CLASS – 18

PROFIT & LOSS

Profit = SP − CP

Loss = CP − SP

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

Loss % = $\frac{L}{CP} \times 100$

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

$CP = \frac{SP \times 100}{(100-L)\%}$

$SP = \frac{MP(100-D)\%}{100}$

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

Discount = MP − SP

D % = $\frac{D}{MP} \times 100$

$\frac{MP}{CP} = \frac{100\% + P\%}{100\% - D\%}$

(1) Find the cost price of an article which is sold at Rs 630 at a profit of 12.5 %.

12.5 % = $\frac{1}{8}$ (P / CP)

SP = 9 —— 630

1 → 70

CP = 8 × 70 = 560 Rs

(2) Find the CP of an article w/c is sold at Rs 1470 at a profit of $16\frac{2}{3}$ %.

$16\frac{2}{3}\% = \frac{1}{6}$ (P / CP)

SP = 7 —— 1470

1 → 210

CP = 6 = 6 × 210 = 1260 Rs.

(3) A shopkeeper sells his article at $16\frac{2}{3}$ % P on SP. Find his actual profit %.

$16\frac{2}{3}\% = \frac{1}{6}$ (P / SP)

SP → 6

P → 1

CP → 5

Actual % P = $\frac{1}{5} \times 100$

= 20 %

(4) A shopkeeper sells his goods at $8\frac{1}{3}$ % P on SP. Find actual P %.

$8\frac{1}{3}\% = \frac{1}{12}$ (P / SP)

SP = 12

P = 1

CP = 11

P % = $\frac{1}{11} \times 100$

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

⑤ A man sells his goods at 25% loss on SP. find his loss %.

$25\% = \frac{1}{4}$ (L) — SP

$CP = 5$

$\text{loss}\% = \frac{1}{5} \times 100 = 20\%$

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⑥ cost price of 16 articles is equal to SP of 14 articles. Find profit or loss %.

$16 \times CP = 14 \times SP$

$\frac{CP}{SP} = \frac{7}{8}$) $P = 1$ | $P\% = \frac{1}{7} \times 100 = 14\frac{2}{7}\%$ P

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⑦ A man finds that CP of 2750 articles is equal to SP of 2500 articles. find P or L %.

$\frac{CP}{SP} = \frac{2500}{2750} = \frac{10}{11}$) $P = 1$ | $\%P = \frac{1}{10} \times 100 \Rightarrow 10\%$ P

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⑧ cost price of 12 articles is equal to SP of 9 articles. while the discount on 10 article is equal to the profit earn on 5 articles. find the difference b/w P% & D%.

$12 \times CP = 9 \times SP$

$\frac{CP}{SP} = \frac{3}{4}$

$\%P = \frac{1}{3} \times 100 = 33.33\%$

$10 \times D = 5 \times P$

$\frac{D}{P} = \frac{1}{2}$

CP	SP	MP
3	4	4.5
	1	0.5

$D\% = \frac{1}{4.5} \times 100 = \frac{1}{9} \times 100$

$= 11.11\%$

$P\% - D\% = 33.33\% - 11.11\% = 22.22\%$ Ans

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⑨ CP of 12 articles is equal to SP of 9 articles while the D on 8 articles is equal to P on 6 articles. Find the diff b/w P% & D%.

$\frac{CP}{SP} = \frac{9}{12} = \frac{3}{4}$) $P = 1$

$\%P = \frac{1}{3} \times 100$

$= 33.33\%$

$D \times 8 = P \times 6$

$\frac{D}{P} = \frac{3}{4}$

CP	SP	MP
3×4	4×4	19
	1×4	3

$D\% = \frac{3}{19} \times 100 = 15.79$

$P\% - D\% = 17.5\%$ A

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(10) After selling 72 articles a man loses SP of 9 articles. find L%

SP of 1 Article = 1 Rs
loss = 9 Rs
SP = 72 Rs
CP = 72+9 = 81 Rs

$$\text{loss\%} = \frac{9}{81+9} \times 100$$

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

---

(11) After selling 72 Articles a man earns a profit of SP of 9 articles. find profit %.

SP of 1 Article = 1 Rs
Profit = 9 Rs
SP = 72 Rs
CP = 72−9 = 63

$$P\% = \frac{9}{63_7} \times 100$$

$$= 14\frac{2}{7}\%$$

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(12) After selling 72 Articles a man earns a profit of CP of 9 article. find profit %.

CP of 1 Article = 1 Rs
P = 9 Rs
CP of 72 Articles = 72 Rs

$$P\% = \frac{9}{72_8} \times 100$$

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

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(13) After selling 10 candles a man earn a profit of the SP of 3 pens. While selling 10 pens a man losses SP of 4 candles. The numerical value of P% and L% is equal and the CP of candle is half of the CP of the pen. find the ratio of SP of candle to pen.

	candle	pen
CP →	x	2x
SP →	a	b

CP → 10x
→ 3b

$$P\% \to \frac{3b}{10x} \times 100$$

CP → 20x
loss → 4a

$$L\% \to \frac{4a}{20x} \times 100$$

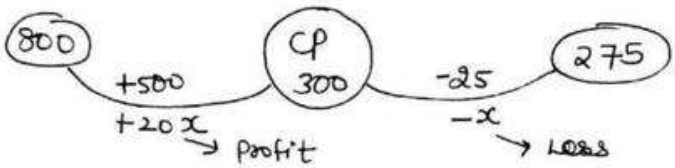
$$\Rightarrow P\% = L\%$$

$$\frac{3b}{10x} \times 100 = \frac{4a}{20x} \times 100$$

$$3b = 2a$$

$$\frac{a}{b} = \frac{3}{2}$$ Ans

(14) The profit earned when article is ~~solved~~ sold for Rs 800 is 20 times the loss incured when it is sold for Rs 275. find at what price he sold his goods if he wants to earn 20% P.



$\underbrace{800-20x}_{CP} = \underbrace{275+x}_{CP}$

$x = 25$

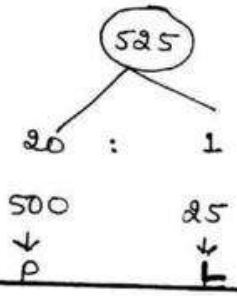
CP = 300

$P = \frac{3}{\cancel{300}} \times \frac{20}{\cancel{100}} = 60$

SP = 300 + 60 = 360

OR

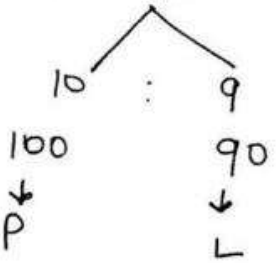
800 − 275 = 525



(15) Profit after selling an article for Rs 717 is $11\frac{1}{9}$% ~~of~~ more than the loss incured when it is sold at Rs 527. What would be the selling price if he wants to earn a profit of 10%.

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

717 − 527 = 190

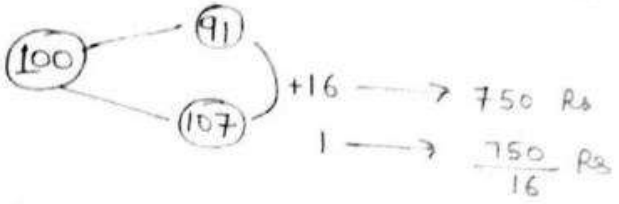


CP = 617

$\cancel{\%}P = 61.7$

SP = 617 + 61.7 = 678.7 Rs.

(16) A shopkeeper sells at 9% loss. Had he sold it Rs 750 more then he would gain 7%. Find initial cost price.



initial cp = $100 \times \frac{750}{16}$ = 4687.50 P.

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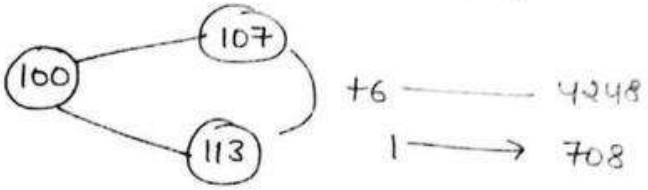
(17) A shopkeeper sells his goods at 7% P. Had he sold it Rs 4248 more than he would gain 13% P. find initial cp.



$CP = 100 \times 708 = 70800$

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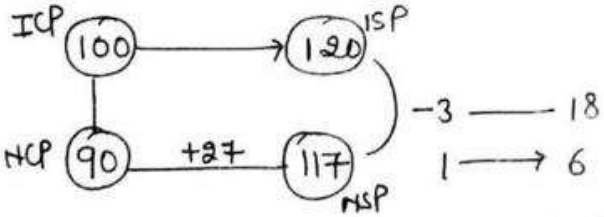
(18) A shopkeeper sells his goods at 30% P. Had he purchase it for 10% less and sold it Rs 18 less then he would gain 30% find initial cp.



$90 \times \frac{30}{100} = 27$

Initial cp = $100 \times 6 = 600$ Rs.

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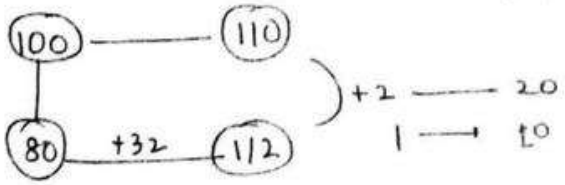
(19) A man sell his goods at 10% P. Had he purchase it for 20% less and sold it for Rs 20 more then he would gain 40%. find initial cp.

$80 \times \frac{40}{100} = 32$



initial cp = $100 \times 10 = 1000$ Rs.

CLASS 19

(20) A man sells his goods at 25% profit. Had he purchase it for 900 less and sold it for 900 less then he would gain 5% more profit. find the initial cost price.

P = 25% = $\frac{1}{4}$

	ICP	ISP
	4x	5x

NCP / NSP $\quad \frac{4x-900}{5x-900} = \frac{10}{13}$

$52x - 11700 = 50x - 9000$

$2x = 2700$

$x = 1350$

ICP = $4 \times 1350 = 5400$ Rs.

OR

CP	SP
$4_{\times 3}$	$5_{\times 3}$
10	13
900	900

2 (diff same) 2 multiply

$\Rightarrow$ 2 → 900
1 → 450
12 → 12 × 450 = 5400 Rs.

30% = $\frac{3}{10}$

OR

$\frac{30}{5} \times 900$

$= 5400$ Rs.

(21) A man sells his goods at 20% profit. Had he purchase it for Rs 600 less and sold it for Rs 400 less then he would gain 10% more profit. find the initial cost price.

20% = $\frac{1}{5}$

ICP	ISP
5x	6x

$\frac{5x-600}{6x-400} = \frac{10}{13}$

$5x = 3800$

ICP = 3800 Rs.

(22) A man purchase some article @ 11 article for Rs 10 and sells all the articles @ 10 article for Rs 11. find P% or L%.

Article	price	
11×10	$10_{\times 10}$	(100)
10×11	$11_{\times 11}$	(121)

+21

$\frac{21}{100} \times 100$

21% P

(23) A man purchase some pencils @ 6 pencils for Rs 5 and he sells all the articles @ 5 article for Rs 6. Find overall profit or loss %.

Article	price	
6×5	5×5 = 25	+11
5×6	6×6 = 36	

$\frac{11}{25} \times \frac{4}{100} = 44\%$ P

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(24) A man purchase some orange @ 1 orange for Rs 2 and same no. of oranges @ 2 orange for Rs 1 and he sells all of them @ 4 oranges for Rs 3. find profit or loss %.

	Article	price	price/article
CP	1	2 Rs =	$\frac{2}{1} \times 4 = 8$
CP	2	1 Rs =	$\frac{1}{2} \times 4 = \frac{2}{10}$
			CP
SP	4	3 Rs =	$\frac{3}{4} \times 8 = 6$
			SP = 6

$\frac{4}{10} \times 100 = 40\%$ L

OR

	Article	price
CP	1×2	2 Rs × 2
CP	2	1 Rs
CP	4	5 Rs
SP	4	3 Rs

) −2

$\frac{2}{5} \times 100 = 40\%$ L

---

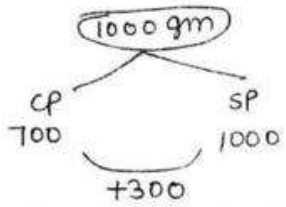
(25) A man buys some oranges at the rate of 5 for Rs 1 and same no. of oranges @ 4 for Rs 1. He sold all of them @ 9 for Rs 2. During the whole transaction he incurs a loss of 30 Rs. find the no. of articles that he purchase.

Article	price	
CP 5	1 →	$\frac{1}{5} \times 180$
CP 4	1 →	$\frac{1}{4} \times 180$
	360 Article CP →	81 Rs) −1 → 30
SP 9	2 →	$\frac{2}{9} \times 360 = 80$ Rs

$360 \times 30 = 10,800$ Ans

(5, 4, 9 का LCM → 180)

(26) A dishonest shopkeeper promise to sell his goods at its CP but he uses 30% less weight. Find the profit %.



$\frac{300}{700} \times 100 = 42\frac{6}{7}\%$

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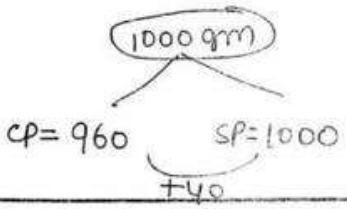
(27) A dishonest shopkeeper promise to sell his goods at its CP. but he uses 960 gm wt. instead of 1kg. find P%.



$\frac{40}{960} \times 100 = 4\frac{1}{6}\%$ P

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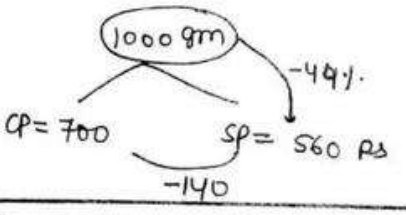
(28) A shopkeeper promise to sell his goods at 44% loss but he uses 30% less weight. Find actual loss %.



$\frac{140}{700} \times 100 = 20\%$ L

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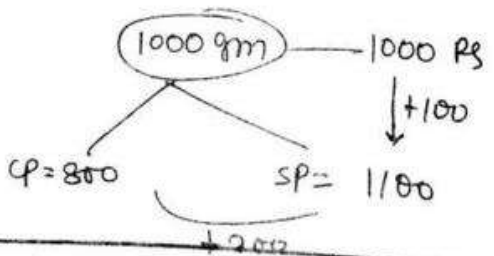
(29) A shopkeeper promise to sell his goods at 10% profit but he uses 20% less weight. Find the profit %.



$\frac{300}{800} \times 100 = 37\frac{1}{2}\%$ P

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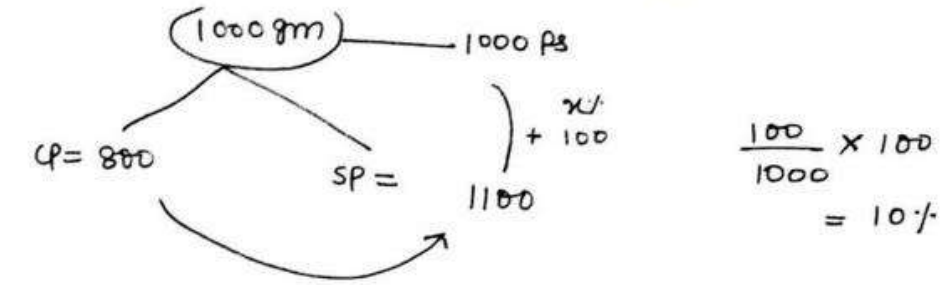
(30) A shopkeeper promise to sell his goods at x% profit but he uses 20% less weight thus gain $37\frac{1}{2}\%$. find x.



$\frac{100}{1000} \times 100 = 10\%$

$37\frac{1}{2}\% = \frac{3}{8}$ — P, CP

SP = 11

CP 8 — SP 11

CP 800 — SP 1100

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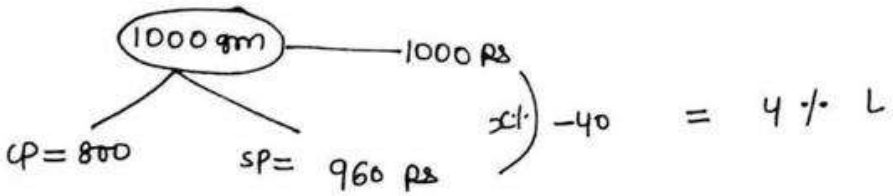
(31) A shopkeeper promise to sell his goods at x% loss but he uses 20% less weight thus gain 20%. find x.



$= 4\%$ L

$20\% = \frac{1}{5}$ — P, CP

CP 5 — SP 6

×160 → 800

×160 → 960

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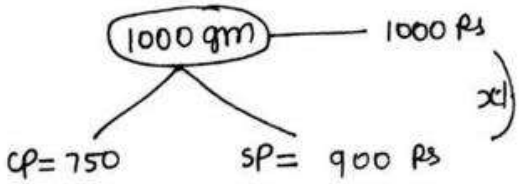
(32) A shopkeeper promise to sell his goods at x% loss but he uses 25% less weight thus gain 20%. find x.



$= 10\%$

$20\% = \frac{1}{5}$ — P, CP

SP = 6

5 — 750

1 — 150

6 — 900

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(33) A dishonest shopkeeper makes a cheating of 20% at the time of buying the goods and 40% cheating at the time of selling the goods. He promise to sell his goods at 10% Loss. find the profit %.

1000 gm —— CP = 1000 Rs

1200 gm —— CP = 1000 Rs

2×600 gm —— SP = 900 Rs (10% L)

1200 gm —— SP = 1800 Rs

P% = $\frac{800}{1000} \times 100$ = 80%

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(34) A shopkeeper marks his goods 40% above the CP and gives 25% discount to customer. At the time of selling the goods he uses 800 gm weight instead of 1kg. Find his profit %.

4×1000 gm —— CP = 1000 Rs×4 = 4000) 1250

5×800 gm —— SP = 1050 Rs×5 = 5250)

CP SP MP

100 105 140

5% −35

↑ profit ↓ discount

140×$\frac{25}{100}$ = 35

$\frac{1250}{4000} \times 100$ = 31.25%

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(35) A shopkeeper marks his goods 80% above the CP and gives 10% discount to the customer. At the time of selling the goods he uses 900 gm weight instead of 1kg and at the time of buying he uses 1100 gm instead of 1 kg. Find his profit %.

1000 gm —— CP = 1000 Rs

×9 1100 gm —— CP = 1000 Rs×9 = 9000) +2880

×11 900 gm —— SP = 1080 Rs×11 = 11880)

CP SP MP

100 108 120

8% −12

$\frac{2880}{9000} \times 100$ = 32% P

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(36) A dishonest shopkeeper makes a cheating of 10% at the time of buying the goods & 10% cheating at the time of selling the goods. find the profit %.

100 gm —— CP = 100 Rs

9 × 110 gm —— CP = 100 Rs × 9 = 900

11 × 90 gm —— SP = 100 Rs × 11 = 1100 } +200

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

SSC इसका Ans 21.1% मानता है।

$$\frac{10 + 10 + \frac{10 \times 10}{100}}{} = 21.1\%$$

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(37) A man purchase some no of oranges at the rate of 11 oranges for Rs 1. How many for a Rs did he sell to gain 10%.

Price	100	:	110
	10	:	11
Quantity	11	:	10
	↓		↓
	11 orange		10 orange

#

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(38) A man purchases some no of oranges @ 25 oranges for Rs 1. How many for a Rs did he sell to gain 25%.

अगर sale | purchase की amount same नहीं है तो जैसा इस type में है, Price का जो Ratio होगा उसके opposite quantity का Ratio होगा।

Price	100	:	125
	4	:	5
Quantity	5	:	4
	×5		×5
	25 orange		20 orange

20 orange Ans

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(39) By selling 32 oranges for a Rs a man ~~loss~~ 40%. ~~How many~~ for a rupee did he sell to earn 20%.

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Price	60	:	120
	1	:	2
Quan.	2	:	1
	×16		×16
	32 oranges		16 oranges Ans

(40) By selling 12 oranges for a Rs a man loss 20%. How many for a Rs did he sell to earn 20%

Price	80	:	120
	2	:	3
Quantity	3	:	2
	×4		×4
	12 oranges		8 oranges Ans.

(41) By selling 45 oranges for Rs 40 a man loss 20%. How many did he sell for Rs 24 to earn 20%.

Price	80	:	120
	2	:	3
Q.	3	:	2
	×15		×15
	45		30

40 Rs — SP = 30 oranges

1 Rs — SP = $\frac{30}{40}$

24 Rs → $\frac{30}{40} \times 24 = 180$ oranges.

CLASS 20

(42) Bhuvnesh makes 750 articles at a cost of 60 paise/article. He fixed the selling price such that if only 600 articles are sold, he would have made profit of 40% on the outlay. However, 120 articles got spoilt and he was able to sell 630 articles at this price. find his actual profit % as the percentage of total outlay assuming that the unsold articles are useless.

$CP = 750 \times \frac{60}{100} = 450$ Rs

$P = 450 \times \frac{40}{100} = 180$

600 Articles —— SP = 630 Rs

1 Article —— SP = $\frac{630}{600} = \frac{21}{20}$ Rs

SP of 630 articles = $\frac{21}{20} \times 630 = 661.5$ Rs

P = 661.5 − 450 = 211.5 Rs

P% = $\frac{211.5}{450} \times 100 = 47\%$

OR

CP = 100 Rs ⟶ अगर amount of profit पूछा होता तो ये नहीं apply कर सकते। P% पूछा है तो real data की need नहीं है। comparision कराना है कोई भी value उठा लो

600 A —— SP = 140

1 A —— SP = $\frac{140}{600} = \frac{7}{30}$

630 Article — SP = $\frac{7}{30} \times 630 = 147$

Profit % = 47%

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(43) A man purchase some no. of articles at Rs 5400 and he sells $\frac{2}{3}$rd of them at 5% profit. At what profit % did he sell the remaining to gain 13% overall.

$$\frac{2 \times 5\%}{3 \times 13\%} = \frac{1 \times 29\%}{39\%} = \frac{10\%}{39\%} = \frac{29\%}{39\%}$$

29% Ans.

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(44) A man purchase some no. of articles at Rs 189000 and he sells $\frac{3}{8}$ of them at 12% profit. At what loss % did he sell the remaining to gain 4% overall.

$3 \times 12\% = +36\%$

$5 \times \frac{4}{5}\% = -4\%$

$8 \times 4\% \quad +32\%$

(45) A manufacturer estimates that on inspection 12% of the articles he produces will be rejected. He accepts an order to supply 22,000 articles at Rs 7.50 each. He estimates the profit on his outlay including the manufacturing of rejected article to be 20%. find cost of manufacturing each article.

$$SP = 22000 \times \frac{88}{100} \times 7.50$$

$20\% = \frac{1}{5}$ — P, CP — $SP = 6$

6 unit $\longrightarrow$ $22000 \times \frac{88}{100} \times 7.50$

CP → 22000 Articles; 5 $\longrightarrow$ $\frac{22000 \times 88 \times 7.50 \times 5}{6 \times 100}$

$$CP\left(\frac{1}{22000}\text{ Article}\right) = \frac{22000 \times 88 \times 7.50 \times 5}{6 \times 100 \times 22000} = 5.50 \text{ Rs.}$$

(46) **DISCOUNT**

Buy 5 get 4 free

MP of 1 Article = 10 Rs

MP of 9 = 90 Rs

SP of 5 = 50 Rs) -40

$D\% = \frac{40}{90} \times 100$

$= 44\frac{4}{9}\%$

Buy 3 get 3 free

MP of 6 = 60 Rs

SP of 3 = 30 Rs) 30

$D\% = \frac{30}{60} \times 100$

$= 50\%$ discount

(#) Buy 5 get 4 free + 20% more discount

MP = 90 → 50 → 40 (20% of 50) → −50

$D\% = \frac{50}{90} \times 100$

$= 55\frac{5}{9}\%$ discount

(#) Buy 4 get 5 free + 50% more discount

MP = 90 → 40 → 20 (50% of 40) → −70

$\frac{70}{90} \times 100$

$= 77\frac{7}{9}\%$ discount.

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(46) A shopkeeper allow 25% discount on mark price and earn 30% profit. If he gets Rs 90 as profit. find the amount of the discount.

CP	SP	MP
	3×13 :	4×13
10×3 :	13×3	
30	39	52

P = 9 ($\times10$) → 90

D = 13 ($\times10$) → 130 Rs Ans

25% = D/MP = 1/4

SP = 3

30% = P/CP = 3/10

SP = 13

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(47) By how much % a shopkeeper mark his goods above its CP so as by giving 20% discount he may gain 10%.

CP SP MP

4×11 : 5×11

10×4 : 11×4

40 44 55

+15

$\frac{15}{40} \times 100 = 37\frac{1}{2}\%$

OR

(100% − D%) (100% + P%)

CP MP

80 110

+30

$\frac{30}{80} \times 100 = 37\frac{1}{2}\%$

(48) By how much % a shopkeeper mark his goods above its CP so as by giving 10% discount he may gain 30%.

CP MP

9ϕ : 13ϕ

4

$\frac{4}{9} \times 100 = 44\frac{4}{9}\%$

(49) A shopkeeper mark his goods at such a price that after allowing a discount of 12.5% on the mark price he can earn a profit of 20% if the article cost him Rs 1400 then find its mark price.

CP MP

$1 - \frac{1}{8}$ $1 + \frac{1}{5}$

$\frac{7}{8}$: $\frac{6}{5}$

35 : 48

35 → 1400

1 → 40 Rs

48 → 40×48 = 1920 Rs

(50) A shopkeeper gives 25% discount to his customer but he sells only smuggled goods and as a bribe he pays 10% on the cost price. find what should be the MP if he desires to make a profit of $9\frac{1}{11}\%$ and the cost price of article is 2500 Rs.

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CP		MP
$1-\frac{1}{4}$		$1+\frac{1}{11}$
$\frac{3}{4}$	:	$\frac{12}{11}$
11	:	16
×250 ↓		×250 ↓
2750		4000

$2500 \times \frac{10}{100} = 250$

$2500 + 250 = 2750$ Rs.

---

(51) By selling an article for Rs 1170 a man allow 10% discount and earn 30% profit. If the article is sold at 0% discount what should be the profit %.

CP	MP
90	130

If sold at 0% discount then it is sold at MP means

SP = 130

$P\% = \frac{40}{90} \times 100 = 44\frac{4}{9}\%$

---

52. By selling an article for 15600 Rs a man allow 8% discount and 19.6% profit. If the article is sold at 0% discount what should be the profit %.

CP	MP
92	119.6
27.6	(119.6) SP

$\frac{27.6}{92} \times 100 = 30\%$

---

(53) By selling an article for Rs 1170 a man allow 10% discount and earn 30% profit. If the article is sold at 5% discount what should be the profit %.

CP	MP
90	130
+33.5	-6.5 Rs (-5%)
(123.5) SP	

$\frac{33.50}{90} \times 100 = 37\frac{2}{9}\%$

(54) A shopkeeper give 3 articles free on purchase of articles. He also allow ~~allow~~ a discount of 20%. & still earn 25% profit. find the ratio of cost price and mark price.

Buy 5 get 3 free + 20% D.

MP = 80

↓

50

↓ 20%.

SP = 40

25% = 1 — P

4 — CP

SP = 5

5 → 40

1 → 8

CP = 4 × 8

= 32 Rs

CP : MP

32 : 80

2 : 5 Ans

OR

CP	MP
80/8	125/5
10	25
2	5

(55) A shopkeeper give 1 article free on the purchase of every 15 article, he also allow a discount of 4% to customer and still earn 35% profit. find the ratio of CP & MP.

CP	MP
96	135
96/16	135/15
6	9
2	3

(56) A shopkeeper give 4 articles free on the purchase of every 12 articles he also allow a discount of 20%. to customer and still earn 20% profit. find the ratio of CP to MP of the article.

CP		MP
80		120
$\frac{80}{16}$	:	$\frac{120}{12}$
5	:	10
1	:	2

---

(57) Rakesh Yadav Readers publication published 3500 books for 3,50,000 Rs at CP, he give 500 books free to some book shops, he also allowed a discount of 25% on the mark price and give 1 book free for every purchase of 29 books. find the amount of profit or loss if the mark price of each book is 160 Rs.

CP = 3,50,000

SP = 2900 × 120 = 3,48,000

Loss = 2000

29 Books — 1 free

if 30 books sold, money will come only of 29 books

3000 books then money will be of 2900 books.

$160 \times \frac{25}{1004} = 40$

160 − 40 = 120 Rs.

---

(58) A rickshaw dealer buys 30 rickshaws for Rs 4725. Of these 8 are four seaters and the rest are two seaters. At what price must he sell the four seaters so that if he sells the two seaters at 3/4 th of this price, he makes a profit of 40% on his outlay.

	Four seater	Two seater
~~AB~~ →	8	22
SP	4x	3x
	32x	66x

$32x + 66x = 6615$

$98x = 6615$

$x = 67$ approx

$4x = 67 \times 4 = 268 \Rightarrow 270$ Rs

$40\% = \frac{2}{5} \frac{SP}{CP}$

$CP - 5 \rightarrow 4725$

$1 \rightarrow 945$

$SP \rightarrow 7 \rightarrow 945 \times 7 = 6615$

CLASS 21

(##) Equation

30% Book + 40% Pen = Profit

40% Book + 30% Pen = Profit + 800

$-10\%B + 10\%P = -800$

$\frac{10}{10\%}(B - P) = 800$

$B - P = 8000$

~~800 × 10~~ / ~~100~~

$\frac{800}{10} \times 10 = 8000$

(59) A man sold a book at 9% Profit and a pen at 13% P. If he sold the book at 13% Profit and the pen at 9% Profit, he gain Rs 80 more. find the cost price of book and pen. if he ~~sold~~ purchase both at Rs 20,000.

$9\%B + 13\%P = [P]$

$13\%B + 9\%P = [P] + 80$ Rs

$B - P = \frac{80}{4} \times 100 = 2000$

$B + P = 20,000$

$B - P = 2,000$

$B = 11,000$

$P = 9000$

(60) A man purchase a book and a pen for Rs 25000. He sold the book at 13% P and pen at 17% Profit. if he sold the book at 17% profit and pen at 13% profit he earns Rs 80 more. find their individual cost price.

$B+P = 25{,}000$

$B-P = 2000$

$\frac{80}{4} \times 100 = 2000$

$B = 13{,}500$

$P = 11{,}500$

---

(61) A shopkeeper bought two cycles in Rs 1600. if he sold 1st cycle at 10% profit and 2nd at 20% profit, he earns a certain profit. if he sold 1st at 20% P & 2nd at 10% P, he got Rs 5 more The prices of both the cycles is ?

$T_1 + T_2 = 1600$

$T_1 - T_2 = 50$

$\frac{5}{10} \times 100 = 50$

$T_1 = 825$

$T_2 = 775$

---

(62) The total cost of 8 books and 5 pens is 92. then find the cost of 3 books and 2 pens if the cost of 5 books & 8 pens is 77.

$8B + 5P = 92$

$5B + 8P = 77$

Add → $13B + 13P = 169$

subtract

$3B - 3P = 15$

$B - P = 5$

$B+P = 13$

$B-P = 5$

$B = 9$

$P = 4$

$3B + 2P$

$27 + 8$

$= 35$ Rs.

(63) Rakesh yadav has 2 bats and 1 ball. The cost of ball is 96. If he sells the ball along the value of the 1st bat, the amount received will be twice the value of the 2nd bat. But if he sells the ball with the 2nd bat, the amount received will be less than the value of the 1st bat by Rs 306. What is the value of the 1st bat?

A B Ball = 96

$A + 96 = 2B$ | $B + 96 = A - 306$

$B = 2B - 96 - 306 - 96$

$A = 996 - 96$

$A = 900$

$B = 498$

(64) Rakesh yadav sells a pen at 5% loss and a book at 15% P, he gets Rs 7 as profit. If he sells the pen at 5% profit & the book at 10% profit, he gets Rs 6 more. The prices of book & pen are:

$-5\%P + 15\%B = 7$ —(i)

$5\%P + 10\%B = 13$ —(ii)

$\frac{25}{100}(B) = 20$

$B = 80$

Put value of B in (i)

$-5\%P + \frac{3}{100} \times 80 = 7$

$-5\%P = 7 - 12 = -5$

$\frac{5}{100}P = 5$

$P = 100$

(65) A man sells a table at 12% loss and a book on 19% profit, & earns a profit of 160 Rs but if he sell the table 12% profit & book at 16% loss then he bears a loss of 40 Rs. find the price of the book.

$-12\%T + 19\%B = 160$

$12\%T - 16\%B = -40$

$3\%B = 120$

$\frac{3}{100}B = +40$

$B = 4000$ Ans

Put in eq (ii)

$\frac{12}{100}T - \frac{16}{100} \times 4000 = -40$

$\frac{12}{100}T = -40 + 640 = 600$

$T = 5000$ Rs

(66) A man sells a table at 15% profit and a chair at 12% loss & earn 540 Rs as profit. If he sell the table at 12% loss & chair at 15% profit then he bears no profit no loss. Find the price of table & chair.

$-12\% \cdot T + 15\% \cdot C = 0$

$\frac{15}{100} C = \frac{12}{100} T$

$\frac{C}{T} = \frac{4}{5}$

T	C
500	400
|	|
75	48

27 unit — 540

1 → 20

Table = 500 × 20 = 10000

chair = 400 × 20 = 8000

(67) A man sells a book and a table at 13% & 19% profit respectively & earns 1060 Rs as profit. But if he sells the book at $16\frac{2}{3}\%$ P and Table at $11\frac{1}{9}\%$ loss then bears no profit no loss. find their CP ?

$\frac{1}{6} B = \frac{1}{9} T$

$\frac{B}{T} = \frac{2}{3}$

Book	Table
200	300
|	|
26 +	27

53 — 1060

1 → 20

Book = 20 × 200 = 4000

Table = 6000

(68) A man sell two articles first at 15% loss & 2nd at 19% profit. if during the whole transaction he bears a loss of 90 Rs if he sell both article at same price then find the cost price of 2nd article.

	I	II
CP	20x7	100
P/L	−3x7	+19
SP	17x7	119

loss = 2 → 90

1 → 45

CP of 2nd article = 45 × 100 = 4500 Rs.

(69) A man sell two articles first on 20% loss and 2nd on 60% ~~loss~~ profit. Find their selling price if the diff b/w the CP is 3200 Rs if the selling price of both the articles is same.

	I	II
CP	5x2	5
P/L	-1x2	+3
SP	4x2	8

$CP_1 - CP_2 = 5 \longrightarrow 3200$

$1 \longrightarrow 640$

$SP = 640 \times 8 = 5120$ Rs.

(70) A man sell 3 article at same price. 1st on 20% profit, and on 10% loss, 3rd on 25% loss. During the whole transaction he bears a loss of Rs 120. find the selling price of each article?

	I	II	III
CP	5x3	10x2	4x6
P/L	+1x3	-1x2	-1x6
SP	6x3	9x2	3x6

Loss = $+3-2-6 = 5$

$5 \longrightarrow 120$

$1 \longrightarrow 24$

$SP = 18 \times 24 = 432$ Rs.

(71) A man sells two articles for Rs 1710. He sells 1st at 10% loss & 2nd at 25% profit. find the amount of overall profit/loss if the cost price of 1st article is equal to the selling price of 2nd article.

	I	II
CP	10	4x2
P/L	-1	+1x2
SP	9	5x2

$SP = 9 + 10 = 19 \longrightarrow 1710$

$1 \longrightarrow 90$

P/L = $-1+2 = +1 \longrightarrow$ 90 Rs Profit

(72) The selling price of A & B are Rs 1800 each. A calculate his P% on SP while B on CP. find the diff b/w their CP if both claims 20% profit.

	A	B
CP	4×6 (1 unit)	5×5
P/L	+1×6	+1×5
SP	5×6	6×5

$30 \longrightarrow 180$

1 unit $\rightarrow$ 60

Diff. (CP_{AB}) = 25 − 24 = 1 unit = 60 Rs.

(73) A and B purchase an article on same price. Later on C purchase both article from A and B at Rs 240 each from A & B. But the profit % of A was P%. while profit % of B was q%. since B calculate his profit on SP. if C sells one of the article to D at P% profit what is the cost price for D if $q = 41\frac{2}{3}\%$ P ?

	A	B
CP	x	x
140%	P%	q%
SP	240	240

$$x \times \frac{P}{100} = 240 \times \frac{q}{100}$$

$$x \times P = \frac{20}{240} \times \frac{5}{12} P$$

$$x = 100 \text{ Rs.}$$

$$q = \frac{5}{12} P$$

$$\frac{q}{P} = \frac{5}{12}$$

(A)

CP = 100, SP = 240) P%.

$P\% = \frac{140}{100} \times 100$

$P\% = 140\%$

(C) — CP = 240

140%

$SP = \frac{140}{100} \times 240 = 336$

336 + 240 = 576 Rs.

Cost price for D = 576 Rs.

(74) A company allow 15% discount to his customers and still earn 19% profit. If the production cost of the product is ↑ by 12% therefore company issued a new dist price w/c is 10% higher than the previous ~~dis~~ list price and company still allow 15% discount to his customers. find the new profit % of the company.

$$\frac{CP}{MP} = \frac{85}{119} = \frac{5}{7}$$

CP	MP
500	700
↓ +60	↓ +70
560	770

SP (654.50)

$$770 \times \frac{15}{100} = 115.50$$

$$\%P = \frac{94.50}{560} \times 100$$

$$= 16\frac{7}{8}\%$$

---

(75) A man purchase a home and a shop. He sold the shop at 10% P and home at 10% Loss. and selling price of both the articles is same (1,00000 Rs each) find the amount of loss.

	I	II
CP	$10_{\times 9}$	$10_{\times 11}$
P/L	$+1_{\times 9}$	$-1_{\times 11}$
SP	$11_{\times 9}$	$9_{\times 11}$

$CP = 90 + 110 = 200$

$L = 2$

$\frac{2}{200} \times 100 = 1\%$ Loss.

$\%$ = $\frac{-1 \text{ loss}}{100 \text{ CP}}$

SP = 99

SP = 99 ——— 2 lakh

1 ——— $\frac{2}{99}$ lakh.

---

(76) A dealer sold 2 TV set for Rs 2400 each. and earn 20% profit on 1st article and 20% loss on 2nd article. find his total profit or loss.

4% loss

$\frac{1 \text{ loss}}{25 \text{ CP}}$

SP = 24 ——— 4800

1 ——— 200

Loss = 200 Rs.

If selling price of two articles is same & one is sold at x% profit & other is sold at x% loss. Then overall

loss% = $\frac{-x^2}{100}$

Q39 A shopkeeper bought some books at discount of 20% on list price. If he want to mark them at such a price given that after giving a discount of 20% he still makes a profit of 25%. find the % of the list price he should mark on its goods above its CP.

CP = 80

P = 25% = $\frac{1}{4}$ — P, CP

SP = 5

4 → 80

1 → 20

SP = 20 × 5 = 100

↳ But this value is obtained after giving 20% discount.

D = 20% = $\frac{1}{5}$ — D, MP

SP = 4 → 100

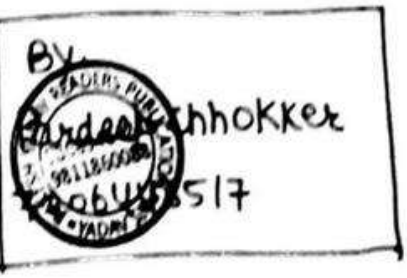
1 → 25

MP → 5 ⇒ 25 × 5 = 125

CP	MP
80	125
	45

$\frac{45}{\cancel{80}\ 4} \times \frac{5}{\cancel{100}} = \frac{225}{4} = 56\frac{1}{4}\%$

CP	SP	MP
80	100	125
	25% P	-25 / 20% D



AVERAGE

(#) 84, 97, 53, 59, 79. let Avg = 60

+24 +37 −7 −1 +19 +14.4

74.4 Ans

$\frac{72}{5} = 14.4$

(1) If the Avg score of 42 boys of a school is 137. while the avg score of 98 girls is 124 of the same class. find the combined average of the class.

137 124 → 127.9 → 3.9

3 : 7

42 : 98

13 → 3 : 7 → 10 → 13, 1 → 1.3

OR

137 • 124 → 130

+7 −6 → +0.5

⇒ 130.5

$\frac{1}{2} = +0.5$

OR

42 : 98

3 : 7

137 124

+7×3 −6×7

21 −42

$-\frac{21}{10} = -2.1$

let Avg = 130

− 2.1

127.9

Ans

(#) 4 : 3 : 2

129 137 124

−4 +21 −12

Avg = 130 $+\frac{5}{9}$ =

$130 + \frac{5}{9} = 130\frac{5}{9}$

(#) No. of students 39 : 91 : 52

3 7 4

Avg score 79 56 70

find avg score of All. +7×3 −14×7 0

+27 −98

$\frac{-71}{14} = 5.07$

let Avg = 70

− 5.07

64.93

Ans

(2)

	X	Y	Z
Students	~~27~~ 3 :	~~36~~ 4 :	~~45~~ 5
Avg score	83	76	85
	+9	−16	+25

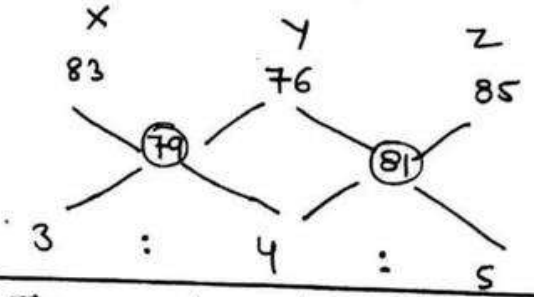
$\frac{+18}{12} = +1.5$

find avg of 3 classes

let avg = 80
+ 1.5
81.5 Ans

---

(3) The avg marks of the class X, Y, Z is calculated. The avg score of class X, Y, Z are 83, 76, 85. The avg score of class X & Y is 79 while the avg score of Y & Z is 81. find the avg score of all the three classes.



Avg of X, Y, Z = 81.5
(Soln in above Ques)

---

(4) The avg of 9 observations is 87. if the avg of first five observations is 79 and the avg of next three is 92. find the 9th observation.

1 — — 5 | 6 — — 8 | — = 87
79 92

79 × 5 = 395
92 × 3 = 276
671

87 × 9 = 783
−671
112 Ans

OR

79 | 92 | — = 87
−8 × 5 | +5 × 3
−40 | +15
−25

87 + 25 = 112 Ans
(Avg से 25 कम है 9th no में +25 होगा).

(#) [1 — -3] [4 — -7] — = 117

110 130

-21 +52 (-31)

+31

117
-31
86

(5) The avg. of 7 data is 34 and the avg of first three data is 28 and the avg of next two data is 47. find the avg of last two data.

[1 — -3] [4.5] [— —] = 34

28 47

-18 +26 $\frac{-8}{2} = -4$ 30-4 = 30 Ans

+8

(6) The avg. age of 30 students of a class is 14 years 4 months Due to admission of 5 new students the avg. becomes 13 years 9 months, while the age of the younger one in new 5 students is 9 years 11 months. find the avg of remaining four new students.

[- - - - - - - - - -] [- - - - -] = 13-9

14-4 → Avg of these 5 students = 10.3

7×30 (+210) months.

$\frac{-210}{5} = -42\ (-3.6)$

13-9
-3.6
10.3

[- - - - -] = 10.3

10.4 Ans

9-11 $\frac{+4}{4} = (+1)$

(-4)

(7) The avg of 9 data is 79. The avg of first 2 data is +5. if the avg of next four data is 87. if the 8th data is 5 more than 7th data and one more than 9th data. Calculate 9th observation.

75 | 87 | 71 = 79

-8 | +32 | +24

$\frac{-24}{3} = -8$ $\quad 79 - 8 = 71$

68 — 7th 73 8th 9th 72

x | x+5 | x+4 = 71

$\Rightarrow 3x + 9 = 71 \times 3$

$x = 68$

OR Avg = x

$x + 3 = 71$

$x = 68$

---

(8) Avg. of 8 nos is 20. The avg of first two no's is 15.5 and the avg of next three no's is $21\frac{1}{3}$. if the 6th no. is 4 & 7 less by the 7th & 8th no's. find the 8th no.

15.5 | $21\frac{1}{3}$ | $21\frac{2}{3}$ = 20

(-9) (+4) $\quad -5$

$\frac{+5}{3} = 1\frac{2}{3}$

6th 7th 8th

x | x+4 | x+7

$\frac{11}{3} = 3\frac{2}{3}$

$x + \frac{11}{3} = 21\frac{2}{3}$

$x = 18$

8th = 25 Ans

CLASS 29

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(9) 9 girls and 1 boy go to a restaurent for lunch. If each girl spent Rs 30 and boy spent Rs 72000 more than the avg of expenditure of all. find the amount spent by the boy?

1 Boy | 9 Girls

30 30 30 — 30

+8000

8030

Boy = A + 72000

A → Avg.

$\frac{A + 72000}{9}$

A + 8000

Boy = 8030 + 72000

= 80030.

(10) Five year ago the avg age of Husband & wife was 23 years today the avg age of Husband, wife & child is 20 years. How old is the child?

H w C = 20

(4)

28

+16 −16

---

(11) 3 years ago the avg. of family of five members was 17 years. A baby having been born the avg. age of the family is the same today. find the age of the child?

- - - - - = 17

20 (2)

+3×5 age of child = 2

+15 −15

---

(12) The avg ~~weight of A, B & C is~~ age of mother, father & son was 42 years at the time of the marriage of the son. After 1 year an infant was born and after 6 years of marriage the avg age of the family becomes 36 years. find the age of the bride at the time of the marriage.

S M F Bride Baby = 36 Y

48 Y 18 Y

SMF → Avg after 6 years = 44+6 = 48

+12×3

+36 $\frac{-36}{2} = -18$

Bride + Baby = 36 Y

31 Y 5 Y

(−6

25 Y

Bride + Baby का avg 18 means

Bride + Baby की age = 36

---

(13) The avg. weight of A, B & C is 84 kg. if D join the avg wt becomes 80 kg. if another person E who is 3 kg heavier than D replaces A, then the avg weight of B, C, D & E becomes 79 kg. find the weight of A.

A, B, C, D = 80 kg
84 — 68 kg
D = 68
E = 71

+4 × 3
= +12

B, C, D, E = 79

A + B + C + D = 80 × 4
B + C + D + E = 79 × 4
A − E = 4

A = 4 + E
A = 75

(14) The avg temp of mon, tue, wed & Thu is 31°C & the avg temp of Tue, wed, thu & fri is 29.5°C. if the avg temp of mon was 37½% more than the avg temp of friday. find the temp of monday?

M + T + W + Th = 31 × 4
T + W + Th + F = 29.5 × 4
M − F = 6

37½% = $\frac{+3}{8}$

M — F
11 — 8
3 unit ——— 6
1 ——→ 2

M = 22°C
F = 16°C

(15) The avg temp from mon to wed is 37°C while the avg temp from tue to thu is 34°C. The temp of thu. is $\frac{4}{5}$ times that of mon. find the temp of thu?

M − THU = 9

THU — M
4 — 5
1 unit ——→ 9

$TH = \frac{4}{5}M$

$\frac{TH}{M} = \frac{4}{5}$

THU = 4 × 9 = 36°C Ans

(16) There are 35 students in a hostel. If the no. of students increased by 7, The expense of mess increased by Rs 42 per day. while the avg expenditure per head decreased by Rs 1. find the original expenditure of the mess.

35 A → mess charges.

42(A-1) → new mess charges

A Rs/day/student

(A-1) Rs/day/student

$\therefore$ $35A + 42 = 42(A-1)$

$7A = 84$

$A = 12$

mess charges in starting $= 35A = 35 \times 12 = 420$ Rs.

---

(17) There were 42 students in a hostel, due to admission of 13 new students, expense of the mess ↑ by Rs 30 per day, while per day expenditure per student is reduced by Rs 3 what was the original expenditure of the mess per day?

42 A → mess charges

55(A-3) → new mess charges

$\therefore$ $42A + 30 = 55(A-3)$

$A = 15$

original expense of mess $= 42A = 42 \times 15 = 630$ Rs.

---

(18) There are 3 natural nos. if avg of any two no. is added with the 3rd no. 24, 20 & 18 will be obtained. find all the natural no's?

a, b, c

$\frac{a+b}{2} + c = 24 \Rightarrow a+b+2c = 24 \times 2$

$\frac{b+c}{2} + a = 20 \Rightarrow b+c+2a \Rightarrow 20 \times 2$

$\frac{a+c}{2} + b = 18 \Rightarrow a+c+2b = 18 \times 2$

$4(a+b+c) = \frac{62}{31} \times 2$

$a+b+c = 31$

OR

24
20
18
62

$\frac{62}{2} = 31$

a, b, c की separate value नहीं पूछेगा। ये हमने Assume की हैं।

$a+b+2c = 24\times2$

$a+b+c+c = 24\times2$

$c = 24\times2-31 = 17$

$a = 20\times2-31 = 9$

$b = 18\times2-31 = 5$

---

(19) There are 4 natural no's. if avg of any 3 nos is added with the 4th no 29, 23, 21 & 17 will be obtained. find all 4 natural no's?

$\frac{a+b+c}{3}+d = 29$

$a+b+c+3d = 29\times3$

$\frac{a+b+c+d}{45}+2d = 29\times3$

$2d = 29\times3-45$

$d = \frac{29\times3-45}{2}$

$\frac{29\times3-45}{2} = 21$

$\frac{23\times3-45}{2} = 12$

$\frac{21\times3-45}{2} = 9$

$\frac{17\times3-45}{2} = 3$

---

(20) In an examination, the avg of 40 students is 72. Afterwards it is found that the marks of three students are misread as 68, 75 & 73 instead of 64, 62 & 84 resp. find the correct avg.

(✗) $68+65+73 = 206$

(✓) $64+62+84 = 210$) $+4$

$A = 72$

$\frac{+4}{40} = +0.1$

New $A = 72+0.1 = 72.1$

$\frac{72\times40+4}{40} = 72.1$

(21) The avg of 100 numbers is 46 but it was found that 2 numbers 16 & 43 are mistakenly calculated as 61 & 34 find the correct avg if it was also found that total no. are only 90.

Total = 100×46
$= 4600$

(✗) 61 34 = 95
(✓) 16 43 = 59
$\Delta = 36$

$4600 - 36 = 4564$

Correct avg $= \frac{4564}{90} = 50.7$

OR

Correct avg $= 46 - 0.36$

$\frac{-36}{100} = -0.36$, 45.64

Total $= 45.64 \times 100 = 4564$

avg of 90 nos $= \frac{4564}{90} = 50.7$ Ans

(22) The avg weight of some students in a class is 43 kg. When 4 new students are included the avg weight becomes 42.5 kg and the weight of these 4 students are 42, 36.5, 39 & 42.5. find the total no. of students in the class?

Total student $= x$

Avg $= 43x$

$43x + 160 = (x+4) \times 42.5$

↓ new avg ↓ new avg

$x = 20$.

42
36.5
39
42.5
160

OR

43 | 40 = 42.5

$-2.5 \times 4 = -10$

$+0.5x = 10$

$x = 20$

(23) The avg of batsmen in some innings is 21.75 & the scores in next 3 innings – 28, 34 & 37 runs resp. Therefore avg ↑ by 1.125, find the no. of innings played by him?

21.75 | 33 = 22.875

$-1.125x = -30.375$

$+10.125 \times 3$
$+30.375$

$x = \frac{30.375}{1.125} = 27$

No of innings currently $= x + 3 = 30$ Ans

28
34
37
99

Total innings = x

$21.75x + 99 = 22.875(x+3)$

$28 + 34 + 37 = 99$

$x = 27$

---

(24) A batsman scores 87 runs in his 17th innings, due to this his avg ↑ by 3 runs. find his current avg.

- 16 innings avg = x

$16x + 87 = (x+3) \times 17$

$x = 36$ current avg = $36+3 = 39$

OR

$87 - 51 = 36$ $\quad 3 \times 17 = 51$

---

(25) A batsman has certain avg in his 11 innings. He scores 90 runs in 12th innings, due to this his avg ↓ by 5 runs

- $11x + 90 = (x-5) \times 12$

$x = 150$

current = 145

$90 + 60 = 150$ $\quad 12 \times 5 = 60$ current = 145

---

(26) The batting avg. of a batsmen in ~~some~~ 40 (forty) innings is 50 runs, if the diff b/w his highest & lowest score is 172. if these both innings are excluded his avg becomes 48. find his highest score?

- 40 innings ⟶ $40 \times 50 = 2000$

38 innings ⟶ $48 \times 38 = 1824$

176

$H + L = 176$

$H - L = 172$

$H = 174$

$L = 2$

48 | 88 | = 50

Run in these two innings = $88 \times 2 = 176$

$-2 \times 38 = -76$

$\frac{+76}{2} = +38$

(27) A batsman has an avg of 30 runs in his 42 innings. The diff b/w his max. & min score is 100. if these two innings are removed his avg for 40 innings comes down to 28. what is his maximum score?

42 innings $\longrightarrow 30 \times 42 = 1260$

40 innings $\longrightarrow 28 \times 40 = 1120$

140

$H + L = 140$

$H - L = 100$

$H = 120$

$L = 20$.

(28) If the bowling avg of bowler is 12.4 runs per wicket. He takes 10 wickets in his next innings by giving 52 runs, due to this his bowling avg improved by 0.4 run per wicket. find the total no. of wickets taken by him at present?

- wickets $= x$

$A = 12.4$ Runs/wickets

Runs $= 12.4x$

$$\frac{12.4x + 52}{x + 10} = 12$$

$x = 170$

Bowling Avg $= \frac{\text{Total Run}}{\text{Total wicket}}$

wickets at present $= 170 + 10 = 180$.

By.
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OR

Career | New Inning

12.4 | 5.2

12 → Avg = Runs/wickets

6.8 | 0.4 → wickets ratio 17:1

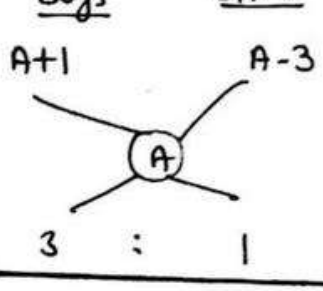
17 : 1

x10 | x10

170 | 10

wickets at present = $170 + 10 = 180$ Ans

(29) in a class the avg of boys & girls is 'A'. The ratio of no. of boys and no. of girl is 3:1. and the avg of the boys is A+1. find the avg of girls.



3 : 1

Boys Girls = A

A+1 A-3 ~~Ans~~

+1 × 3

+3 −3 × 1 = −3

(30) The avg ~~rate~~ weight of 8 persons is increased by 2.5 kg when one of them who weighs 56 kg is replaced by a new man. find the weight of new man.

56 kg

2.5 × 8 = 20

+ 20

76 kg.