

Profit and Loss

Cost Price = CP

Selling Price = SP

Investment

Recovery

Profit = CP < SP

Loss = CP > SP

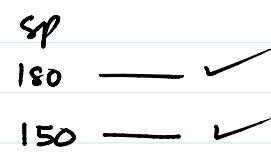
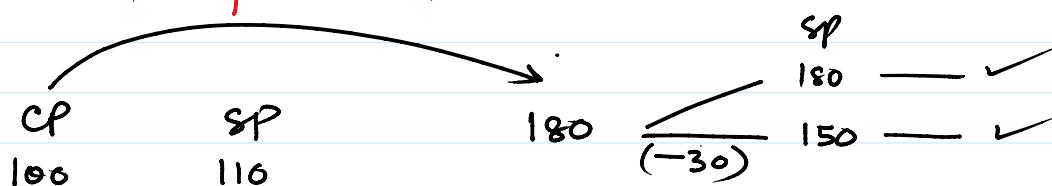
$1000 < 1200$ - Profit

$1000 > 900$ = Loss.

$$\text{Profit \% / Loss \%} = \frac{P/L}{CP} \times 100$$

Base Price = CP

Marked Price = Mark up Price = Advertised Price = List Price



* Discount is always offered on Marked Price. never on Cost Price.

	CP	SP	P	L	P%	L%
①	100	120	<u>20</u>		$\frac{20}{100} \times 100$	20%
②	100	80		<u>20</u>		$\frac{20}{100} \times 100 = 20\%$
③	<u>125</u>	150	<u>25</u>			20%
④	<u>250</u>	200		<u>50</u>		20%
		x			$1.2x = 150$	
		x			$x = \frac{150}{1.2} = 125$	
					$0.8x = 200$	
					<u>200</u> <u>250</u>	

$$x \cdot 8x = 200$$

$$\frac{2000}{160} = 250$$

	<u>CP</u>	<u>SP</u>	<u>P/L</u>	<u>P/L%</u>	<u>MP</u>	<u>D%</u>
(1)	100	?	?	+20%	150	<u>?</u> <u>20%</u>

$$D = \frac{30}{150} \times 100 = 20\%$$

$$500 \times \frac{120}{100} = 600$$

$$400 \times \frac{80}{100} = 320$$

Question 1:-A Person bought an article at 500 rupees at what price he should sell it to get 20% profit. 600.

Question 2:-A Person bought an article at 400 rupees at what price he should sell it to get 20% loss. 320.

Question 3:-A Person sold an article at 600 rupees and he incurs a loss 25% find the CP of the article 800

Question 4:-A Person bought a second hand bike for 30000 he spends 5000 for its repairing at what price he should sell the bike to get the profit of 25%

$$\text{overall CP} = 30000 + 5000 = 35000.$$

$$35000 \times \frac{125}{100} = 43750$$

Question 5:-A Person bought 10 watches for 2000 at what price he should sell each watch to get the profit of 50% 300

$$200 \times \frac{150}{100} = 300$$

get the profit of 50% 300

Question 6:- A Person bought 6 mangoes for 50 at what price he should sell 4 mangoes to get the profit of 20%

$$6 \text{ Mangoes} — \frac{CP}{50}$$

SP
50 × 120
100 = 60

6 Mangoes

$$6 \text{ Mangoes} — \underline{\text{Rs } 60}$$

$$\cancel{4 \text{ Mangoes}} \rightarrow \underline{\text{Rs } 40}$$

$$= \frac{10}{60} \times 40 =$$

$$\frac{SP}{50} = 60$$

Question 7:- Oranges are bought at the rate of 7 for rupees 3 at what rate per hundred must be sold to get 33% profit 57

$$7 \text{ oranges} — \text{Rs } 3$$

$$100 \text{ oranges} — ?$$

$$\frac{100 \times 3}{7} = \underline{\underline{\frac{300}{7} \text{ Rs}}}$$

$$\frac{300}{7} \times \frac{133}{100}$$

$$\underline{\underline{\frac{399}{7} \text{ Rs}}}$$

$$1 \text{ flower} = \frac{360}{90}$$

Rs 4

Question 1:- A Person sold an article at 200 rupees and gets a loss of 20% at what price he should sell it to get 20% profit. 300

$$80\% \rightarrow 200$$

$$120\% \rightarrow ?$$

$$\frac{100}{200} \times 200 = 3$$

Question 2:- A Person sold a notebook at 42

Question 2:- A Person sold a notebook at 42 rupees and he gets a profit of 5% at what price he should sell it to get the profit of 25%

$$\underline{\text{CP}} \\ \underline{250}$$

$$\underline{\text{SP}} \\ \underline{200}$$

$$\underline{\text{L}} \\ \underline{20\%}$$

$$100 \xrightarrow{\quad} 80 \xrightarrow{\quad} 200$$

\downarrow

\downarrow

?

$$\frac{25}{200 \times 100} \xrightarrow{\quad} \underline{80}$$

$$\begin{array}{c} \cancel{\text{SP}} \\ \cancel{80} \end{array} \quad \begin{array}{c} \text{P} \\ 20\% \end{array}$$

$$250 \xrightarrow{\quad} \underline{300}$$

$$\frac{250 \times 120}{100} \xrightarrow{\quad} \underline{300}$$

$$105\% \xrightarrow{\quad} 42$$

$$125\% \xrightarrow{\quad} ?$$

$$\begin{array}{c} \cancel{42 \times 125} \\ \cancel{105} \end{array} \xrightarrow{\quad} \underline{25}$$

$$\underline{50}$$

Question 3:- A Person sold a TV in 500 and a radio in 270 & gets a profit of 10% if he would have sold TV in 380 and radio at its cost price then he would have got 10% loss find the CP of Radio

Question 4:- By selling 12 oranges for 60 rupees a person gets a loss of 25% How many oranges he should sell for rupees 100 to get 25% profit

$$12 \text{ Oranges} \xrightarrow{\quad} \underline{60} \xrightarrow{\quad} \begin{array}{l} 75\% \\ \cancel{100} \end{array} \xleftarrow{\quad} \begin{array}{l} 125\% \\ ? \end{array}$$

$$\begin{array}{c} \cancel{770} \\ ? \end{array} \xrightarrow{\quad} \begin{array}{l} 110\% \\ \cancel{100\%} \end{array}$$

$$\frac{770 \times 100}{110} \xrightarrow{\quad} \underline{700}$$

$$\underline{700} = \text{TV} + \text{Radio}.$$

$$380 + \text{Radio} = 630.$$

$$\begin{array}{l} \text{Radio} = 630 - 380 \\ = \underline{250}. \end{array}$$

$$\begin{array}{c} \cancel{125 \times 60} \\ \cancel{75} \end{array} \xrightarrow{\quad} \underline{4}$$

Question 5:- By selling 20 articles for 50 rupees a person gets a loss of 20% at what price he should sell 16 articles to get 60% profit

"Had it been sold" questions:-

Question 1:- A person sold an article at 7% loss

$$\begin{array}{c} \cancel{50} \\ ? \end{array} \xrightarrow{\quad} \begin{array}{l} 80\% \\ \cancel{160\%} \end{array}$$

$$2 \frac{160 \times 50}{80} = \underline{100}$$

$$\begin{array}{c} \cancel{20} \\ \cancel{12} \end{array} \xrightarrow{\quad} \begin{array}{l} 100 \\ ? \end{array} \xrightarrow{\quad} \begin{array}{l} 60\% \\ \dots? \end{array}$$

Question 1: - A person sold an article at 7% loss had it been sold for 64 rupees more there would have been a profit of 9% find the Cost price of the article

$$\begin{array}{ll}
 \text{CP} & \text{SP} \\
 \textcircled{100x} & 93x \\
 93x + 64 = 109x & \\
 64 = 16x & \\
 4 = x & \\
 \underline{400} &
 \end{array}$$

$$\begin{array}{ll}
 \textcircled{100x} & 93x > \underline{64} \\
 \underline{400} & 109x - 93x = 64 \\
 & 16x = 64 \\
 & x = 4.
 \end{array}$$

$$\begin{array}{rcccl}
 20 & \cancel{100} & 100 & - & 60\% \\
 16 & ? & - & - & 60\% \\
 \hline
 \frac{16 \times 100}{20} & 5 & 80 & &
 \end{array}$$

$$\begin{array}{l}
 16\% \\
 -7\% + 9\%
 \end{array}$$

$$\begin{array}{l}
 +9 - (-7) \\
 +9 + 7 = \underline{16\%}
 \end{array}$$

$$\begin{array}{l}
 64 = 16\% \\
 ? \cancel{100\%} \\
 \frac{64 \times 100}{16} \\
 \underline{400}
 \end{array}$$

Question 2: - A cooker is sold at a gain of 16% had it been sold for 20 rupees more the gain would have been 20% find the Cost price of the cooker

500

$$\begin{array}{ll}
 \textcircled{100x} & 116x > 20 \\
 & 120x \\
 & \cancel{80x} > 50
 \end{array}$$

$$4x = 20$$

Question 3: - An article is sold at a gain of 20% had it been sold for 50 rupees less then there would have been a loss of 20%. At what price he should sell it to get the profit of 40% 175.

$$\begin{array}{l}
 \frac{25}{125 \times 40} 2 \\
 \cancel{100x} \\
 \underline{50}
 \end{array}$$

$$100x = \frac{25}{9}$$

$$\begin{array}{l}
 40x = 50 \\
 x = \frac{5}{4} \\
 \underline{125} \text{ CP}
 \end{array}$$

$$125 + 50 = \underline{175}$$

Question 4: - A Shopkeeper sold an article for 5% loss. If he had bought it for 10% less and sold it for 33 rupees more he would have got 30% profit. Find the Cost Price of the article. 150.

Question 5: - A Shopkeeper sold an article for 10% loss. If he had bought it for 20% less and

$$\begin{array}{l}
 \text{CP} \quad \text{SP} \\
 \textcircled{100x} \quad 95x \\
 \frac{90x \times 1.30}{100} = 95x + 33 \\
 117x = \cancel{95x} + 33
 \end{array}$$

Question 5: - A Shopkeeper sold an article for 10% loss. If he had bought it for 20% less and sold it for 120 rupees more he would have got 50% profit. Find the Cost Price of the article.

$$117x = \cancel{95x} = 33$$
 ~~$22x = 33 \div 1.5$~~

$$1.5 \times 100 = \underline{\underline{150}}$$

$$\begin{array}{ll} CP & SP \\ 100x & 90x \\ 40 \cancel{80x} \times \frac{3}{100} & = 90x + 120 \\ x & \end{array}$$

$$\begin{aligned} 120x &= 90x + 120 \\ 30x &= \cancel{120} 4. \end{aligned}$$

$$CP = \underline{\underline{400}}$$

Question 1: - A sell a bicycle to B at 20% profit while B sell to C at 25% profit. If C pays rupees 225 for it the cost price of bicycle for A is 150.

$$\begin{array}{lll} A & B & C \\ x & \frac{x+20}{100} & \frac{x+20}{100} \times \frac{25}{100} \end{array}$$

Question 2: - A bought an article for 300 and sold it to B at 20% profit while B sells to C at 10% loss. At what price C purchased the article

$$\frac{30}{100} \times \frac{120}{100} \times \frac{90}{100} = \underline{\underline{324}}$$

$$\begin{aligned} \frac{x+20}{100} \times \frac{25}{100} &= 225 \\ x &= \frac{75}{125} \times \frac{20}{100} \times 100 \text{ fr. } 2 \\ x &= 150. \end{aligned}$$

4. A shopkeeper purchases ~~20 mangoes for 30 rupees~~ and he sells every ~~15 mangoes for 27 rupees~~ find his profit/loss%

$$CP = \frac{30}{40} \quad \underline{\underline{1.5}}$$

$$\frac{18}{15} \times \frac{100}{100} \underline{\underline{20\%}}$$

$$\frac{18}{90} \times \frac{100}{100} \underline{\underline{20\%}}$$

$$SP = \frac{27}{15} \frac{9}{5} = 1.8$$

$$\frac{90}{450} \times \frac{100}{100} \underline{\underline{20\%}}$$

$$\begin{array}{ll} CP & 20 \\ SP & 15 \end{array} \rightarrow 30 \rightarrow 4.50$$

$$\begin{array}{ll} SP & 15 \\ SP & 27 \end{array} \rightarrow 27 \rightarrow 540$$

$$\begin{array}{ll} 60 & 90 \\ 60 & 108 \end{array}$$

5. A shopkeeper purchases 11 pens for 10 rupees and he sells every 10 pen for 11 rupees find his profit/loss%

$$\begin{array}{r} \cancel{CP \ 11 = 10} = 100 \\ \cancel{SP \ 10 = 11} = 121 \\ \hline 21\% \end{array}$$

6. If CP of 15 articles is as same as SP of 20 articles then find the profit/loss%

$$\begin{array}{r} CP \ 15 = 60 \\ SP \ 20 = 60 \\ \hline \end{array}$$

(4)

(3)

7. A dishonest salesman professes to sell his goods at no profit no loss but he uses a weight of 800 grams instead of 1kg find his profit%

$$\frac{1}{4} \times 100 = 25\% \text{ Loss}$$



$$\frac{100}{800} \times 100 = 25\%$$

$$P\% = \frac{\text{Error committed}}{\text{Product given}} \times 100\%$$

8. A dishonest salesman sells his goods at 20% profit & he also uses a weight of 800 grams instead of 1kg find his profit%

$$CP = 100$$

$$Rs \ 100 = 1000 \text{ gms.}$$

$$SP = 150$$

$$\begin{array}{r} Rs \ 120 = 800 \text{ gm} \\ \downarrow \quad \quad \quad \downarrow \\ ? \quad \quad \quad 1000 \text{ gm} \end{array}$$

$$P\% = \frac{50}{100} \times 100$$

$$\underline{50\%}$$

$$\frac{100}{800} \times 120 = 15$$

1. A fruit seller sell fruits at 44rs/kg and gains a profit of 10% how many kg's of fruits he should sell to get a profit of 52 rupees.

$$\begin{array}{r} 44 = 110\% \\ ? \leqslant 100\% \end{array}$$

$$\frac{100 \times 44}{110} = 40$$

$$CP = 40 \quad SP = 44$$

(4)

3. If selling price is doubled then profit earned

(4)

3. If selling price is doubled then profit earned on article becomes 4 times find the original profit%

5% 13

$$\frac{120\%}{100\%} = \frac{720}{?}$$

$$\frac{6}{100} \times 100 = 600.$$

$$120 \times 10 \times 30 = \underline{\underline{36000}}$$

$$\frac{65k \times 100}{100} = 50\%$$

CP x	SP y	P $y-x$	• 5x
x	\cancel{y} $1.5x$	$y-x$	
x	$\cancel{2y}$ $3x$	$2y-x$	$2x$

$$4(y-x) = 2y-x$$

$$4y - 4x = 2y - x$$

$$2y = 4x - x$$

$$2y = 3x.$$

$$y = 1.5x$$

4. Two articles are sold at same price one on profit of 20% and other on loss of 20% find the overall profit or loss%

- 4%

5. A person sells 100kg of sugar partly at 7% profit and remaining at 17% profit, if the overall profit earned by him is 10% then find how many kg's of sugar is sold at 7% profit

* Rule :- CP of 2 products equal (1) x% Profit (2) x% Loss
 ("No Profit No Loss")

* Rule:- SP of 2 Products equal (1) x% Profit (2) x% Loss.

* Rule: - SP of 2 Products equal (1) \times % Profit (2) \times % Loss.

$$\begin{array}{rcl} CP & \begin{array}{c} 1000 \\ +10\% \\ \hline 1100 \end{array} & \begin{array}{c} 1000 \\ -10\% \\ \hline 900 \end{array} \end{array}$$

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

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

4% Loss

overall $CP = 2000$

$SP = 2000$

Overall

$$SP = 2400 \\ +20\%$$

$$\begin{array}{rcl} 120\% & \cancel{\underline{2400}} & 200 \\ 100\% & \cancel{\underline{200}} & 200 \end{array}$$

$$2400 \\ -20\%$$

$$\begin{array}{rcl} 80\% & \cancel{\underline{2400}} & 300 \\ 100\% & \cancel{\underline{300}} & 300 \end{array}$$

$$CP = 5000 \\ SP = 4800$$

$$\begin{array}{rcl} 200 & \cancel{\underline{5000}} & 100 \\ 500 & \cancel{\underline{4800}} & 4800 \end{array}$$

4% Loss.

5. A person sells 100kg of sugar partly at 7% profit and remaining at 17% profit, if the overall profit earned by him is 10% then find how many kg's of sugar is sold at 7% profit

$$110. = \frac{x \times 107 + (100-x) 117}{100}$$

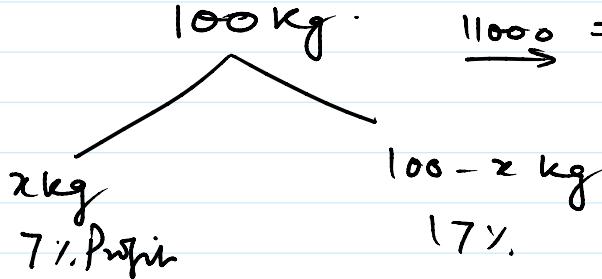
$$11000 = 107x + 11700 - 117x$$

$$\cancel{11000} = -10x + 11700$$

$$10x = 700$$

70 kg

Cost/kg ₹100



$$10000 \rightarrow 11000$$

3. 12 copies of a book were sold for ₹ 1800/- thereby gaining cost price of 3 copies. The cost price of a copy is :

- (1) ₹ 120/- (2) ₹ 150/-
 (3) ₹ 1200/- (4) ₹ 1500/-

CP of each book = ₹ x

$$12x \quad 1800 \quad 3x$$

$$1800 - 12x = 3x$$

$$\begin{array}{rcl} 1800 & = & 15x \\ 120 & = & \underline{15x} \end{array}$$

25. A man purchased some eggs at 3

25. A man purchased some eggs at 3 for ₹ 5 and sold them at 5 for ₹ 12. Thus he gained ₹ 143 in all. The number of eggs he bought is

- (1) 210 (2) 200
(3) 195 (4) 190

$$15 \text{ eggs} \rightarrow 11$$

~~?~~

$$\cancel{15} \cancel{\times} \cancel{11} \quad \cancel{143}$$

~~CP~~
$$\begin{array}{r} 3 \quad 5 \\ \cancel{5} \quad \cancel{12} \\ \hline 25 \quad 36 \end{array}$$

$$\begin{array}{r} 143 \\ \cancel{14} \\ \hline 13 \times 15 \\ \hline 195 \end{array}$$

~~$$\begin{array}{r} 15 \times 11 \\ \hline 143 \end{array}$$~~

34. A fruit-seller buys some oranges and by selling 40% of them he realises the cost price of all the oranges. As the oranges being to grow over-ripe, he reduces the price and sells 80% of the remaining oranges at half the previous rate of profit. The rest of the oranges being rotten are thrown away. The overall percentage of profit is

- (1) 80 (2) 84
(3) 94 (4) 96

37. Two toys are sold at ₹ 504 each. One toy brings the dealer a gain of 12% and the other a loss of 4%. The gain or loss per cent by selling both the toys is

$$CP = 975$$

$$SP = 1008$$

$$11 \frac{33}{975} \times 100 = 4$$

$$\frac{44}{13} \quad 3 \frac{5}{13} \%$$

CP/orange Rs - 10

100 oranges \rightarrow Rs 1000.

40 oranges \rightarrow Rs 1000.

48 oranges \rightarrow $\frac{48 \times 17.5}{840}$

12 Oranges \rightarrow discarded.

$$\underline{1600} \quad 1840.$$

$$\frac{840}{1600} \times 100\% = 84\%$$

$$504 \quad 504$$

$$+12\% \quad -4\%$$

$$\begin{array}{l} 112\% \rightarrow 504 \\ 100\% \rightarrow ? \end{array}$$

$$\begin{array}{l} 96\% \rightarrow 504 \\ 100\% \rightarrow ? \end{array}$$

$$18 \quad +26 \quad \frac{504 \times 106}{112} = 25$$

~~112~~
~~28~~

$$450$$

$$21 \quad +26 \quad \frac{504 \times 100}{96} = 25$$

~~96~~
~~24~~

$$525$$

31. A vendor sells lemons at the rate of 5 for ₹ 14, gaining thereby 40%. For how much did he buy a dozen lemons?

- (1) ₹ 20 (2) ₹ 21
 ✓ (3) ₹ 24 (4) ₹ 28

SP 5 Lemons — Rs 14.

$$\begin{array}{l} 140\% \rightarrow 14 \\ 100\% \cancel{\rightarrow ?} \\ \underline{\text{Rs } 10} \end{array}$$

44. A manufacturer sells an item to a wholesale dealer at a profit of 18%. The wholesaler sells the same to a retailer at a profit of 20%. The retailer in turn sells it to a customer for ₹ 15045 thereby earning a profit of 25%. The cost price of the manufacturer is

- (1) ₹ 8000 (2) ₹ 8500
 (3) ₹ 9000 (4) ₹ 10000

$$x \times \frac{118}{100} \times \frac{120}{100} \times \frac{125}{100} = 15045$$

$$x = \frac{5015}{15045 \times 100 \times \cancel{100} \times \cancel{100}}$$

$$x = \frac{118 \times 120 \times 125}{59 \times \cancel{100} \times \cancel{100}}$$

$$x = \frac{85}{5015 \times 100}$$

$$\underline{\underline{8500}}$$

4. A milkman makes 20% profit by selling milk mixed with water at ₹ 9 per litre. If the cost price of 1 litre pure milk is ₹ 10, then the ratio of milk and water in the said mixture is

- (1) 3 : 1 (2) 4 : 1
 (3) 3 : 2 (4) 4 : 3

Milk + Water

9

$$\begin{array}{l} 120\% \cancel{\rightarrow} 9 \\ 100\% \cancel{\rightarrow} ? \end{array}$$

$$2.5 \quad \frac{100 \times 9}{120} = 7.5$$

$$\begin{array}{l} SP \rightarrow 9 \\ 12 \cancel{\rightarrow} 3.6 \end{array}$$

$$\begin{array}{l} \text{Solution} - CP = 7.5 \\ \text{Milk} \quad CP = 10 \quad > 30 \end{array}$$

$$\begin{array}{l} \text{Milk} - 3 \text{ Ltr} \rightarrow \text{Rs } 30 \\ \text{Water} - 1 \text{ Ltr} \rightarrow \text{Rs } 0 \end{array}$$

$$\begin{array}{l} 4 \text{ Ltr} \rightarrow 9 \times 4 \\ = \underline{\underline{36}} \end{array}$$