***** PROFIT & LOSS

$$P = (SP - CP)$$

- selling price (SP)
- cost price (CP)

$$P\% = \left[\frac{(SP - CP)}{CP}\right] \times 100$$

(Pr)

$$L\% = \left[\frac{(CP - SP)}{CP}\right] \times 100$$

(Loss)

20% Profit $\longrightarrow$ $SP = CP \times 1.2$

↳ SP is 20% above the cost price.

20% loss $\longrightarrow$ $SP = CP \times 0.8$

↳ SP is 20% below the cost price.

Q eggs are bought at the rate of 7 eggs for Rs. 1. If the shopkeeper wants to make a profit of 40%, how many eggs should he sell for 1 Rs.

Sol

$$CP\ (1\ egg) = \left(\frac{1}{7}\right)$$

$$SP \text{ of } 1\ egg = \left(\frac{1}{7}\right) \times 1.4$$

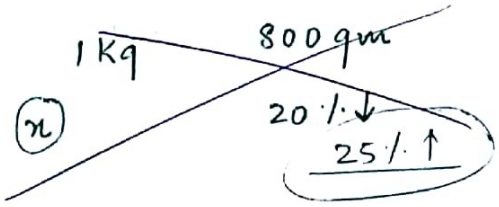
$$=$$

Q① A dishonest shopkeeper uses a false weight of 800gm instead of 1 kg weight. If he promises to sell the goods and at the cost price, then his profit %

Q② on selling 36 mangoes, a shopkeeper recovers a CP of 33 mangoes only. Find loss %

Sol 1

$$P = \frac{SP - CP}{CP}$$



SIR →

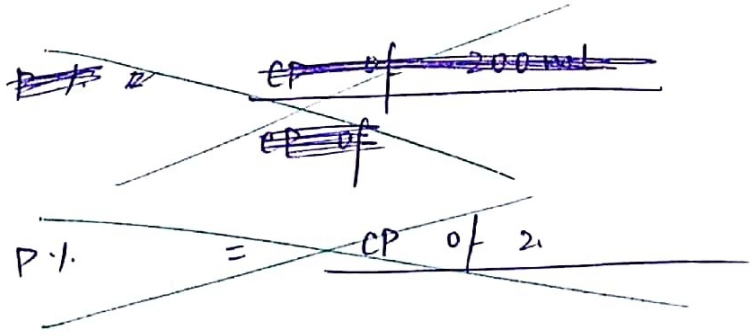
$$\text{Profit} = \frac{(\text{CP of 200 gms})}{(\text{CP of 800 gms})} = 1/4 \approx 25\%$$

Sol 2

$$\frac{L}{CP} = \frac{\text{CP of 3 Mangoes}}{(\text{CP of 36 mangoes})} = 1/12 \approx 8.\overline{3}\%$$

Q 1> A dishonest milkman uses a false measuring vessel of 800 ml instead of 1 l and further adulterates milk with 20% water (free of cost). If he promises to sell the milk at the CP then his Profit %.

Sol



1st cheating → $\frac{\text{CP of 200 ml}}{\text{CP of 800 ml}} = 1/4 \times$ (25%.) ✓

1st cheating (without mixing waters) ⟶ 25%

$(1.25) \times (1.2) = 1.50$

or

$25 \times 20 + \frac{25 \times 20}{100} = 50\%$

ex

1 ml = 1 Rs

1000 ml (m) = 1000 Rs

(+) 200 ml (w) = 0 Rs

1200 ml = 1000 Rs = Total cost Price (TCP)

→ $\frac{1}{6} = 16.\overline{6}\%$ w

800 ml ⟶ Rs. 1000

400 ml ⟶ Rs. 500

1200 ml ⟶ TCP = Rs 1500

$\frac{P}{CP} = \frac{500}{1000} \times 100 = 50\%$

other ex

1 ml = 1 Rs (1/6)

800 ml (m) ⟶ Rs 800

160 ml (w) ⟶ Rs 0.

960 ml ⟶ Rs. 800 = TCP

adulterate → add. puts

mixture does not contain 20% water

800 ml ⟶ Rs 1000 (beaker 1/5)

160 ml ⟶ Rs. 200 (beaker 1/5 w)

960 ml ⟶ 1200 Rs

$P/cp = \frac{400}{800} \times 100 = 50\%$

Q 29 (Pg 72)

SP → Rs 60/unit

TC Price = Rs 100

TP$_{rofit}$ = Rs 500

SP = 600

₹ 60 — 1 unit

100 ₹

Sir

SP/unit = 60 Rs

Total CP = 100 Rs

Profit = 500 Rs

Profit % = $\frac{P}{CP} \times 100 = \frac{500}{100} \times 100 = 500\%$

~~SP = CP + Profit~~ ~~SP = 600~~ CP' = 130 Rs

P% = 500% same

~~60~~

Profit' = 650 Rs (+130)

SP' = 780

SP'/unit = $\frac{780}{10}$ = (78/=)

60 × 1.3 (30%)

↑ 30%

130

TC' = 130

Laymen dont follow this

Now Sir

SP = CP × 1 of P

SP × 1.3 = CP × 1.3 × 1 of P

SP' = CP'

Profit doesn't depends on no of units.

SALE

Reduced value ↑

(80% + 40%) off → 88% off

100 × 0.2 × 0.6 = 12

milkman

1.25×1.20

$25 + 20 + \frac{25 \times 20}{100}$

$= 50\%$

successive profit condn → dhamaka pey dhamaka.

$-80 - 40 + \frac{(-80)(-40)}{100} = -88$ off

$-120 + 32$

100 ↓ ×0.9

90 ↓ ×0.9

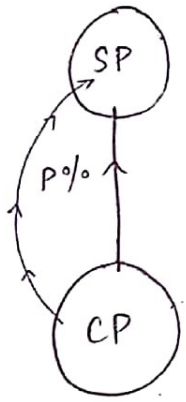
81 ×0.9 ↓

72.9

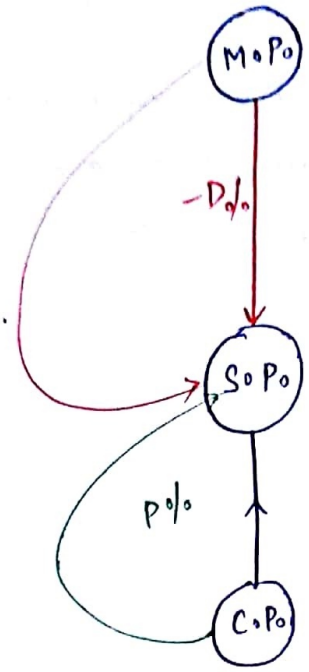
Q (70% + 30%) off → 79% off if ~~+~~ 10%

100 × 0.3 × 0.7 = 21 × 0.9 =

MARKED PRICE → list Price, Labelled price, print price, MRP



[N.P]

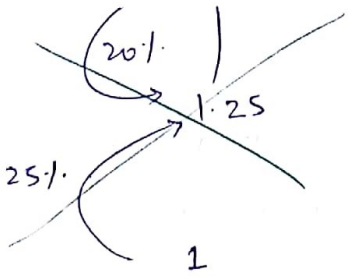


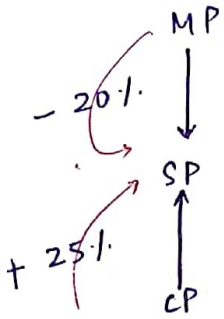
marked price per discount selling price and CP per SP → Profit.

Q.) After offering a discount of 20%, a shopkeeper still manages to make a profit of 25%. By how much % is the mark price above the cost price

Sol

$MP \times 0.8 = SP$ $\quad SP = CP \times 1.25$





$$MP = CP \times \frac{1.25}{.8}$$

$$MP = CP \times 1.5625$$

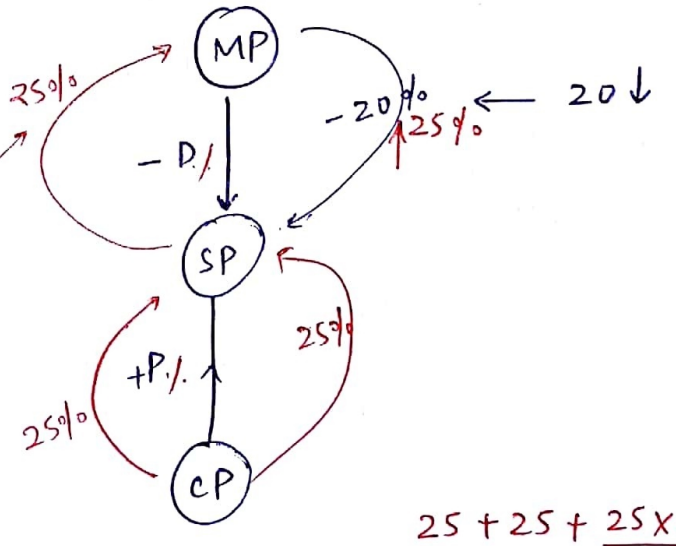
56.25%

✓ $MP \times .8 = SP$

$MP \times 4/5 = SP$

$MP = SP \times 5/4$

$MP = SP \times 1.25$



$25 + 25 + \frac{25 \times 25}{100}$

56.25%

Two Rules

↳ **Rule (1)** Two articles are sold at a common SP (selling price) of Rs S each. one is sold at a profit of P% and another at a loss of P%, then effectively there is always a loss during the entire transaction

$$\text{(value) Loss} = \frac{2P^2 S}{(100^2 - P^2)} \quad (\text{Rs})$$

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

↳ **Rule (2)** Two articles are bought at a common CP, one is sold at a profit of P% and another at a loss of P%, then effectively there is no profit no loss.

Q Two shirts are sold at a common SP of Rs 480 each, 1 is sold at a profit of 20% and another at a loss of 20%. then find loss and loss %.

Sol

$SP_1 = SP_2 = ₹\ (480)$ each

$SP_1 = CP_1 \times 1.2$

$480 = CP_1 \times 1.2$ ⇒ $CP_1 = 400$

$SP_2 = CP_2 \times 0.8$

$480 = CP_2 \times 0.8$ ⇒ $CP_2 = 600$

$TSP = 960$

$TCP = 1000$

Loss = 40 Rs

$\text{Loss\%} = \frac{40}{1000} \times 100$

$= 4\%$

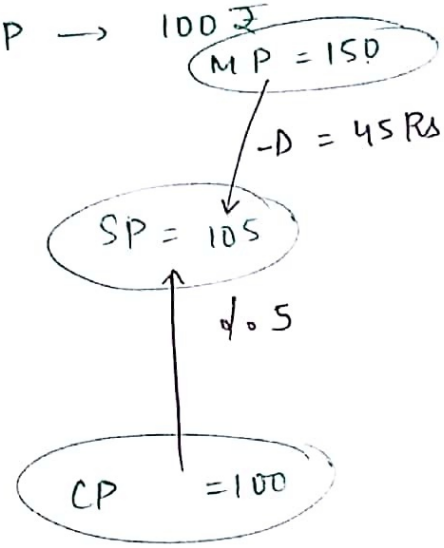
OR $\quad$ Loss $= \dfrac{2 \times 20 \times 20 \times 480}{80 \times 120} = 40$ ₹

Loss % $= \dfrac{20 \times 20}{100} = 4\%$

Pg 52
Q10

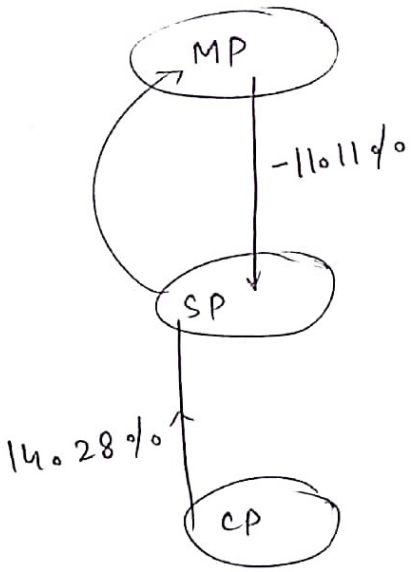
~~50%~~ ~~CP~~

CP → 100 ₹



hence $\dfrac{45}{150} \times 100 = 30\%$

TG



SIR

11.11 → 1/9

MP $\left(1 - \dfrac{10}{100}\right)$ ← 11.11%

MP $\left(1 - \dfrac{1}{9}\right)$ ← ×0.9

14.28% ↓

$= SP = CP \times \left(1 + \dfrac{1}{7}\right)$

$MP \times \dfrac{8}{9} = CP \times \dfrac{8}{7}$

$MP = \dfrac{9}{7} CP$

$\boxed{MP = 1.2856\ CP}$

51
P9 Q7

80% $\xrightarrow{P}$ E

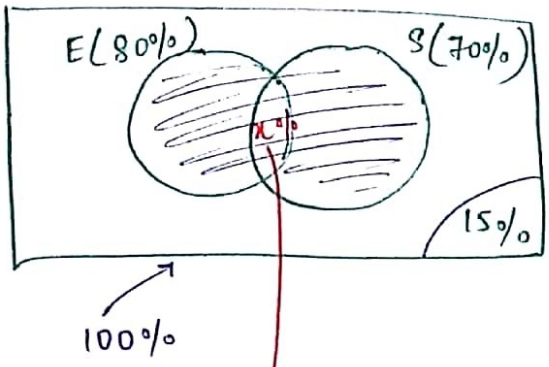
70% $\xrightarrow{P}$ S

15% $\xrightarrow{F}$ E & S

195 $\xrightarrow{P}$ E&S

~~24 + 21~~

SIR



$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$85\% = 80\% + 70\% - x\%$

$x = 65\%$

65% of T = 195

T = 300

RATIO

comparison b/w 2 quantities

Q. A student scored marks in 5 subjects in the ratio of 5 : 6 : 7 : 8 : 9. If the maxm. marks for all subjects is same and on aggregate, he scored 60% marks. in how many subjects did he pass the exam if passing marks is 50%.

Sol let the maxm. marks in each subject = 100

Total ——— semester = 500

~~He scored = $\frac{5}{100} \times \frac{6}{100} \times \frac{07}{100} \times \frac{8}{100} \times \frac{9}{100}$ = 300~~

$5x + 6x + 7x + 8x + 9x = 300$

$35x = 300$

$x = 60/7$

$5 \times \frac{60}{7}$ $6 \times \frac{60}{7}$

PROPORTION

I II III IV

$a : b :: c : d$

$$\frac{a}{b} = \frac{c}{d}$$

$$a \times d = b \times c$$

if a, b, c, d are in continuous proportion.

$$\frac{a}{b} = \frac{b}{c} \Rightarrow b^2 = ac \Rightarrow b = \sqrt{a \times c}$$

b is GM (geometric mean)
or MP (mean proportion) b/w (a & c)

DIRECT PROPORTION

$\uparrow a \propto b \uparrow$

$a = kb'$

$a/b = K$

→ $a_1/b_1 = a_2/b_2$ (division constant)

→ unitary method

→ $y = mx$

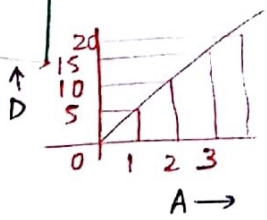
↑ A $\propto$ D ↑

M [1 ∝ 5]

3 ∝ 15 Rs

6 ∝ 30

[10 ∝ 50]



ONGC 2012

Q Reduction in speed of a Railway engine is directly $\propto$ to the sq. root of no. of ~~computer~~ compartments attached. If the maximum speed of the engine was 42 kmph when no compartment was attached and speed was 24 kmph when 9 compartments were attached. then the maxm. no. of compartments that can be ~~be~~ carried forward by the Engine.

$42 - k(3) = 24$

Sol

~~$(x) \propto y^{1/2}$~~

$\text{Redn} \propto \sqrt{n}$

$\text{Redn} = k\sqrt{n}$

$Sp = Spmax - k\sqrt{n}$

$Sp = 42 - k\sqrt{n}$

$24 = 42 - k\sqrt{n}$

$k = 6$

$Sp = 42 - 6\sqrt{n}$

$6\sqrt{n} = 42$

$\sqrt{n} = 7$

$n = 49$

engine stops so at $n = 48$ engine can go.

Redn $\propto \sqrt{n}$

$(v_2 - v_1) = k\sqrt{n}$

$42 - 24 = k\sqrt{9}$

$k = 6$

$42 - 0 = 6\sqrt{n}$

$n = 49$

INVERSE PROPORTION

$\uparrow a \propto \frac{1}{b} \downarrow$

$a = \frac{k}{b}$

$a \times b = k$

$a_1 \times b_1 = a_2 \times b_2$

never applicable

~~unitary method.~~

$x y = c$

Rect. hyperbola → x-axis, y-axis (asymptotes)

if 40 m → 100 day

20 m → $x = 200$ "

CHAIN RULE

m	d	l	b	h
30	15	40	60	90
20	~~x~~	50	45	80

DP

$\frac{a}{b} = k$

IP

$a \times b = k$

d ↑ : 15, x

m ↓ : ~~30~~, 20

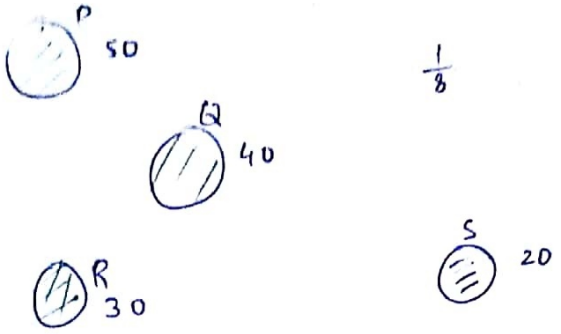
l ↑ : 40, 50

b ↑ : 60, 45

h ↑ : 90, 80

$$\frac{15 \times 30}{40 \times 60 \times 90} = \frac{x \times 20}{50 \times 45 \times 80}$$

Pg69
Q9



1/8

P	Q	R	S
50	40	30	20

V

SIR

$D \propto P$
$\propto t$
$\propto g$

$D = K\,pgt$

varies proportionately → graphs

↑D ∝ anger

→ ↑ Growth of a single microbe surviving human immunity system within 24hrs of entering the body

→ ↑ Potency (Probability of microbe overcoming H. immunity)

→ ↓ $\frac{1}{t}$ Toxicity (milligram of Mic req.)

$$D = \frac{pg}{t} K$$ formulae

LR DI

Logical Reasoning Data interpretation

$D_P = \frac{5^2 \times 4}{8_2} = 12.5$

$D_q = \frac{4^2 \times 5}{6} = 13.33$

$D_A = \frac{3^2 \times 4}{3} = 12$

$D_S = \frac{2^2 \times 8}{2} = 16$

dangerous Level ←

Pg no. 50

Q3 → 25p → $\frac{1}{5}$ rs

10p → $\frac{1}{10}$ rs = 6l

Q7 $\frac{a}{b} = \frac{b}{c}$ ✓ $\frac{36}{48} = \frac{48}{x}$

Q9 0.7, 2.8

MP = $\sqrt{0.7 \times 2.8}$

Q6 $\frac{a}{b} = \frac{c}{d}$

Q10

investment → IA, Time → TA

$$\frac{\text{Profits}_A}{\text{Profit}_B} = \frac{I_A \times T_A}{I_B \times T_B}$$

In A ↳ $5 \times 8 + 4 \times 4$

In B → $6 \times 4 + 3 \times 8$

$\frac{5x}{8x}$

$$\frac{8 \text{ months} \times \frac{5x}{8x}}{T_B \times} = \frac{1}{2}$$

T_B = 10 months

Q