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

Ex Asha buys a certain no. of oranges at 12 per Rs 9 and the same no. of 18 per Rs 9. If she sells them at 18 per Rs 15, does she gain or lose and by what %?

Let Asha buys x oranges at 12 per 9.

$$C \to x \times \frac{9}{12} + x \times \frac{9}{18} = x \times \frac{3}{4} + x \times \frac{1}{2} = \frac{x(3+2)}{4} = \frac{5x}{4}.$$

$$S = 2x \times \frac{15}{18} = \frac{x \times 15}{9} = \frac{5x}{3}.$$

$$\text{Profit \%} = \frac{5x/3 - 5x/4}{5x/4} \times 100$$

$$= \frac{100}{3}\% = 33\frac{1}{3}\%.$$

Ex Wasim started a business with Rs 25,000 and after 4 months Waqar joined him with Rs 60,000. Wasim received Rs 58,000 including 10% of the profits as commission for managing the business. What amount did Waqar receive?

$$\frac{25000 \times 12}{60,000 \times 8} = \frac{5}{12} \times \frac{12}{8} = \frac{5}{8}.$$

$$0.9P \times \frac{5}{13} + 0.1P = 58,000$$

$$\Rightarrow P = \frac{58000}{0.9 \times \frac{5}{13} + 0.1} = 1,30,000.$$

Then, Waqar received = $1,30,000 - 58,000 = 72,000$.

Ex A started a business with Rs 40,000. After 2 months B joined him with Rs 60,000. C joined them after some more time with Rs 1,20,000. At the end of the year, out of a total profit of Rs 3,75,000 C get Rs 1,50,000 as his share. How many months after B joined the business did C join?

$$A:B:C = \frac{40\times 12}{60\times 10}:\frac{60\times 10}{120\times x} = \frac{24}{30}:\frac{6}{x} = \frac{4}{5}:\frac{1}{x}.$$

Then, $\frac{150}{375} = \frac{6}{15} = \frac{2}{5} = \frac{x}{9+x}$

$\Rightarrow 18+2x = 5x$

$\Rightarrow x = 6$.

Ans $\rightarrow$ 6 - 2 = 4 months.

Ex The working partner of a business gets as his commission 10% of the profits left after his commission is paid. If the working partner's commission is Rs 30,000, then, find the total profit.

$$(P - 30,000)\times 0.1 = 30,000$$

$\Rightarrow P = 3,30,000$.

Stocks & Shares :-

Face Value / Par Value

Market value $\rightarrow$ Rate at which share is bought or sold in the market

If Market Value > Face Value — Premium
Market Value < Face Value — Discount

Dividend is always calculated on Face value.

5% stock → Rate of return is 5%.

Ex What is annual income from Rs 21,500 invested in 3% stock at 7.5% premium?

$$\frac{21,500}{107.5} \times 3 = 600.$$

Ex Which of the following is a better investment - 4% stock at Rs 84 or 8% stock at Rs 128.

$$\frac{4}{84} \times 100 = \frac{100}{21} \qquad \frac{8}{128} \times 100 = \frac{200}{32} = \frac{100}{16}.$$

$$\frac{100}{16} > \frac{100}{21}$$ Hence 8% is better.

Ex A man owned Rs 25,000 worth of 6% stock. When it was quoting Rs 228 he sold it and invested the proceeds in 7.5% stock quoting at Rs 135, so that his annual income doubled. How much money he was left with or how much more money was he required to bring in?

No. of stocks = $\frac{25,000}{100} = 250.$ Annual income → $250 \times 6 = 1500.$

Sold value = $250 \times 228 = 57,000$

No. of stocks required for double annual income = $\frac{3000}{7.5}$

$= 400.$

Then $400 \times 135 = 54,000$

He will be left with = $57000 - 54000 =$ Rs 3000.

Ex A person invests Rs 19,400 in 5% stock at 97. He then sells it when it is quoting Rs 104. He then reinvests this money in 4% stock at ~~₹~~00, which he sells when the stock is quoting ~~at~~ 105. Find the overall profit of transaction.

$\frac{19400}{97} = 200$ stocks.

$200 \times 104 = 20{,}800$

1400 Profit

$\frac{20{,}800}{\text{₹}00} = 208$ ~~Stocks~~

$208 \times 105 = 21{,}840$

1040 Profit.

$\therefore$ Overall profit $= 1400 + 1040 = 2440$.

Ex A man invested Rs 17,400 in 6% stock at 13% discount. What is his yield percent approximately?

$\Rightarrow \frac{6}{87} \times 100 = 6.89\% \approx 7\%$

Ex A student appears for 4 papers English, Maths, Physics, Chemistry, maximum marks for which are in ratio 1:1:2:2. His marks are in ratio 4:8:13:15. If he got 80% of total of max. marks, in how many papers did he get more than 80%?

$\frac{4x+8x+13x+15x}{T+T+2T+2T} = 0.8$

$\Rightarrow \frac{40x}{6T} = 0.8 = \frac{4}{5}$

$\Rightarrow \frac{2}{T} = \frac{4}{5} \times \frac{6}{40} = \frac{6}{50} = \frac{3}{25} = 12\%$.

Ans → 2.

Ex In any month, Harish deposits m% and withdraws n% of the closing balance of previous month. If his balance at the end of March (after the withdrawal) is the same as his balance at the beginning of Jan (before deposit), which of following is True?

(a) $\frac{n}{2} < m < n$ (b) $m = n$ (c) $m > n$ (d) $m < n/2$.

$$A\left[1 + \frac{m-n}{100} \times \frac{m-n}{100}\right]^3 = A$$

$$\Rightarrow 1 + \frac{m-n}{100} = 1$$

$$\Rightarrow m = n.$$

Ex Investment of Rs X for max. return

(i) Investment in mutual fund of X Ltd. If a rise occurs in stock market, he would get 8% return. If a fall occurs in it, he would get -5% return.

(ii) Investment in Y. If rise occurs, he would get -4% return. If a fall occurs, he would get 3% return.

(iii) Investment in bank which assures 0.15% return.

Lets assume x% in (i) and (100-x)% in Y.

$$x \times \frac{8}{100} + (100-x)\frac{-4}{100} = x \times \frac{-5}{100} + (100-x)\times\frac{3}{100}$$

$$\Rightarrow 8x - 400 + 4x = -5x + 300 - 3x$$

$$\Rightarrow 20x = 700$$

$$\Rightarrow x = 35\%.$$

Return → If market rise → $35\% \times \frac{8}{100} + 65\% \times \frac{-4}{100}$

$$= 2.8 - 2.6$$

$$= 0.2\%.$$

∴ Greatest assured return = 0.2%

- Strategy → 35% in (i) + 65% in (ii)

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Ex A shopkeeper normally makes a profit of 20%. In a certain transaction, he weighed 900 gm instead of 1 kg without his knowledge due to an error in weighing scale. If he charges ~~less than~~ 20% less than what he normally charges, what is his actual profit or loss %?.

C → 100 S → 120.

C → 90 S → 120 × 0.8 = 96

Profit % = $\frac{6}{90} \times 100 = \frac{20}{3}\% = 6\frac{2}{3}\%$.

Ex A trader cheats both his supplier and his customer by using faulty weights. When he buys from the supplier, he takes 10% more than the indicated weight. When he sells to his customer, he gives 10% less than the indicated weight. If he sells at his 'cost-price' (i.e. charges the cost price of the indicated weight), what is his profit %?

Let's assume → C Rs/Kg.

Bought 1.1 Kg for Rs C.

∴ Cost price ₹ C/1.1.

Cost price of 0.9 kg = $\frac{C}{1.1} \times 0.9$

$$\frac{0.9C - \frac{C}{11}}{\frac{9C}{11}} \times 100$$

$$= \frac{\frac{9}{10} - \frac{9}{11}}{\frac{9}{11}} \times 100 = \frac{99 - 90}{110} \times 100$$

$$= \frac{9}{110} \times \frac{11}{9} \times 100 =$$

Let the supplier sell his goods at Rs 100/kg.
While buying the trader takes 1100 gm from supplier for Rs 100 and while selling he gives only 900 gm and charges Rs 100.

$S = 100$ $\quad\quad$ $1100 \to 100$

$900 \to \frac{100}{1100} \times 900 = \frac{900}{11}$.

$$\text{Profit \%} = \frac{100 - \frac{900}{11}}{\frac{900}{11}} \times 100$$

$$= \frac{\frac{200}{11}}{\frac{900}{11}} \times 100 = \frac{200}{9} = 22\frac{2}{9}\%.$$

Ex A trader cheats both his suppliers and ~~traders~~ his customer by using false weights. While buying from his suppliers, he takes 10% more than the indicated weight. When he sells to his customers he gives the customer a weight such that if 10% of that is added to the weight, the weight claimed by the trader is obtained. If he charges cost price of the weight that he claims, find his profit %.

$S \to 100$ $\quad\quad$ $1100 \to 100$

$x \times 1.1 = 1 \Rightarrow x = \frac{1}{1.1} = \frac{10}{11}$ $\quad\quad$ $\frac{10000}{11} \to \frac{100}{1100} \times \frac{10000}{11}$

$= \frac{10000}{121}$.

$$\text{Profit \%} = \frac{100 - \frac{10000}{121}}{\frac{10000}{121}} \times 100$$

$$\Rightarrow \frac{2100}{10000} \times 100 = 21\%.$$

Ex There are 2 numbers such that if both of them are individually increased by 5 and then by the same % as they were increased in 1st instance, each would result in 36. Find the difference b/w numbers.

$$(n+5)\left[1+\frac{5}{n}\times 100\right] = 36$$

$n+5+5$

$$\Rightarrow n+5+(n+5)\frac{500}{n} = 36$$

$$\Rightarrow n^2+5n+500n+2500 = 36n$$

$$\Rightarrow n^2+469n+2500 = 0.$$

$$\left(n+5\right)\left(1+\frac{5}{n}\right) = 36$$

$$\Rightarrow n+5+5+\frac{25}{n} = 36$$

$$\Rightarrow n^2+\frac{25}{n}+-26 = 0.$$

$$\Rightarrow n^2-26n+25 = 0 \Rightarrow n = 25 \text{ or } 1.$$

Ans → 25 − 1 = 24.

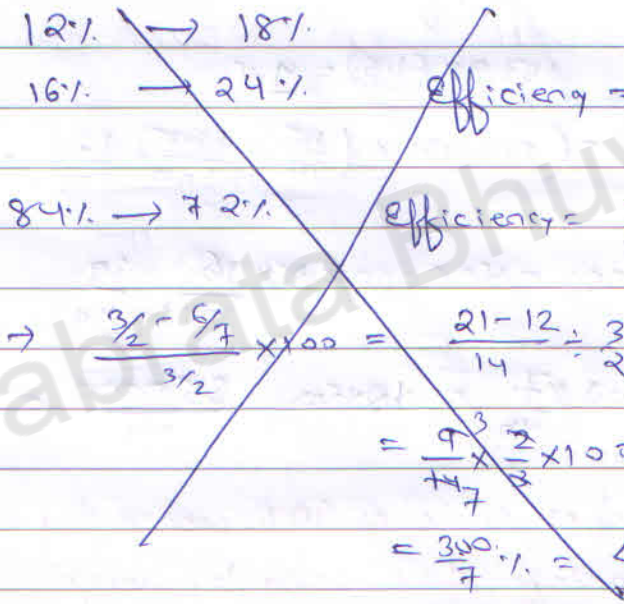
Ex A motorist uses 12% of his fuel to cover 18% of his total journey for non-city driving conditions. He knows that he has to cover another 24% of his total journey in non-city driving conditions. What should be the percentage decrease in fuel efficiency for city driving over non-city driving, so that he just complete his entire journey without a refill?

36% → 54% ⇒ Efficiency = 1.5 = 3/2.

64% → 46% Efficiency → 46/64 = 23/32.

Ans → $\frac{3/25 \quad 23/32}{3/2}$

$= \frac{25}{32} \times \frac{2}{3} = \frac{25}{48} \times \frac{25}{12} = \frac{625}{12}$



Efficiency $= \frac{24}{16} = \frac{3}{2}$.

Efficiency $= \frac{72}{84} = \frac{6}{7}$.

Ans → $\frac{3/2 - 6/7}{3/2} \times 100 = \frac{21-12}{14} \div \frac{3}{2} \times 100$

$= \frac{9}{14} \times \frac{2}{3} \times 100$

$= \frac{300}{7}\% = 4$

12% → 18%

16% → 24%

28% → 42% Efficiency $= 3/2$.

72% → 58% Efficiency $= \frac{58}{72} = \frac{29}{36}$.

Ans → $\frac{3/2 - 29/36}{3/2} \times 100 = \frac{\frac{25}{36}}{3/2} \times 100$

$= \frac{25}{36} \times \frac{2}{3} \times 100$

$= \frac{1250}{27} \approx 46\%$.

Ex The factory equipment cost a certain factory Rs 5,00,000. If the equipment depreciates 15% value in 1st year, 13.5% in next year, 12% in 3rd year ~~...~~ and so on. What will be its value at the end of 10 years (all %s applying to the original cost)?

$15 + 9 \times (-1.5) = 4.5$

$5,00,000 - \left(500000 \times \left(\frac{15}{100} + \frac{13.5}{100} + \frac{12}{100} + \cdots + \frac{4.5}{100}\right)\right)$

$= 5,00,000 - 500000 \times \frac{35}{40}$

$= 500000 \times \frac{7}{8} = \frac{35,00,000}{4} = 87,500$

Ex Fresh grapes contains 90% water by weight whereas dry grapes contain 20% water by weight. Ram buys 64 Kgs of fresh grapes for Rs 160. At what price should Ram sell the dry grapes to get a profit of 20%?

Fresh grapes → $64\,Kg \times 0.1 = 6.4\,Kg$ → Rs 160.

Per Kg → $\frac{160}{6.4}$

$= \frac{160}{64} \times 10$

$= 25$

Profit 20%.

S.P. → $25 \times \frac{6}{5} = 30$

100% → 30

80% → 24.

Ex Ramu manufactures ceramic cups. On any day Ramu manufactures as many cups as the price of cups. Everyday Ramu sells all of his cups at a profit of Rs 10/cup. If at the end of the

day he makes a profit of 5%, then how much profit did he make by the end of everyday?

Cost price = $C \times C$

S.P. = $C(C+10)$.

Then:- $\frac{C(C+10) - C^2}{C^2} \times 100 = 5$.

$\Rightarrow \frac{C+10-C}{C} = \frac{1}{20}$

$\Rightarrow \frac{10}{C} = \frac{1}{20} \Rightarrow C = 200$.

$\therefore$ Profit = $C \times 10 = 2000$.

Ex A person buys some tomatoes at 5 for a rupee and an equal no. at 25 n/p each. He sells them at a rate of 9 for Rs 2 but incurs a loss of Rs 5 in the transaction. How many tomatoes did the person purchase?

$C = x \times 20 + x \times 25 = 45x$.

$S = 2x \times \frac{200}{9} = \frac{400x}{9}$.

Then, $45x - \frac{400x}{9} = 500$

$\Rightarrow \frac{5x}{9} = 500 \Rightarrow x = 900$.

Ans $\rightarrow 2x = 1800$.

Ex X, Y, Z invest in a partnership. The amounts that X, Y, Z invest are in the ratio of $x:y:z$ and their profits are in the ratio of $z:y:x$. The ratio of theire periods of invest is

$$\frac{x \times A}{y \times B} = \frac{z}{y} \qquad \frac{xz^2}{zxy}$$

$$\frac{y \times B}{z \times C} = \frac{y}{x} \qquad \frac{zxy}{zx^2}$$

$$\Rightarrow \frac{A}{B} = \frac{z^2}{zx}$$
$$\frac{B}{C} = \frac{zx}{x^2}$$

Ex The capitals of 4 partners A, B, C & D are in the ratio of 7:8:6:5. A's and C's capitals are there in the buiness for entire year. If each partner kept his money invested in the buiness for a period which is more than 6 months, and B & D together get 111/267 of total profit, then for how many months is D's capital invested?

Capital A/B/C/D = 7/8/6/5.

$$\frac{A}{B} = \frac{7 \times 12}{8 \times x}$$
$$\frac{C}{D} = \frac{6 \times 12}{5 \times y}$$

$$\frac{84 + 72 + 8x + 5y}{84 + 72 + 8x + 5y} = \frac{156}{267}$$

$$\Rightarrow \frac{156}{156 + 8x + 5y} = \frac{156}{267}$$

$$\Rightarrow 8x + 5y + 156 = 267$$

$$\Rightarrow 8x + 5y = 111 \qquad \Rightarrow y = \frac{111 - 8x}{5}$$

x	y
7	11

Ans → 11

__/__/____

Ex A person invests some money in a 4% stock at a 10% discount. He gained Rs 300 on selling the stock when it was quoting at 10% premium. This money was invested in a 3% stock at Rs 75 and sold at a price of Rs 80 per stock. How much profit/loss did he make over his initial investment?

No. of stocks = $\frac{300}{20} = 15$

Initial investment = $\frac{15}{100} \times 90 = 1350$

No. of stocks → $\frac{1650}{75} = 22$.

SP = $22 \times 80 = 1760$ Ans → Rs 410 Profit.

Ex A, B, C & D are 4 friends. A purchase a bicycle for Rs 1000. He sells it to B at a certain gain %. B in turn sells it for Rs 1500 to C who in turn sells it to D. The gain % of A, B and C are in AP. Had B sold the bicycle to D directly for the same rate for which C sells the cycle, then he would have made a profit of 62½%.

(i) What profit did B make on selling the cycle to C.?

$$A \xrightarrow{x\%} B \xrightarrow{1500} C \xrightarrow{3x\%} D$$
$$1000 \qquad X \qquad 1500 \qquad \frac{13X}{8}.$$

$X\left(1 + \frac{125}{2} \times \frac{1}{100}\right) = D$

$\Rightarrow D = X\left(1 + \frac{5}{8}\right) = X \times \frac{13}{8} = \frac{13X}{8}$.

$$\frac{X - 1000}{1000} + \frac{\frac{13X}{8} - 1500}{1500} = 2x \frac{1500 - X}{X}$$

$$\Rightarrow \frac{X}{1000} - 1 + \frac{13X}{12000} - 1 = 2\frac{1500}{X} - 2.$$

$$\Rightarrow \frac{X}{1000} + \frac{13X}{12000} = \frac{3000}{X}$$

$$\Rightarrow \frac{X}{1000} + \frac{13X}{12000} = \frac{3000}{X}$$

$$\Rightarrow \frac{1}{1000}\left[\frac{X}{10} + \frac{13X}{120}\right] = \frac{3000}{X}$$

$$\Rightarrow \frac{1}{100} \times \frac{120X + 143X}{1320} = \frac{3000}{X}$$

$$\Rightarrow 263X^2 = 3000 \times 100 \times 1320.$$

$$\Rightarrow X^2 = \frac{300 \times 132 \times 10^4}{263}$$

$$\Rightarrow \frac{1}{1000} \times \frac{25X}{12} = \frac{3000}{X}$$

$$\Rightarrow X^2 = \frac{3000 \times 12 \times 1000}{25} = 12 \times 12 \times 10^4.$$

$$\Rightarrow X = 1200.$$

(i) $1500 - 1200 = 300$

(ii) What profit did C Make?

$$1200 \times \frac{13}{8} - 1500$$

$$= 150 \times 13 - 1500$$

$$= 150 \times 3 = 450.$$

Ex Is the SP of an article more than CP, given that article is sold at a discount of 20%?

(i) M.P. of article was 30% more than CP.
(ii) Had the article been sold at discount of 40%, there would have been loss of Rs 50.

From (i) $MP = 1.3C$

$SP = 1.3C \times 0.8 = 1.04C$.

$\therefore S > C$.

From (ii) $C - MP \times 0.6 = 50$

$\Rightarrow MP = \frac{C-50}{0.6} = \frac{5C}{3} - \frac{250}{3}$

Then $S.P = \left(\frac{5C}{3} - \frac{250}{3}\right) \times \frac{4}{5}$

$= \frac{4C}{3} - \frac{200}{3} = \frac{4C-200}{3}$. Can't say.

Ex In a college election, only Vinod and Varma contested. The total no. of valid votes is 300. Who won in the elections ?

(i) Among the voters whose votes are valid, 79% of PG voters and 43% of UG voters voted in favour of Verma.

(ii) Ratio of PG to UG is 2 : 1.

From (i) $X \times 0.79 + (300-X)\, 0.43$.

$\Rightarrow 129 - \frac{36X}{100}$.

$\Rightarrow = 129 - \frac{9X}{25} < 150$ $\therefore$ Vinod won.

From (ii) No conclusion.