Profit and Loss

Cost price (CP): The price at which an article is purchased or manufactured.

Selling Price (SP): The price at which an article is sold.

Overhead Charges: The extra expenditures on purchased goods apart from actual cost price.

ex: freight charges, rent, Salary, repairing cost on purchased articles etc.

Profit: $SP > CP$

Loss: $CP > SP$

1) Raman purchased a car for 25 lakh and sold it for 24 lakh. Find profit/loss in this transaction.

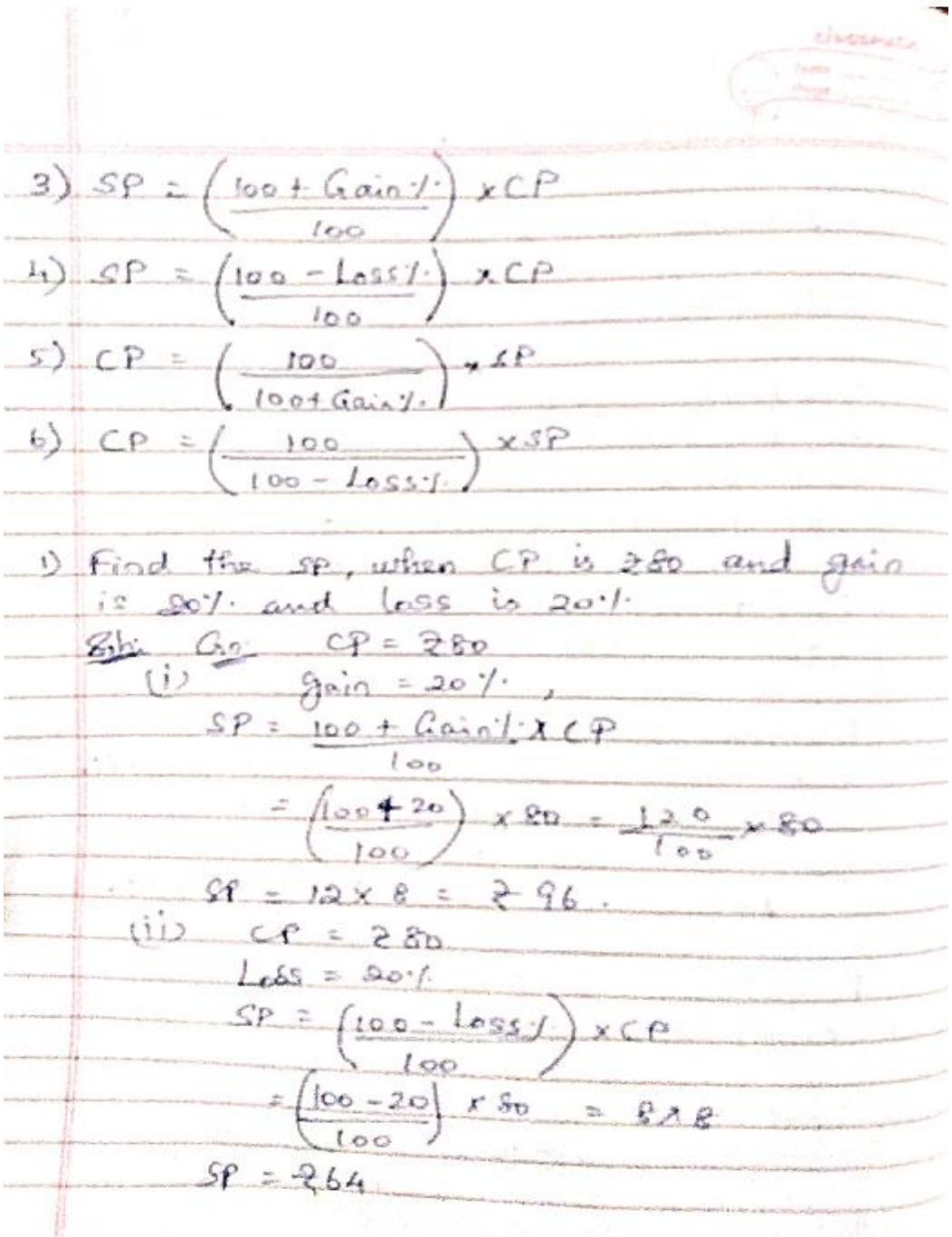
Sol: $SP < CP \Rightarrow$ Loss

$\text{Loss} = CP - SP = (5-4) = 2$ lakh

Formulas

1) $\text{Profit \%} = \frac{\text{Profit}}{\text{Cost price}} \times 100$

2) $\text{Loss \%} = \frac{\text{Loss}}{\text{Cost price}} \times 100$



3) $SP = \left(\frac{100 + \text{Gain\%}}{100}\right) \times CP$

4) $SP = \left(\frac{100 - \text{Loss\%}}{100}\right) \times CP$

5) $CP = \left(\frac{100}{100 + \text{Gain\%}}\right) \times SP$

6) $CP = \left(\frac{100}{100 - \text{Loss\%}}\right) \times SP$

1) Find the SP, when CP is ₹80 and gain is 80% and loss is 20%.

Sol: Given $CP = ₹80$

(i) Gain = 20%,

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

$= \left(\frac{100+20}{100}\right) \times 80 = \frac{120}{100} \times 80$

$SP = 12 \times 8 = ₹96.$

(ii) $CP = 280$

Loss = 20%

$SP = \left(\frac{100 - \text{Loss\%}}{100}\right) \times CP$

$= \left(\frac{100-20}{100}\right) \times 80 = 8 \times 8$

$SP = ₹64$

2) A person sold a table at a profit of $6\frac{1}{2}\%$. If he had sold it for ₹1250 more, he would have gained 19%. Find the CP of the table.

Sol:

Hint : A man sells his items at a profit/loss of a%. If he had sold it for ₹R more, he would have gained/loss b%. Then,

CP of items $= \frac{R}{b \pm a} \times 100$

$\therefore a = 6\frac{1}{2}\% = \frac{13}{2}\%$, $b = 19\%$ & $R = ₹1250$

$$\text{CP of table} = \frac{R}{b-a} \times 100$$

$$= \frac{1250}{19 - \frac{13}{2}} \times 100$$

$$= \frac{1250 \times 2}{25} \times 100$$

$$= ₹10,000.$$

3) If the cost price of 20 articles is equal to the selling price of 18 articles, then find the profit per cent.

[Hint: If cost price of 'a' articles is equal to the Selling price of 'b' articles then profit percentage $= \frac{a-b}{b} \times 100\%$.]

Sol: $a = 20, \quad b = 18$

$$\text{profit } \% = \frac{(a-b)}{b} \times 100\% = \frac{(20-18)}{18} \times 100\%$$

$$= \frac{100}{9}\% = 11\frac{1}{9}\%$$

4) A dishonest dealer professes to sell his goods at cost price but he uses a weight of 930g for 1kg weight. Find his gain per cent.

Sol:

[Hint: "If a dishonest trader profess to sell his items at CP but uses false weight, then $\text{Gain } \% = \frac{\text{Error}}{\text{True Value} - \text{Error}} \times 100\%$

$\text{Gain } \% = \frac{\text{True weight} - \text{False weight}}{\text{False weight}} \times 100\%$]

Sol:

$$\text{Gain } \% = \frac{\text{Error}}{\text{True Value} - \text{Error}} \times 100\% = \frac{70}{1000-70} \times 100\%$$

$$= \frac{70}{930} \times 100\% = \frac{700}{93}\% = 7\frac{49}{93}\%$$

Discount

1) Discount = Marked price − Selling Price
2) Discount % = $\frac{\text{Marked price} - \text{Selling Price}}{\text{Marked price}} \times 100$
3) Discount % = $\frac{\text{Discount}}{\text{Marked price}} \times 100$
4) Selling Price = Marked price $\times \left(1 - \frac{a}{100}\right)$
5) Selling Price = Marked Price − Discount

1) Two successive discounts of 10% and 20% respectively, on the marked price of an article are equal to single discount of Rs. 980. The marked price (in Rs) of the article is :

(a) 1900 (b) 2200 (c) 2,470 (d) 2,070

Sol:

Given Two discounts = 40% and 20%.

Formula Hint:

Two discount a% and b%.

Total discount = $a + b - \frac{ab}{100}$

Discount amount = (marked price) × (Discount %) Ans

Calculation

Single discount percentage = $(40 + 20) - \frac{(40 \times 20)}{100}$

= 52%

$\Rightarrow 52 = 988/\text{marked price} \times 100$

$\Rightarrow$ Marked price $= 1900$.

2) The marked price of a bicycle is ₹1100. A shopkeeper allows a discount of 10% and get a profit of 10%. Find the cost price of the bicycle.

[Hint: If a shopkeeper wants a profit of R% after allowing a discount of r%, then marked price of the item

$$= CP\left(\frac{100+R}{100-r}\right)$$

(or)

Cost price of the item $= MP\left(\frac{100-r}{100+R}\right)$.

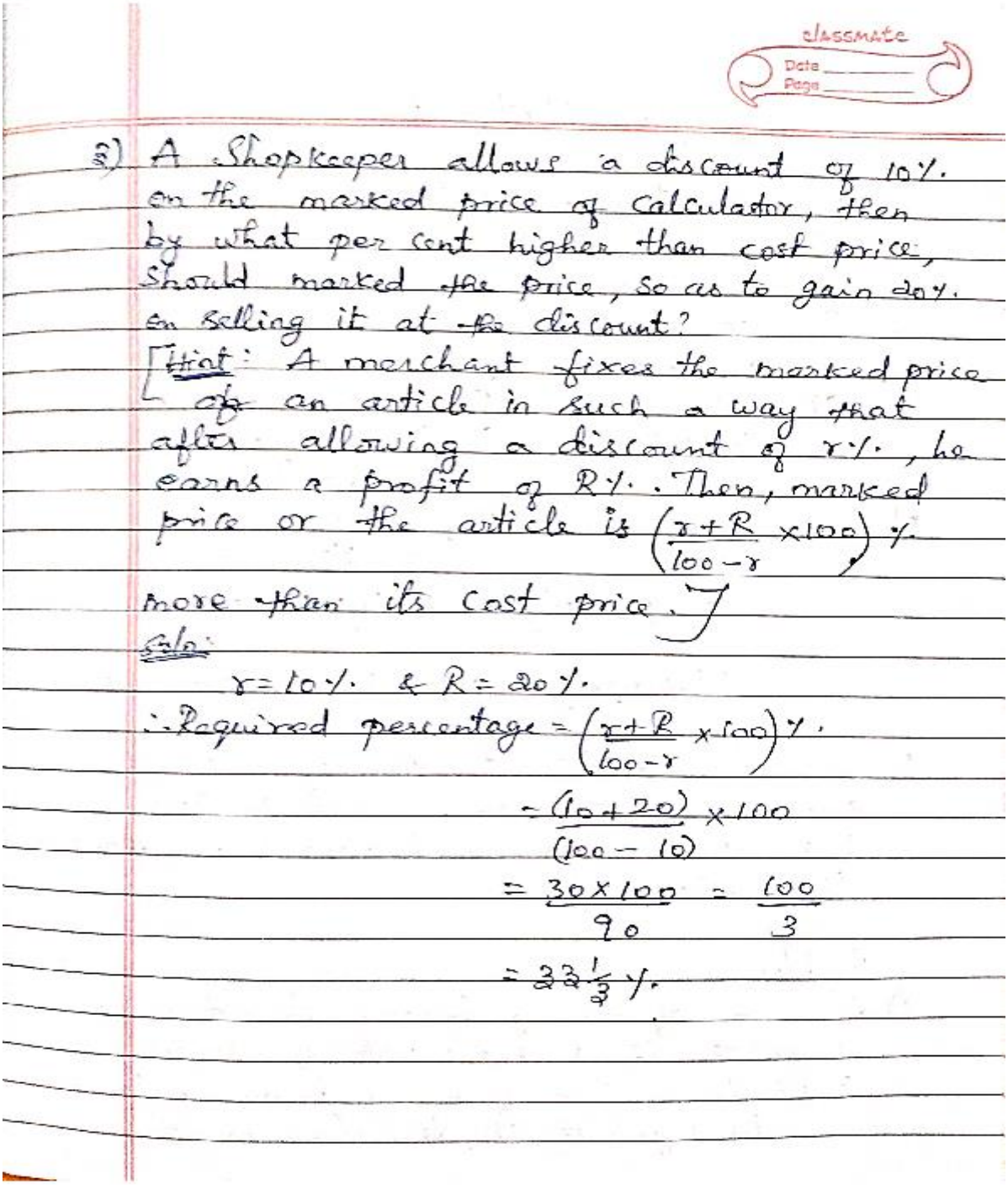
Sol:

$MP = ₹1100$, $r = 10\%$ & $R = 10\%$.

$$CP = MP\left(\frac{100-r}{100+R}\right)$$

$$= 1100 \times \frac{(100-10)}{(100+10)}$$

$$= \frac{1100 \times 90}{110} = ₹900/-$$



3) A Shopkeeper allows a discount of 10%. on the marked price of Calculator, then by what per cent higher than cost price, should marked the price, so as to gain 20%. on selling it at the discount?

[Hint: A merchant fixes the marked price of an article in such a way that after allowing a discount of r%., he earns a profit of R%. Then, marked price or the article is $\left(\frac{r+R}{100-r} \times 100\right)$% more than its cost price.]

Sol:

$r = 10\%$ & $R = 20\%$

$\therefore$ Required percentage $= \left(\frac{r+R}{100-r} \times 100\right)\%$.

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

$= \frac{30 \times 100}{90} = \frac{100}{3}$

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