Rate/~~Ratio/Proportion~~/Shares

Rate = ① Unit price :

② Data comparison :

③ Data → Different quantity

④ End Result = Unit :

eg① Esha ⇒ 5hr = 60pages

1.5hr = ?

① Unit Rate

5hr = 60page

1hr = $\frac{60}{5}$ pages

1hr = 12 pages — U.R

R.R = $\frac{\text{Score}}{\text{overs}}$

Eco.R = $\frac{\text{Score}}{\text{Balls}}$

1.5 X 1hr = 1.5 X 12 pages

1.5hr = 18pages :

1. Ayesha collects apples in the basket. She picks about 6 apples each minute. Approximately how many apples she will collect in 10mins.

2. Cost of three dozen eggs is Rs. 720. What is the cost of 5 eggs.

① 60 Apples :

② 100

3. A car takes 3 hours to cover a distance of 360km. What distance will it cover in 40mins? 80km

Q4:. India scored 215, in a T20 match. In response PAK scored with a Rate of 8.5 in the Power play (6); find the Required Run Rate to chase the target of 215?

Score in Power play

$R.R = \frac{\text{Score}}{\text{overs}}$

Score = $8.5 \times 6 = 51$

Remaining Score = $215 - 51$

$= 164$

Req. $R.R = \frac{164}{14} = 11.71$

~~4~~ ms: 2

Ratio/Proportion

Rate = Data Comparison

= Data = Same quantities,

End Result = Unitless :

Representation = Antecedent : Consequent

A : B

$$A : B = A/B$$

$$A : B \neq B : A$$

$$\frac{A}{B} \neq B/A$$

$$A^2 \neq B^2$$

1. Ahmad's monthly income is 90000/- while his expenditure is 65000/-

simplest form

a. Find ratio b/w income expenditure

b. Ratio b/w expenditure and saving

c. Ratio b/w saving and income

(b) H.W

(c) H.W

Sol:- Income : EXP

90K : 65K

18 : 13

18(x) : 13(x)

18×5 : 13×5

90K : 65K

Long Length

2. What is the ratio of 4 inches to 8 feet? ⇒ 1 Foot = 12 inches

3. The ratio of 250ml and 8L is?

4. Find the mean proportion between 4 and 25?

A : B

$\frac{4 \text{ inches}}{8 \times 12 \text{ inches}}$

1 : 24

③ 8L = 8000ml

250ml : 8000ml

1 : 32

Mean proportion $= \sqrt{A \times B}$

$= \sqrt{A} \times \sqrt{B}$

$= \sqrt{4} \times \sqrt{25}$

2×5

$= 10$

Ans.

Compound Proportion:

1. Direct proportion
2. Inverse proportion

> Comparison of quantities:

(1) Direct proportion:

$y \propto x$

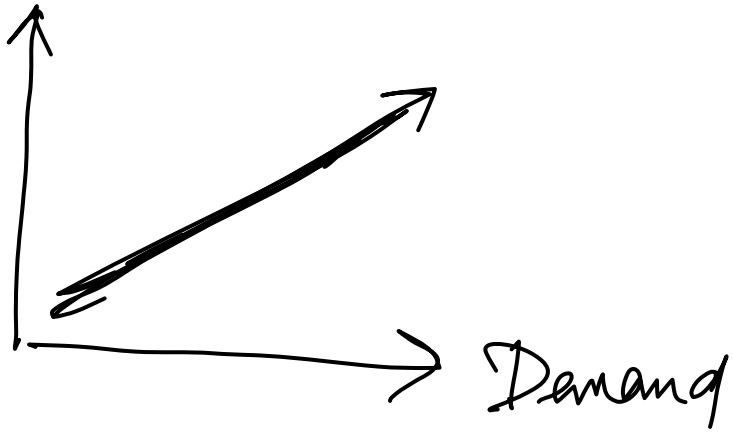
$y \uparrow \Rightarrow x \uparrow$

$\Rightarrow \boxed{y = kx}$

K = Constant

K = Slope

eg (1)



Direct Prop:

$A : B :: C : D$

$A : B = C : D$ — (1)

$\frac{A}{B} = \frac{C}{D}$ (cross mul)

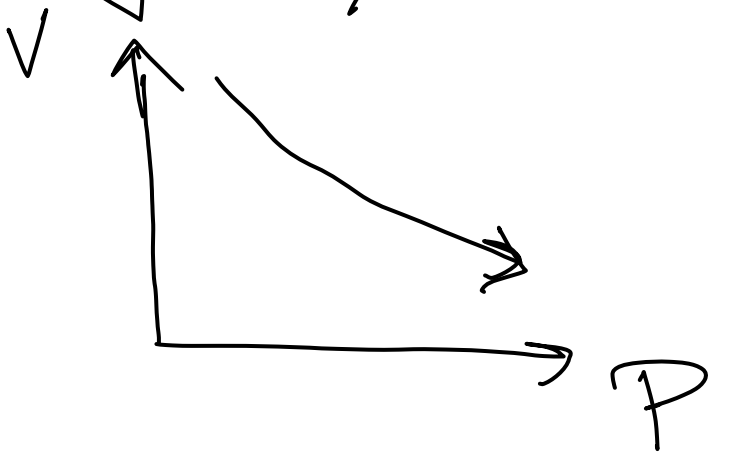
$AD = BC$

product of mean is equal to product of extreme

(2) Inverse Prop:

$\uparrow y \propto \frac{1}{x \downarrow}$

$y = K/x$ — (1)



$E \propto \frac{1}{\lambda}$

$E \propto f$

continue:

Inverse Prop:

$$A : \frac{1}{B} :: C : \frac{1}{D}$$

$$\frac{A}{1/B} = \frac{C}{1/D}$$

$$= \frac{A/1}{1/B} = \frac{C/1 \rightarrow}{\rightarrow 1/D}$$

$$\Rightarrow \boxed{AB = CD}$$

The product of AB should be equal to the product of CD.

$$\frac{1 \times A}{1}, \quad \frac{10 \times 1}{1}$$

Compound Proportion

1. 20 pens const 200rs, what will be the cost of 35pens?

$P_1 : R_s = P_2 : R_s$

$20 : 200 = 35 : x$

2. The value of x in the given proportion 1.6:1.2:2.4:x is?

$1.6 : 1.2 :: 2.4 : x$

$\Rightarrow \frac{16}{10} : \frac{12}{10} = \frac{24}{10} : x$

$\Rightarrow \frac{16}{10} x = \frac{12}{10} \times \frac{24}{10}$

$x = \frac{12 \times 24}{10} \times \frac{10}{16}$

$x = \frac{18}{10}$

$x = 1.8$

Ans: 2

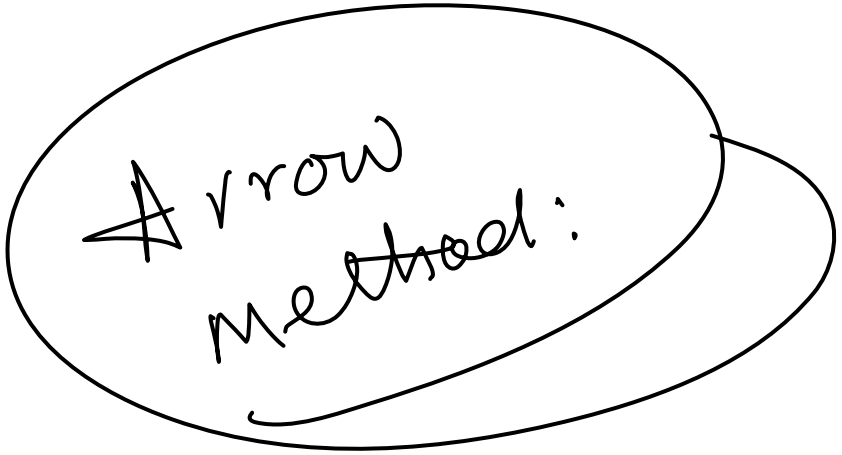
✓ In a cage containing 50 parrots, 10 are blue, 18 are green, and 22 are yellow. How many green parrots should be added to make the ratio between green and yellow parrots as 3:2?

H.W

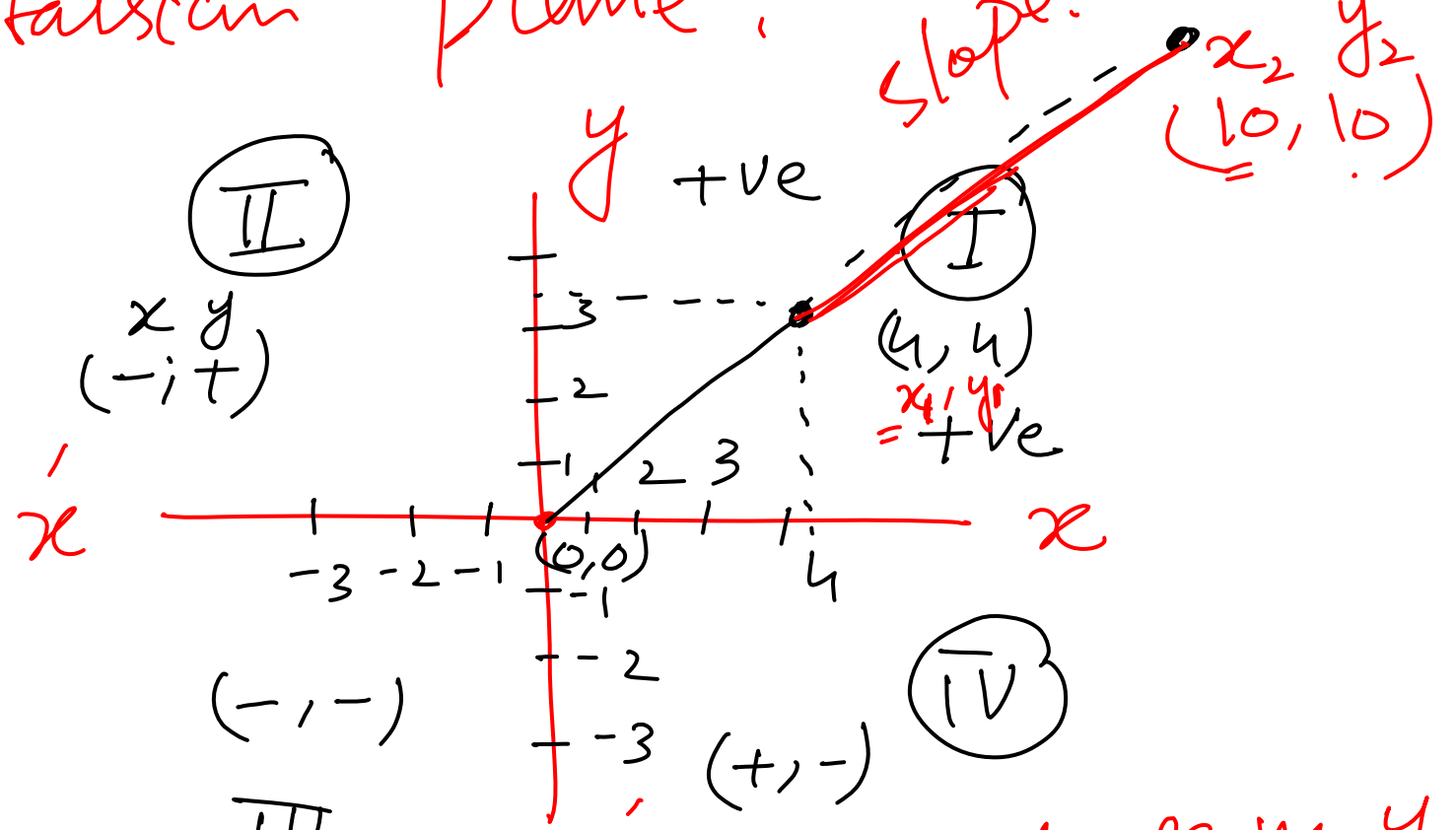
✓ Two numbers are respectively 20% and 50% more than a 3rd number. Find the ratio of the 1st and 2nd number.

H.W

Direct and Inverse Proportion



Certaisian Plane:



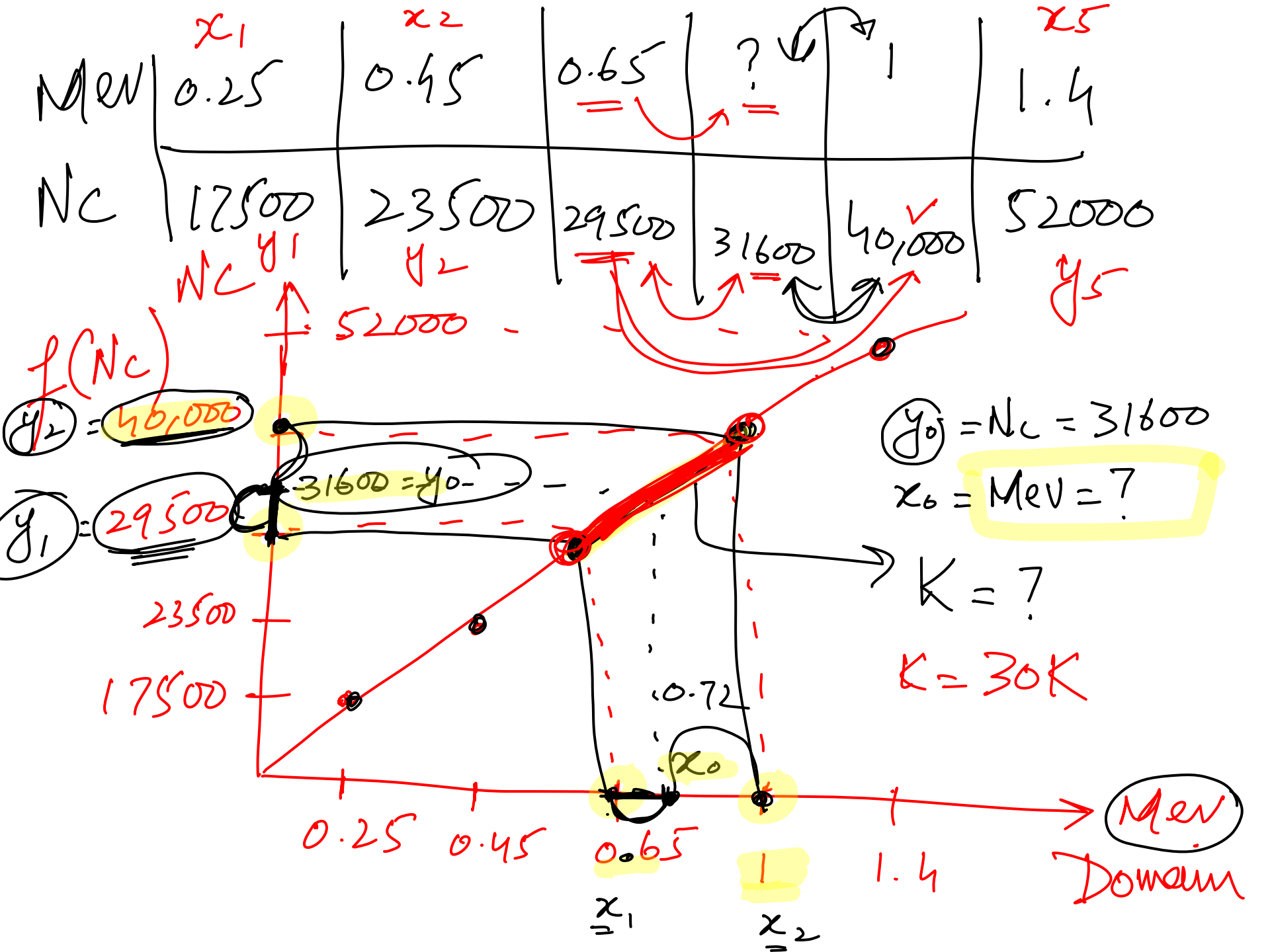
$x = 0$

$y = 0$

$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$

$$= \Delta y / \Delta x$$

$$\text{Slope} = K = m = \frac{y_2 - y_1}{x_2 - x_1}$$


x1
x2
x5
MeV
0.25
0.45
0.65
?
1
1.4
Nc
17500
23500
29500
31600
40,000
52000
y1
y2
y5
NC
52000
f(Nc)
y2 = 40,000
31600 = y0
y1 = 29500
23500
17500
y0 = Nc = 31600
x0 = MeV = ?
K = ?
K = 30K
0.72
x0
0.25
0.45
0.65
1
1.4
MeV
Domain
x1
x2

$K = ?$

$y_1 = 29500$

$y_2 = 40{,}000$

$x_2 = 1$

$x_1 = 0.65$

$$K = \frac{y_2 - y_1}{x_2 - x_1}$$

$$K = \frac{40{,}000 - 29500}{1 - 0.65}$$

$$K = \frac{10500}{0.35}$$

$$K = \frac{10500 \times 100}{35}$$

$$\boxed{K = 30{,}000}$$

$$K = \frac{y_2 - y_0}{x_2 - x_0}$$

$$30{,}000 = \frac{40{,}000 - 31600}{1 - x_0}$$

$$\Rightarrow (1 - x_0)\,30{,}000 = 8400$$

P.T.O

$$(1 - x_0)\,30{,}000 = 8400$$

$$30{,}000 - 30{,}000\,x_0 = 8400$$

$$30{,}000 - 8400 = 30{,}000\,x_0$$

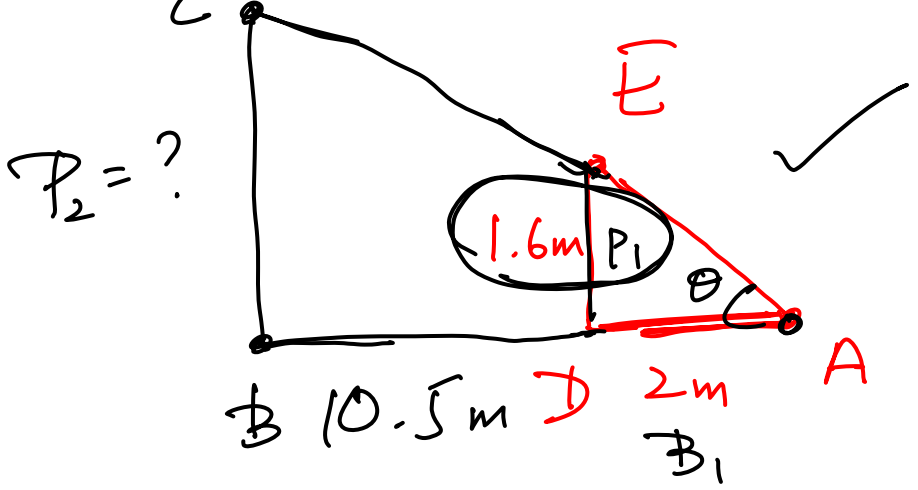
$$21\,600 = 30{,}000\,x_0$$

$$x_0 = \frac{21\,600}{30{,}000} =$$

$$\boxed{x_0 = 0.72}$$

ANS:

CSS = 2024



Base 2 = A → B = 10.5 + 2m = 12.5m

Base 1 : Per 1 = B_2 : P_2

2 : 1.6m = 12.5 : x

logic: product of means = product of extreme

$1.6 \times 12.5 = 2 \times x$

$x = \frac{1.6 \times 12.5}{2} \Rightarrow x =$

Arrow method :-

Dr Hira ⇒

4pm

Ref:

Height	:	Shadow
0.5m ↑	:	1m
1.5m ↑	:	x ↑ Ref

Direct Rel: (↑↑, ↓↓)

Inverse Rel (↑↓)

Head (Denominator)

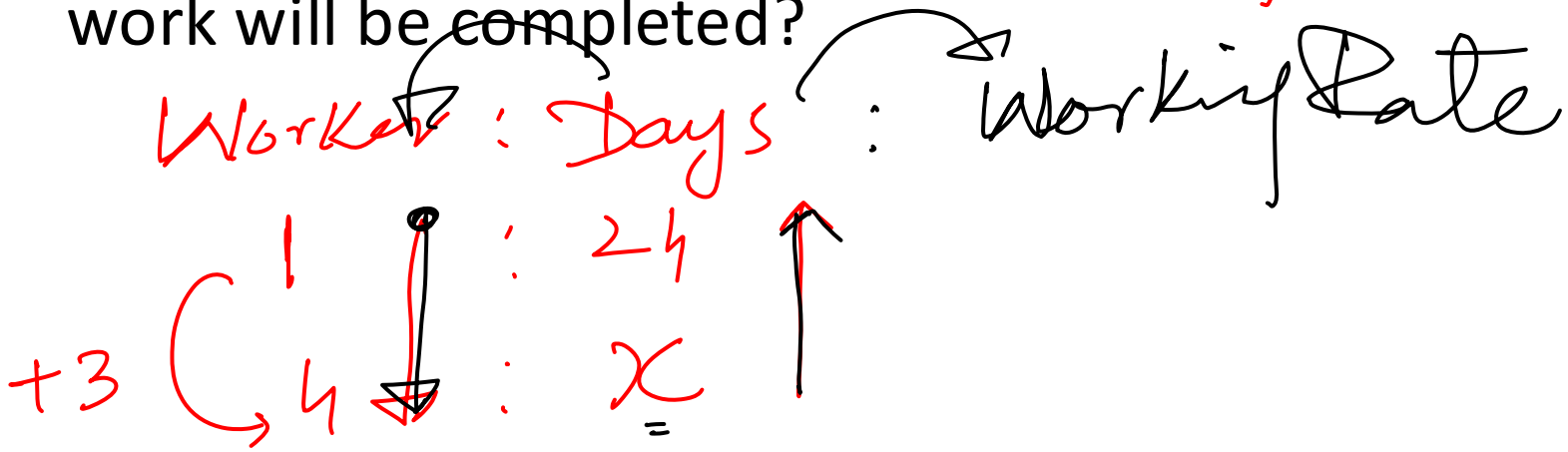
Tail (Numerator)

Uknown = Q x Q x Q :
(Fraction)

$$\frac{x}{1} = \frac{1.5}{0.5}$$

$$x = 3m$$

1. A worker can complete a task in 24days. If three more workers join him, in how many days the same work will be completed?



Days $\propto$ Worker = Inverse ($\uparrow\downarrow$)

$$\frac{x}{24} = \frac{1}{4}$$

$$x = \frac{24}{4} = 6 \text{ days}$$

2. Aslam types 200 words in 30mins. How many words he will type in 12mins?

Q2: 6 pipes are required to fill a tank in 1hr,20mins. If we use 5 such types of pipes, how much time it will take to fill the tank?

Mins

Pipes | Time(mins)

6 | 80 ↑ Head

5 | x ↓ Tail

$60+20=80$

$$\frac{x}{80} = \frac{6}{5}$$

$$x = \frac{6}{5} \times 80 = 96 \text{ mins}$$

1 hr, 36 mins

✓ 3. In a factory 5 men work for 8hrs to produce 200 products. If 8 men work for 6hrs then how many commodities will be manufactured?

Men	Time	products
5	8	200
8	6	x

Two quantities at a time :

① Product & Time = Direct
Men = Constant

② product & Men : Direct
Time : Constant

$$\frac{x}{200} = \frac{6}{8} \times \frac{8}{5} \Rightarrow x = \frac{6}{5} \times 200$$

$= 240$ Ans

4. If 80kg of ration is sufficient for a family of 8 members for 40 days. Then for how many days, 100kg food will be sufficient for a family of ~~5 members~~?

Food	Days	members
80 ↑	40 ↑	8 ↓
100	x	5

(1) Days & mem
Food = Const
Inverse

(2) Days & Food
mem = Const
Direct

$$\frac{x}{40} = \frac{\cancel{100}^{2}}{\cancel{80}} \times \frac{\cancel{8}}{\cancel{5}}$$

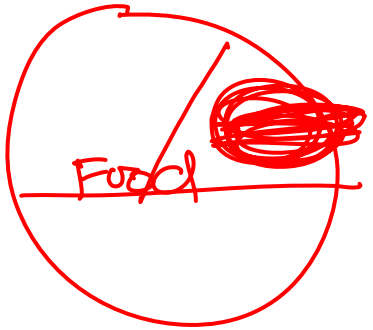
$$x = 2 \times 40 = 80 \text{ days}$$

A fort had enough provision of food for 300 soldiers for 90days. After 20 days, 50 men left the fort. How long would the food last now at the same rate?

Soldiers ↓ Days: ↑

300 → 70

250 → x



300, 90

−20

70

$$\frac{x}{70} = \frac{300}{250} = \frac{6}{5}$$

$$x = \frac{6}{5} \times 70 = 84 \text{ days}$$

Shares

`

$$\text{Share of Hadia} = \frac{\text{Total (Profit. etc)}}{\text{Total Ratio}} \times \text{Ratio of Hadia}$$

Case = Time Constant:

Naveed		Hadia
20K	:	50K
2	:	5

Profit = 10K

− Hadia

Naveed = ( )

Total Ratio = 2 + 5 = (7)

Hadia's share = $\left(\frac{10,000}{7}\right) \times 5 =$ ( )

Naveed's share = $\frac{10,000}{7} \times 2 =$ ( )

1. Share an amount of 840 between A and B in the ratio of 4:3

2. Share 150kg into 9:4:2.

A : B : C

9 : 4 : 2

90kg, 40kg, 20kg.

Q1: A : B

4 : 3

TR (total Ratio) = 4+3

= 7

A's share = $\frac{840}{7} \times 4$

= 480

B's share = 360

3. Moiz and Mair share a lottery win of Rs. 2000 in the ratio of 1:4, Moiz then share his part between himself, his wife and his son in the ratio of 4:5:1, how much more his wife gets over his son?

H.W

4. Three persons start a business and spend 25,000, 15,000 and 40,000 respectively. Find the share of each out of a profit of 14,400 in a year.

H.W

5. A and B started a business in partnership investing Rs. 20000 and Rs. 15000 respectively. After six months, C joined them with Rs. 20000. What will be B's share in the total profit of Rs. 25000 earned at the end of 2 years from the starting of the business?

= 8/04/2023

= 8/04/2025

case = Time variable:

A x Time : B x Time : C x T

20,000 x 2 : 15K x 2 : 20K x 1.5

4 x 2 : 3 x 2 : 4 x 1.5

8 : 6 : 6

4 : 3 : 3

TR = 4+3+3

B's = $\frac{25000}{10} \times 3$

= 7500