Find the list price of the watch.

$$\rightarrow \frac{CP}{450} \quad \frac{MP}{?} \quad \frac{P}{10\%} \quad \frac{\text{Profit}}{20\%}$$

$$a+b + \frac{ab}{100}$$

$$x - 10 - \frac{10x}{100} = 20$$

$$450 \times \frac{100}{3}\%$$

$$100x - 600 - 10x = 2000$$

$$90x = 3000$$

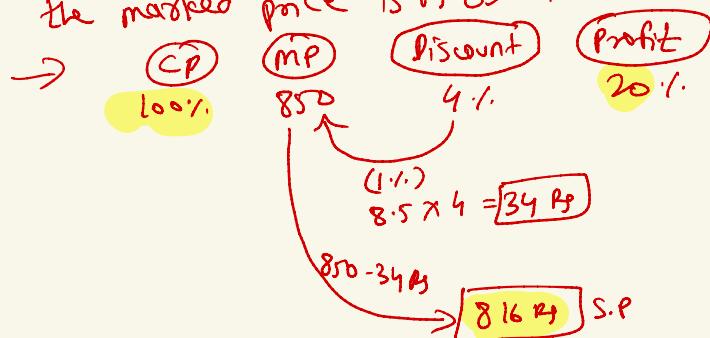
$$\frac{450 \times 100}{150} \%$$

$$x = \frac{3000}{9} = \frac{100}{3}\%$$

$$\Rightarrow \text{Ans } 150 \text{ Rs}$$

Find Cost Price

① Ram allows a discount of 4%. on the market price of his goods and still earns a profit of 20%. What is the cost price of a goods if the marked price is Rs 850?



$$120\% = 816$$

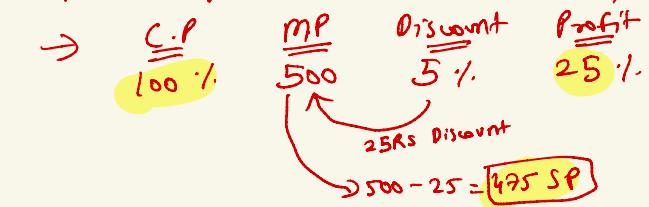
$$100\% = x$$

$$120 \times x = 100 \times 816$$

$$x = \frac{100 \times 816}{120} = 680$$

$$(x = 680) \text{ C.P.}$$

② The market price of an article is Rs 500. A shop keeper gives a discount of 5%. and still makes a profit of 25%. The cost price of the article is,



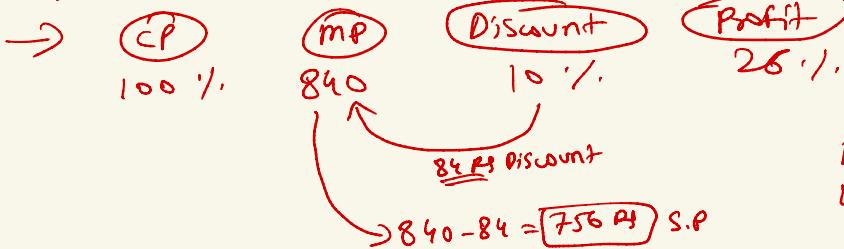
$$125\% = 475$$

$$100\% = x$$

$$x = \frac{475 \times 100}{125} = 380$$

$$(x = 380) \text{ C.P.}$$

③ A cycle dealer offers a discount of 10% and still makes a profit of 26%. What does he pay for a cycle whose marked price is 840?



$$126\% = 756$$

$$100\% = x$$

$$x = \frac{756 \times 100}{126} = 600$$

$$(x = 600)$$