

## healthedge

- \* healthcare
- \* Digital transform
- \* Insurance for health
- \* Payment process
- \* Check & Governance in payment

→ 4 solutions ← core adminis.

Payment Intensity

## Management

→ verbal reasoning, clint

→ Basic program

verbal  
apti  
reasoning

→ 2004 - started

→ Investor grp → Blackstone

## Why healthedge

- diff diversity
- more stream
- interaction with end user
- new techs Java, devops, .net etc.

## Guiding Care (management)

- used to help people & aged people who have chronic prob. e.g. like will remind to take medicine
- This software will be used by Insurance company to take care of patients.

## Percentage

$$\gamma_2 = 50\%$$

$$\gamma_3 = 33.33\% \quad \gamma_5 = 20\% \quad \gamma_7 = 14.28\%$$

$$\gamma_4 = 25\%$$

$$\gamma_6 = 16.66\% \quad \gamma_{10} = 10\% \quad \gamma_9 = 11.11\%$$

$$\gamma_8 = 12.5\%$$

$$\gamma_{12} = 8.33\%$$

$$\gamma_{16} = 6.25$$

$$\boxed{11} - \frac{100}{16} = 11.11\%$$

$$\gamma_{11} = 9.09\%$$

1) Given

30% children, 45% men

25000 people are women

$$100 - (30+45) = 25\%$$

So 25% of women is 25000

$$\text{So } 11\% = \frac{25000}{25} = 1000 \text{ people}$$

$$30+45 = 75\%$$

$$= 75 \times 1000 = 75000 \quad \textcircled{b}$$

2) Given

A number is reduced by 20%. Then its value

is 960  
So what is the real no.

$$80\% = 960$$

$$80x = 960 \times 100$$

$$100\% = x$$

$$x = \frac{96000}{80}$$

3) Given

20% on cloth

25% personal care

15% on food

10% of travel

30% is left out which is 9000

$$30\% = 9000$$

$$1\% = \frac{9000}{30}$$

$$100\% = 300 \times 100$$

$$= 30000$$

\textcircled{b}

4) Given

60% of no is added to 120  
it makes it 90%  
what is the no.

So 30% is 120

$$1\% = \frac{120}{20} = 4$$

$$\text{So } 100\% \text{ is } = 100 \times 4 = 400 \quad (\text{b})$$

5) Given

40% of a no. is 200 more than 30% of no.

So 10% is 200

$$1\% = \frac{200}{10} = 20$$

$$100\% = 20 \times 100 = 2000 \quad (\text{b})$$

6)

40% of 250 + 60% of 450

$$40 \times 250 + 60 \times 450$$

$$= \text{Crt ans } 370$$

$$\frac{3}{4} \times 5$$

$$10\% \text{ of } 250 = 25$$

$$10\% \text{ of } 450 = 45$$

$$25 \times 4 + 45 \times 6$$

$$= 100 + 270$$

$$= 370$$

7) 70% of no. is 300 less than 80% of no.

$$10\% = 300$$

$$\text{So } 100\% = 300 \times 10$$

$$= 3000 \quad (\text{a})$$

8) 25% of no is 8 less than  $\frac{1}{3}$  of no.

$$25\% = 33.\overline{3}\% \quad (\text{b})$$

$$33.\overline{3} - 25\% \Rightarrow 8.\overline{3}\% = 8$$

$$\frac{1}{3} = 8$$

$$\frac{100}{3} = 88\frac{1}{3}$$

$$\frac{\text{whole part}}{3} = 96$$

$$9) 45\% \text{ of } 750 - 25\% \text{ of } 480$$

$$337.5 - 120 = \boxed{217.50} \quad (b)$$

$$10) 860 \text{ % of } 50 + 50 \text{ % of } 860$$

ie borrow and pay up in  
interests & return bba

$$\begin{array}{r} 12 \\ \times 29 \\ \hline 108 \\ 24 \quad 18 \\ \hline 357.5 \end{array}$$

$$45\% \text{ of } 750 = 337.5$$

$$\begin{array}{r} 10\% \text{ of } 480 = 48 \\ - 120.0 \\ \hline 217.5 \end{array}$$

### Decimals to fraction

- 1) Person salary increased by 28.56 % to become = 18000  
prev. original salary = ?

$$\frac{100}{100} + 28.56 = 18000$$

$$\frac{9}{10} = 18000 \times \frac{1}{100}$$

So 9 part is 18000

$$1 \text{ part} = \frac{2000}{18000}$$

So we need 7 part =  $7 \times 2000$

$$= \boxed{14000} \quad (b)$$

$$2) 100\% - 8.33\% = 3300$$

$$\frac{1}{12} = 8.33\%$$

In  $\frac{1}{12}$  decimal subtract numerator & denominator

$$11 \text{ part} \rightarrow \frac{11}{12} = 3300$$

$$1 \text{ part} = \boxed{\frac{300}{3300}}$$

$$12 \text{ part} = 12 \times 300$$

$$= \boxed{3600} \quad (c)$$

$$3) 100\% + 37.5\% = 48400$$

$$\frac{1}{8} = 12.50\%$$

$$\frac{1+1}{8} = \frac{1}{4}$$

$$\text{So } \frac{3}{8} = 37.5\%$$

in qn given increased so  
add numerator & denominator

$$11 \text{ part} \rightarrow \frac{11}{8} = 48400$$

$$1 \text{ part} = \frac{4400}{48400} = \frac{1}{11}$$

$$8 \text{ part} = 4400 \times 8$$

$$= 35200 \text{ } \textcircled{b} \text{ ans}$$

$$4) 6.25\% \text{ decrease in no given value} = 3000$$

$$100\% - 6.25\% = 3000$$

$$\frac{1}{16} = 6.25\%$$

in qn decrease so subtract numerator & denominator

$$1 \text{ part} \rightarrow \frac{15}{16} = 3000$$

$$1 \text{ part} = \frac{200}{3000} = \frac{1}{15}$$

$$16 \text{ part} = 200 \times 16$$

$$= 3200 \text{ } \textcircled{b}$$

$$5) \text{ increase in unknown part} = 220$$

$$100\% + 22.22\% = 220$$

$$1 + \frac{1}{9} = 111\%$$

$$\frac{2}{9} = 22.22\%$$

in qn given increased so add

$$11 \text{ parts} \quad \frac{11}{9} = \cancel{220} \quad 220$$

$$1 \text{ part} = \frac{220}{\cancel{11}} = 20$$

$$9 \text{ part} = 20 \times 9 = \boxed{180}$$

$\frac{44}{55} \cdot \frac{44}{55}$

$\frac{18}{44440}$

$\frac{5555}{5555}$

$\frac{99990}{99990}$

00

= 0%.

$$\begin{array}{r} 180 \times \cancel{55.55} \\ \hline 100 \\ \hline 999.90 \\ \hline 10 \\ \hline 99.99 \end{array}$$

$$\frac{14}{9} \times 2 = 280$$

$$= 99.99$$

$$\begin{array}{r} 6 \text{ part} = 1 + \frac{2}{9} = 220 \\ \hline 11 \text{ part} = 220 \\ \hline 1 \text{ part} = 20 \end{array}$$

$\frac{5}{9} \quad 14 = \cancel{220}$

$$1150 = 1 + \frac{5}{9} =$$

$$= \frac{14}{9} \Rightarrow \frac{14P}{14 \times 20} = \frac{280}{280}$$

Increase & decreased

always in qn

100  $\Rightarrow$  125 a chuna  $\frac{1}{4}$  percent increased

125 la esund ewalo decrease patna

100 kedaikun na  $\frac{1}{5}$

if  $\frac{1}{4} \uparrow$  then  $\frac{1}{5} \downarrow$

always numerators + denominators  
and put it in other  
fractions denominators.

engala oide product increase

2 oide decrease on either we pannan

$\frac{1}{2} \times \frac{1}{3} = ?$

$\frac{1}{3} \times \frac{1}{2} = ?$

1)

20% is  $y_5$ if  $y_5 \uparrow$  then  $\frac{1}{6} \downarrow$  & should decrease

$$\Rightarrow y_6 = 16.66\% \quad @$$

2) A got 8.33% votes more than B

A has  $\frac{1}{12}$ % more than Bso B has  $\frac{1}{13}$ % less votes than A

$$y_{13} = 7.71\% \quad @$$

3) 25%  $\uparrow$  $\frac{1}{4} \uparrow$  so  $\frac{1}{5} \downarrow$  decrease

$$20\% \quad @$$

4) Price of article  $\downarrow$  by 30%.

$$(i.e.) \frac{3}{10} = 30\%$$

if decrease no. qr la kudue than nma

denominator 1a (denom - number of digits)

$$10-3=7$$

$$\frac{14.28}{42.84}$$

$$\Rightarrow \frac{3}{7} \text{ should } @$$

$$y_7 = 14.28$$

$$z_7 = (42.84)$$

$$(C) 42 \frac{6}{7}$$

$$-84 = 6 \frac{6}{7}$$

7) 12.5% speed increased then what % time is ↓  
 $\frac{1}{8} = 12.5\%$   
 then  $\frac{1}{9}$  is reduced (solved)

(b) 11.11%

Qn 1a increased nu kudutha

ans 1a (numerator + denominator) podanum

if qn 1a decreased kudutha

ans 1a (denominator - numerator) podanum

5) Price ↑ by 20% (ie)  $\frac{1}{5}$

then commodity should ↓ by  $\frac{1}{6}$  → (+)

given  $\frac{1}{6} = 20\text{kg}$

so total is =  $6 \times 20$

$$= 120 \text{ kg}$$

6) given 25% price ↑ (ie)  $\frac{1}{4}$  ↑

then  $\frac{1}{5}$  is decreased in kg

(that is)  $\frac{1}{5} = 5 \text{ kg} \rightarrow$  which is purchased for 300

that is  $\frac{1}{4}$  ↑ at 25 km  $\rightarrow 300 \text{ Rs}$  for purchase  
 pannage  
 so price is  $12.8 \text{ Rs/kg}$  @  
 20 km  $\rightarrow 300 \text{ Rs}$  na  $\frac{300}{20} \Rightarrow 15 \text{ Rs/kg}$

9) price ~~reduced~~ by  $11.11\% \cdot (\frac{1}{9})$ .

then we can purchase  $\frac{1}{9}$  ↑ more wheat for same price  
if

$$\textcircled{8} \rightarrow 8 \text{ part} = 72 \text{ kg}$$
$$1 \text{ part} = 18 \text{ kg}$$

$\textcircled{\frac{1}{9}}$  we purchase more

$$9 \text{ part} = 9 \times 18$$

$$= 162 \text{ kg} \quad \textcircled{a}$$

10) speed ↓ time ↑

25%. speed ↓ than normal

$\frac{1}{4} \downarrow$  Then  $\textcircled{\frac{1}{3}}$  time is ↑

$$\textcircled{\frac{1}{3}} = 20 \text{ min}$$

31a 1 part is  $\rightarrow 1 \text{ part} = 20 \text{ min}$

$$3 \text{ part} = 60 \text{ min}$$

$$\text{So } 60 \text{ min} + \textcircled{\frac{20}{3}} = 80 \text{ min} \quad \textcircled{a}$$

8) Rice g commodity ↑ by 27.27%.

$$3 \times \frac{1}{9} = \frac{3}{9} \uparrow$$

$$3 \times \frac{1}{11} = 27.27\%$$

$$\frac{1}{24} = 25\% \quad \frac{3}{11} = 27.27\%$$

$$\frac{3}{8} = 12.5 \times 3$$

$$= 37.5\%$$

## Successive percentage

6) SI

given population = 100000

each yr  
10%  
for 3 years

$$100000 \times \frac{110}{100} \times \frac{110}{100} \times \frac{110}{100}$$

so only 2 years

$$\begin{array}{r} 110 \\ 110 \\ \hline 000 \\ 110 \\ \hline 12100 \\ 12100 \\ \hline 12100 \end{array}$$

$$= \boxed{121000} \text{ (b)}$$

$$= \boxed{121000} \text{ (c)}$$

2) SI

$$50000 \times \frac{120}{100} \times \frac{120}{100} \times \frac{120}{100}$$

$$= \boxed{172800 \times 5}$$

$$= \boxed{864000} \text{ (d)}$$

$$\begin{array}{r} 120 \\ 144 \\ \hline 480 \\ 480 \\ \hline 120 \\ 120 \\ \hline 480 \\ 480 \\ \hline 864000 \end{array}$$

other way  
put 50000 as 100000

$$(100000 \times \frac{120}{100} \times \frac{120}{100} \times \frac{120}{100})$$

$$(12^3) = 172800$$

The given ans by 2 so

$$= \frac{172800}{2} = \boxed{86400} \text{ (d)}$$

$$6^3 = 216$$

$$7^3 = 343$$

$$8^3 = 512$$

$$9^3 = 729$$

$$10^3 = 1000$$

$$11^3 = 1331$$

$$12^3 = 1728$$

5) Present salary = Rs) 25000

Each year 10% A for 2 years

what is the sum for which it is equivalent

(b)

3) Sol

$$160000 \times \frac{94}{100} \times \frac{108}{100}$$

$$= 162432$$

$$\begin{array}{r} 108 \\ 94 \\ \hline 1432 \\ 92 \\ \hline 162 \\ 16 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 609 \\ 10152 \\ \hline 162432 \end{array}$$

9 oda divisibility rule is

$$\text{ex: } 729 \Rightarrow 7+2+9 = 18$$

$$= 1+8 \Rightarrow 9$$

$$\text{so meta } 108 \text{ ah} \Rightarrow 54 \times 2$$

$$\Rightarrow 9 \times 6$$

so meta ans is divisible

by 9 ah na check

divisibility of 4 na last 2 digits should be  
 divisible by 4

Other method

$$23 \times 23 = 529$$

$$2+3 \times 2+3 = 5+2+9$$

$$\Rightarrow 5 \times 5 = 16$$

$$= 25$$

$$= 2+5$$

$$= \boxed{7} \text{ RHS}$$

$$= 1+6 \Rightarrow \boxed{7} \text{ RHS}$$

$$\boxed{LHS = RHS}$$

ans la

either 7 or another 4 digit  
num for all no.s

$$1) \quad 30000 \times \frac{104}{100} \times \frac{97}{100}$$

~~other ratio~~

$$\begin{aligned} &= 3 \times \frac{104}{10} \times \frac{97}{1} \\ &= \frac{30264}{10} = \boxed{30264} \text{ (d)} \end{aligned}$$

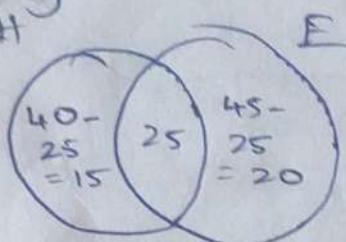
$$\begin{aligned} &\Rightarrow 3 \times 5 \times 16 \\ &= 15 \times 16 \\ &\Rightarrow 6 \times 7 \\ &= 42 \text{ (b)} \end{aligned}$$

$$\begin{array}{r} 104 \\ \times 97 \\ \hline 1728 \\ 935 \\ \hline 10088 \\ \times 3 \\ \hline 30264 \end{array}$$


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Venn diagrams

1)



$$15 + 25 + 20$$

$$= 60 \text{ y.}$$

(a)

2) Given

Profit loss

pg 4

Rs 1470 S.P.

$$\text{Profit} = 22.5\%$$

$$\frac{100}{100} \text{ la } 25\% = 4$$

$$\frac{100}{100} \text{ la } 2.5 = 40$$

$$192.5 \times 1 = 1470$$

$$100 = x$$

$$x = \frac{1470 \times 100}{122.5}$$

$$\boxed{x = 1200}$$

25 la (10) 2.5 erukku

22.5 la 9 (2.5) erukku  
so

$$1470 = 49 \text{ parts}$$

~~x~~  $\rightarrow$  40 parts (Always CP is 100)

$$x = \frac{1470 \times 40}{49}$$

$$= \boxed{1200} \text{ (c)}$$

b)  $600 + x = 1000 - x$

$$2x = 400$$

$$\boxed{x > 200}$$

Substitute

$$600 + 200 = 800$$

CP  $\boxed{800}$  b

9)  $800 - 20x = 275 + x \rightarrow 14 \text{ times loss}$   
so odd

20 times loss  
 $\Rightarrow 275$

$$x = \frac{525}{21}$$

$$525 = 21x$$

$$\boxed{x = 25}$$

$$800 - 20(25)$$

$$800 - 500 = 300 \text{ CP}$$

$$300 \times \frac{25}{100} = 75$$

$$300 + 75 = 375$$

should be SP  
to gain profit  $\$25$ .

CP(Ns)PP

CP of 10 article = SP price of 7 article

$$10 \times 7 =$$

$$CP \text{ of } 10 \text{ article} = 10 \times 7$$

$$CP \text{ of 1 article} = \frac{10 \times 7}{10} = 7 \text{ Rs}$$

$$SP \text{ of 7a} = 10 \times 7$$

$$SP \text{ of 1a} = \frac{10 \times 7}{7} = 10 \text{ Rs}$$

So 3Rs profit

$$\frac{3}{7} = 42.84\% \text{ profit} \quad (\lambda = 14.28)$$

2)

$$CP \text{ of } 15 \text{ books} = SP \text{ of } 20 \text{ books}$$

$$15 \times 20$$

$$CP \text{ of } 1 \text{ book} = \frac{15 \times 20}{15 \times 01} = 20 \text{ Rs}$$

$$SP \text{ of } 1 \text{ book} = \frac{15 \times 20}{20} = 15 \text{ Rs}$$

$$20 - 15 = 5 \text{ Rs} \quad 25 \% \text{ loss (CP 20)}$$

loss (b) 25%

$$3) CP \text{ of } 20 \text{ pens} = SP \text{ of } 15 \text{ pen}$$

$$20 \times 15$$

$$CP \text{ of } 1 \text{ pen} = \frac{20 \times 15}{20} = 15 \text{ Rs}$$



$$SP \text{ of } 1 \text{ pen} = \frac{20 \times 15}{15} = 20 \text{ Rs}$$

$$20 - 15 = 5 \rightarrow \text{is } \frac{1}{3} \text{ of } 15 \text{ (CP)}$$

33.33% Profit (a)

4)

~~$$SP \text{ of } 110 \text{ mangoes} = CP \text{ of }$$~~

$$CP \text{ of } 120 \text{ mangoes} = SP \text{ of } 110 \text{ mangoes}$$

$$120 \times 110$$

$$CP \text{ of } 1 \text{ mango} = \frac{120 \times 110}{120} = 110$$

$$SP \text{ of } 1 \text{ mango} = \frac{120 \times 110}{110} = 120$$

$$120 - 110 = 10 \text{ Rs} \quad \frac{10}{110} = \frac{1}{11} \text{ % profit}$$

9.09% Profit (a)

Type 3 Pg: 5

Article		Rs
11		10
10		11

make it equal

$$\times 10 \Rightarrow 11 \times 10$$

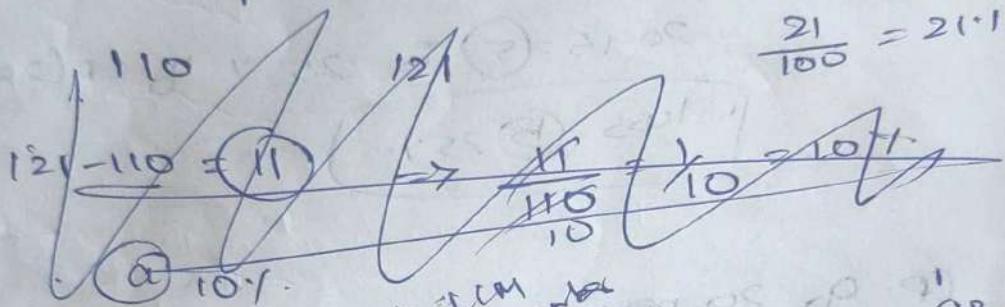
$$\times 11 \Rightarrow 10 \times 11$$

$$10 \times 10 \Rightarrow 100 \text{ CP}$$

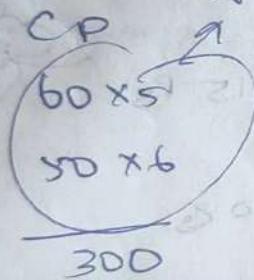
$$11 \times 11 \Rightarrow 121 \text{ SP}$$

$$121 - 100 = 21$$

$$\frac{21}{100} = 21\% \text{ (b)}$$



3)



RS

$$93 \times 5 \Rightarrow 465 \text{ CP}$$

$$93 \times 6 \Rightarrow 558 \text{ SP}$$

$$\frac{465}{465} = 100\%$$

$$\begin{array}{r} 465 \\ \hline 558 \\ -465 \\ \hline 93 \end{array}$$

$$= 93$$

$$\frac{93}{465} = \frac{1}{5} = 20\% \text{ RS}$$

2)

article

$$6 \times 5$$

$$5 \times 6$$

RS

$$5 \times 5 = 25$$

$$6 \times 6 = 36$$

$$36 - 25 = 11$$

$$\frac{11}{36} \times 100 = 30.55\% \text{ Profit (b)}$$

$$\begin{array}{r} 100 \\ -11 \\ \hline 89 \\ \times 5 \\ \hline 445 \end{array}$$

D

Article

$$\begin{array}{r}
 6 \times 4 = 24 \\
 8 \times 3 = 24 \\
 \hline
 \Rightarrow 48
 \end{array}
 \quad
 \begin{array}{r}
 20 \times 4 = 80 \\
 25 \times 3 = 75 \\
 \hline
 155
 \end{array}$$

$$\frac{80}{16} = 5 \quad \frac{75}{16} = 4.6875 \approx 5$$

Article

48

Rs  
15531  
6

8 x 6

31 x 6

$$\begin{array}{r}
 186 \\
 155 \\
 \hline
 031
 \end{array}$$

$$18.6 - 155 = 31$$

$$\frac{31}{155} = \frac{1}{5} \Rightarrow 20.1$$

(a)

### Dishonest seller Problem Pg: 5

1)

$$1000 \text{ g} = 1000 \text{ Rs} + 2 + 8 + 1$$

$$900 \text{ g} = 1000 \text{ Rs} + 2 + 8 + 1$$

$$10.00 - 9.00 = 1.00$$

100

(900) → edhukku no ekvalodha kudukkura  
Sale price

$$= \frac{1}{9} = 11 \cdot 11 \cdot 1 \quad \text{(a)}$$

Profit

3) Vagura apo 1100g a.h 1000g nu  
 emathu vagura so 100₹ Profit  
 811 Panura apo 900g a.h 1000g  
 nu emathu sale panura 100₹ profit  
 so total a.h 200 profit

$$\frac{200}{900} = 22.22\% \text{ (b)}$$

### Averages

1) avg of all natural no from 1 to 100  
 if consecutive no  
 add 1st & last no & divide by 2

$$\frac{1+100}{2} = \frac{100.5}{2} = 50.5 \text{ (b)}$$

2) so

$$1+3+5+7+\dots+99 = \frac{1+99}{2} \times 50 = 50 \text{ (b)}$$

3) down  $900 = 943 \text{ (b)}$

4)  $21+22+23+24+25 = \frac{21+25}{2} \times 5 = 23 \text{ (b)}$

largest no is  $25 \text{ (b)}$

5) 35 37 39 41 43 45

$$\frac{35+45}{2} = \frac{80}{2} = 40$$

largest no. is 45

6) first do it for small form

$$24, 6, 8, 10, 12$$

mid

$$\frac{F+L}{2} = \frac{2+20}{2} = 11$$

$$\frac{2+20}{2} = 402$$

To find 1<sup>st</sup> term from 6

6 la onward 2 term thalli 2 erukku

$$6 - 2(2) = 2$$

$$6 - 4 = 2 \rightarrow \text{is the } 1^{\text{st}} \text{ element}$$

then

$$8 + 2(2) = 8 + 4$$

$\dots = 12$  last term

Play way is  
mid avg is  $= 201$

$$\frac{F+L}{2} = 201$$

$$F+L = 201 \times 2$$

$$= 402$$

Ex: To find 1<sup>st</sup> number of the above series

Total 116

200 201 202

↓  
edukku munadi 57 no. em.

$$200 - 57(2)$$

$$= 200 - 114$$

$$= 86 \text{ first no.}$$

last number is

$$202 + 57(2)$$

$$= 202 + 114$$

$$= 316 \text{ last no.}$$

9)

$$Q \bar{V} = -\frac{51}{2} - \frac{?}{0} - \frac{?}{54} - \dots$$

$$\frac{51+54}{2} = \frac{52.5}{2} = 52.5$$

10)

doubt

$$\text{Avg of } 17 \text{ no} = 63$$

$$\text{Avg of first 9 no} = 64$$

$$\text{Avg of last 9 no} = 61$$

$$\dots = \frac{64}{2} - \frac{61}{2} = \frac{64+61}{2} = \frac{125}{2} = 62.5$$

11) Given, 13 shirt = ₹ 50 each

15 pants = ₹ 60 each

$$12 \frac{\text{shirts}}{\text{pants}} = 265 \text{ each}$$

extra keep ₹ 50 as base

for 1 pant = 10 extra

15 pant = 150 extra

$$\begin{array}{r} 15 \\ 12 \\ \hline 30 \\ 180 \\ \hline 180 \end{array}$$

for 1 shirt = ₹ 5 extra

12 shirts = ₹ 60 extra

$$\text{Total} (150 + 180) = 330 \text{ extra}$$

Total

 $13 + 15 + 12$  ~~extra material~~

= 40 material

$$\begin{array}{r} 330 \\ 40 \\ \hline 290 \\ 250 \\ \hline 40 \end{array}$$

We took 50 as base &amp; add true avg

$$\cancel{50} + 8.25 = \underline{158.25} \text{ avg}$$

$$\frac{x+x+1}{2} = 40$$

$$2x + 1 = 80$$

$$2x = 79$$

$$x = \frac{79}{2}$$

1) 30Given

avg age of 17 stu is 16 years

new stu added  $x$ 

so new avg of

18 stu = 20

 $\times \downarrow$ 

age of new stu = ?

$$\begin{array}{r} 18 \\ 16 \\ 102 \\ \hline 17 \\ 27 \\ \hline 2 \\ 272 \\ -272 \\ \hline 088 \end{array}$$

(6)

$$17 \times 16 = 272$$

$$18 \times 20 = 360$$

$$360 - 272 = 88 \text{ age of new stu}$$

Sendha & stu 16 + ella  
18 kum 4 extra kandu  
vara to make 16 to 20  
= 88 age

2) Avg of 17 stu = 20 year

new stu added

$$\text{so } 17 \text{ stu} = 23$$

$$17 \times 20 = 374$$

$$16 \times 23 = 368$$

$$414 - 374$$

$$= 41 \text{ kg of new comon}$$

$$= 6 \text{ kg}$$

$$368 - 374$$

$$= 6 \text{ kg} \rightarrow \text{weight of stu who left}$$

Pinned  
Pinned  
more  
Pinned

Kings

AC

$$3) 12 \times 5 = 60$$

$90 + 60 = 150 \rightarrow$  other soundness  
avg korajurukache

$$4) 9 \text{ enzinger la um } 9 \text{ sun koravdne}$$

$9 \times 9 = 81$  ana 100 runs additaduktla

$$\text{so } 100 - 81 = \cancel{19}$$

$$= 19 \text{ current avg}$$

new avg =  $100 + 19 = 119$

$$\text{new avg} = 119 \text{ p.a.}$$

hence new avg

new avg =  $119 \text{ p.a.}$

$$\Delta \text{RS} = 30 \text{ p.a.}$$

$$\text{old avg} = 85 \text{ p.a.}$$

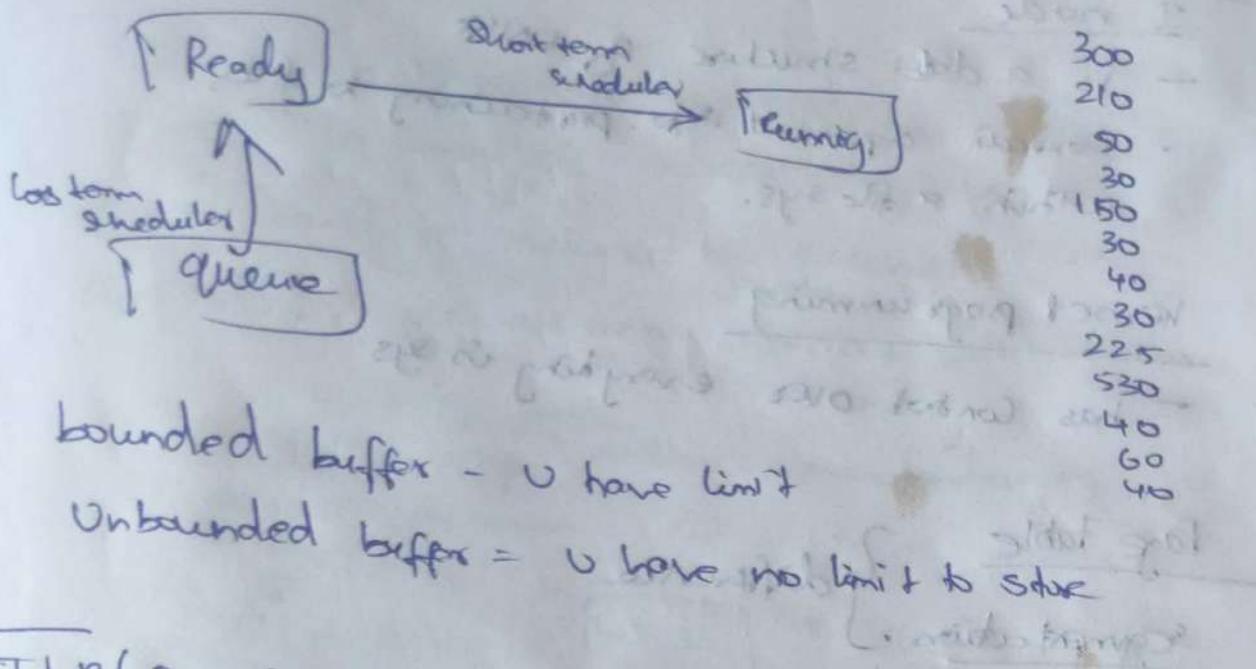
$$\text{new avg} = 119$$

$\boxed{\text{Ans}}$

$$\Delta \text{RS} = 30 \text{ p.a.}$$

old avg = 85

$\boxed{\text{Ans}}$



bounded buffer - u have limit

Unbounded buffer = u have no limit to store

## TLB (Translation Lookaside Buffer)

- is a memory cache to store recent translation of virtual memory to phys memory.
- reduce access time
- called as address translation cache

## ELF (Executable & Linkable Format)

\* common file format for executable & file, obj code, standard libraries etc.

## Demand paging

- memory optimization technique
- it will not load entire prog into memory instead it load a part of prog depending on demand

## ~~File system~~

### I node

- is a data structure of UNIX
- Contains important info pertaining to files within a file sys.

## kernel programming

- has control over everything in sys

## Page table

## segmentation

micro kernel

monolithic kernel

contiguous

non contiguous

over lay

demand paging

Pg: 7

7) Sol

32, 33, 34 should be replaced

11 person is committed increase by 2 years

Tenaga should be replaced by 3 women

apocandra 3 women um  $11 \times 2 = 22$  extra kandu  
varavum

so  $32 + 33 + 34 + 22$  <sup>edhu</sup> apocandra 3 women kandu varavum

edhu replace poornavum

$40 \cdot 33$

$$= \frac{121}{3} \rightarrow \text{edhu} = \boxed{40 \cdot 33}$$

22  
34  
33  
32  
121

8) Sol

avg height of 40sm = 163

avg height of 37 = 162

endha 3 members um ~~162 + 162 + 37(162)~~ + 40

edhu extra  
adhavaradhu each  
162 + 1 for 40  
members  
apocandra  
 $\frac{40(163)}{40} = 163$   
varavum

ans 176

$$162 + 162 + 37(162) + 40 \\ = 526 = A + B \\ \frac{B}{3} = 51 + 3x + (x-2)$$

$40x^2$

$$\Rightarrow 524 = 3x$$

$$x = \frac{174.6}{3} = 174.67$$

When u start feeling bad looking at happiness  
Some random person - it is jealousy  
But when u feel bad looking at the happiness  
3 people u love - it means u hate the  
way that u can't take part in their happiness.

Type 4 : Pg 7

1) Avg of 100 sm = 58

86 was mistakenly written as 68

So  $86 - 68 = 18$   
 $\frac{18}{100} = 0.18$

So new avg for 100 sm =  $58 + 18$

2)

Avg of 5 sm = 50

48 was mistakenly written as 84

So  $84 - 68 = 36$   
 $\frac{36}{5} = 7.2$

Should be subtracted from 50

$50 - 7.2 = 42.8$

3)

Avg of 40 sm = 72

64 → 68 → mistake  
62 → 65 → 3

84 → 73 → 11

$$\begin{array}{r} 8 \\ 73 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 1 \\ + 4 \\ \hline + 4 \end{array}$$

$\frac{1}{40} = 0.1$

added

↳ should be subtracted  
from 72

=  $72 - 1$

$$\begin{array}{r} 72.0 \\ - 0.1 \\ \hline 71.9 \end{array}$$

$$4) \text{ avg of } 100 \text{ article} = 46$$

$16 \rightarrow$  was <sup>mistakenly</sup> read as 61

$2 + 3 \rightarrow$  was mistakenly read as 34

articles were 90 instead of 100

So ellamukum 46 avg last 10 oda values  
toniyachudhu nala 90 mem kui 46 ne avare

$$90 \text{ article} = 46$$

$$16 \rightarrow 61 \Rightarrow -45$$

$$43 \rightarrow 34 \Rightarrow +9$$

$$\begin{array}{r} 4 \\ -36 \\ \hline 90 \end{array} \Rightarrow -0.4$$

$$\begin{array}{r} -36 \\ \hline 45.6 \end{array}$$

$$\begin{array}{r} 56x^{11} \\ 16 \\ \hline 45 \\ 09 \end{array}$$

$$\begin{array}{r} 46.0'0 \\ -0.4 \\ \hline 45.6 \end{array}$$

## Type 2

$$1) \text{ avg of } \underline{64} \text{ innings} = 62$$

high & low innings excluded so

$$\text{avg } 62 \text{ innings} = \underline{60}$$

so andha 2 innings um

$$\begin{array}{r} 60+60+128 \\ \hline 248 \end{array}$$

$$\begin{array}{r} 64 \times 2 \\ 128 \\ 120 \\ \hline 248 \end{array}$$

Given

let lowest =  $x$

$$h - L = 180$$

$$h = 180 + L$$

$$\text{diff between high & low} = h + x - 180 = 180$$

$$(x+180) + x = 268$$

$$\Rightarrow 2x + 180 = 268$$

$$2x = 88$$

$$x = 34$$

$$\begin{array}{r} 14 \\ 268 \\ 180 \\ \hline 068 \end{array}$$

$$\text{low} = 34 - x$$

$$\text{high} = x + 180 = 34 + 180 = 214$$

$$\begin{array}{r} 180 \\ 34 \\ \hline 214 \end{array}$$

2) Sol

$$\text{avg 42 innings} = 30$$

$$\begin{array}{r} 2 \\ 84 \\ 28 \\ \hline 140 \end{array}$$

$$\text{avg 40 innings} = 28$$

(high & low are excluded)

extra high & low  $(2 \times 42 = 84)$  extra needed  
Variance to make  $28 \rightarrow 30$

$$28 + 28 + 84 = 140$$

let  $x$  be low runs

high is  $x+100$

$$x + (x+100) = 140$$

low      high

$$2x + 100 = 140$$

$$2x = 40$$

$$\boxed{x = 20} \rightarrow \text{low}$$

$$\text{high} = x+100 = \boxed{120} \text{ high}$$

$$\begin{aligned} \text{high} - \text{low} &= 100 \\ \text{high} &= 100 + \text{low} \end{aligned}$$

3) Sol

$$\text{avg of 40 innings} = 50$$

(high & low excluded)

$$\text{avg of 38 innings} = 48$$

$$\text{high} - \text{low} = 17.2 \rightarrow \text{given}$$

high & low innings  $(50 \times 2) = 100$  more to  
make  $48 \rightarrow 50$

$$\text{So. } 48 + 48 + 100 = 296$$

let low be  $x$

$$\text{high} = x + 172$$

$$x + x + 172 = 296$$

$$2x = 124$$

$$\boxed{x = 62} \text{ low}$$

$$\begin{array}{r} 296 \\ 172 \\ \hline 124 \end{array}$$

$$172$$

$$62$$

$$\hline 234$$

$$\text{high} = x + 172 = \boxed{234}$$

Sol

$$\text{avg of } 45 \text{ & } 80 = 80$$

$$\text{high} - \text{low} = 99$$

high & low mark size to exclude from class

$$10 \times \text{avg of } 43 = (80+1)$$

$$\text{avg } 43 \text{ size} = 79$$

$$\begin{array}{r} 279 \\ \times 1 \\ \hline 279 \\ 45 \\ \hline 203 \end{array}$$

So high & low marks and bring  $1 \times 45 = 45$   
mark extra to make  
 $79 \rightarrow 1080$

$$79 + 79 + 45 = 203$$

$$x + (x + 99) = 203$$

low      high

$$\begin{aligned} x &= 50 \\ \boxed{x = 50} & \quad \text{low mark} \end{aligned}$$

$$\begin{array}{r} 11 \\ 203 \\ \times 2 \\ \hline 203 \\ 99 \\ \hline 302 \\ 202 \\ \hline 104 \\ 202 \\ \hline 10 \\ 2 \\ \hline 5 \\ 9 \\ \hline 150 \end{array}$$

$$\text{high mark} = x + 99$$

$$= 52 + 99$$

$$= 151 \quad \text{High mark}$$

Type 3

1) avg weight of 3 men A, B, C = 84  
Given

$$A + B + C = 84 \Rightarrow \boxed{A + B + C = 252}$$

$$\frac{(A + B + C) + D}{4} = 80 \Rightarrow \cancel{\frac{84 + D}{4}} = 80 \Rightarrow \frac{252 + D}{4} = 80$$

another man joins E whose value is  $D + 3$

$$\cancel{\frac{A + B + C + D + E}{4}} = 79$$

$$\frac{B + C + D + (D + 3)}{4} = 79$$

$$\text{we know } \boxed{D = 68} \text{ so } B + C + 68 + 68 + 3 = 316$$

Sub B+C in

$$A + B + C = 252$$

$$A = \frac{177 - 252}{3} = 75$$

$$B + C = 316 - 139$$

$$B + C = 177$$

## Ratio & Proportion

### Miscellaneous types

(PQ. 8)

- 1) 35 stu in hotel  
if 7stu added mess expense ↑ by Rs 42 per day  
42 student = 2 to 2 ↑/day

2) avg expenditure per head decrease by 2/-

$$\begin{array}{r} 11 \\ \hline 300 \\ 290 \\ \hline 10 \\ 10 \\ \hline 0 \end{array} \quad \begin{array}{r} 11 \\ \hline 300 \\ 290 \\ \hline 10 \\ 10 \\ \hline 0 \end{array} \quad \begin{array}{r} 11 \\ \hline 300 \\ 290 \\ \hline 10 \\ 10 \\ \hline 0 \end{array}$$

$$(P.P + 2) + x$$

2) Mon + Tue + Wed = 38° C

$$\begin{array}{r} 2 \\ \hline 38 \\ 3 \\ \hline 11 \\ 11 \\ \hline 0 \end{array}$$

Tue + Wed + Thu = 114 ①

$$\begin{array}{r} 43 \\ 3 \\ \hline 12 \\ 12 \\ \hline 9 \end{array}$$

Mon + Tue + Wed = 113

$$\begin{array}{r} 11 \\ 18.5 \\ 2 \\ \hline 38.0 \end{array}$$

Tue + Wed + Thu = 129 ②

Mon + Tue = 37 ③

$$\begin{array}{r} 0 \\ 14 \\ 14 \\ \hline 37 \\ 37 \\ \hline 77 \end{array}$$

sub (3) in (1)

Mon + Tue + Wed = 114

37 + Wed = 114

Wed = 77

Use Elimination

$$\frac{\text{Mon} + \text{Tue} + \text{Wed}}{3} = 35^\circ C \Rightarrow \cancel{\text{Mon} + \cancel{\text{Tue}} + \cancel{\text{Wed}}} = 114$$

$$\checkmark \frac{\text{Tue} + \text{Wed} + \text{Thur}}{3} = 42 \Rightarrow \cancel{\text{Tue} + \cancel{\text{Wed}} + \cancel{\text{Thur}}} = 129$$

$$\underline{\underline{\text{Mon} - \text{Thur} = -15}} \quad Q$$

$$\frac{129}{114} \\ \underline{\underline{015}}$$

Given

$$\frac{\text{Mon} + \text{Tue}}{2} = 18.5$$

$$\underline{\underline{\text{Mon} + \text{Tue} = 37}} \quad ②$$

Solve ① ②

$$\text{Mon} + \text{Tue} = 37$$

$$\text{Mon} - \text{Thur} = -15$$

$$\underline{\underline{2\text{Mon} = 22}}$$

$$\underline{\underline{\text{Mon} = 11^\circ C}} \text{ ans}$$

$$3) 4 \frac{\text{Boys}}{7} + 3 \text{ Girls} = 120$$

$$4(180) + 3(x) = 120 \Rightarrow 600 + 3x = 840 \quad \frac{120}{7} \quad \frac{840}{600} \quad \frac{240}{0}$$

$$3x = 840 - 600$$

$$3x = 240 \Rightarrow x = 70 \quad \begin{matrix} \text{avg capacity} \\ \text{of girls} \end{matrix}$$

$$4) \boxed{6 \text{ table} + 12 \text{ chairs} = 7800}$$

~~$$6 \frac{\text{table} + 12 \text{ chairs}}{6} = 1800$$~~

$$\begin{array}{r} 7800 \\ 6 \\ \hline 4500 \end{array}$$

$$6(780) + 12 \text{ chairs} = 7800$$

$$12 \text{ chairs} = 3300$$

$$\boxed{1 \text{ chair} = 275}$$

$$\begin{array}{r} 7800 \\ 6 \\ \hline 4500 \\ 3300 \\ \hline 275 \end{array}$$

$$\begin{array}{r} 12 \times 300 \\ 24 \\ \hline 900 \\ 84 \\ \hline 60 \\ 60 \\ \hline 0 \end{array}$$

## Ratios & Proportion

pg. 8

1) 6 years back (2017)

Sush Poonam

$$3 : 1 \text{ (2017)} \rightarrow 6 \text{ years back}$$

$$15 : 3 \text{ (2029)} \rightarrow 6 \text{ years hence}$$

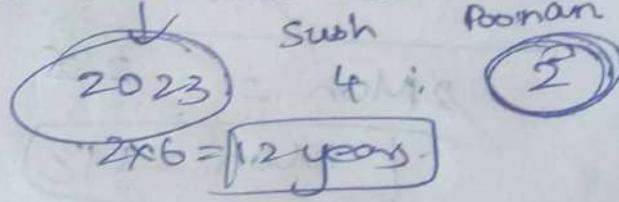
$$\text{diff} = 2 : 2$$

) difference 2029 - 2017

$$2 \text{ part} = 12$$

$$1 \text{ part} = 6$$

They are in 2023 (that is)



2) present age

Kanji Lakshmi

$$\text{present} \quad 6 : 7$$

$$\text{after 8 years} \quad 8 : 9$$

$$\text{diff} = 2 \text{ part} \Rightarrow 8 \text{ years}$$

$$1 \text{ part} = 4 \text{ years}$$

in paper

$$\text{present: } 6+4=10 \\ \text{after 8 years: } 8+4=12$$

Type 2 : Pg: 9

$$20 : 30$$

$$2 : 3 \rightarrow 1$$

$$40 : 60$$

$$40 : 57 \rightarrow 17$$

$$\begin{array}{r} 2 : 3 \\ \times 4 \\ \hline 3 : 4 \end{array}$$

$$34 : 57$$

$$6p = > 4000$$

$$40 : 57$$

$$3p \quad 2000$$

$$5p \times x$$

$$3p \Rightarrow \underline{\underline{2000}}$$

$$5p \times 2000$$

$$\begin{array}{r} 3 \\ + 1 \\ \hline 34000 \end{array}$$

2)

Ramu & Raju draft

$$4 : 5 \rightarrow 1$$

$$48 : 55 \rightarrow 7$$

New ration  
+ 6000

so make new ratio of old by multiply 7

$$(4 \times 7) : (5 \times 7)$$

$$28 : 35$$

$$48 : 55$$

$$\underline{\underline{20 : 20}}$$

$$\begin{array}{l} \text{Given} \\ 20 \text{ part} = 6000 \\ 1 \text{ part} = 300 \end{array}$$

$$\text{Raju} \Rightarrow 35 \times 300$$

$$\text{Raj's salary} = \boxed{10500} \quad (b)$$

3)

$$\text{month salary} = 4 : 7 \rightarrow 3$$

$$+ 25 \Rightarrow 3 : 5 \rightarrow 2$$

$$\rightarrow \underline{\underline{8 : 14}}$$

$$9 : 15$$

$$\underline{\underline{1 : 1}}$$

$$1 \text{ part} = 25$$

$$8 \text{ part} = 25 \times 8 = 200$$

$$16 \text{ part} = 16 \times 25 = 350$$

$$4) \text{ Review } 7 : 4 = 3 \\ 4 \text{ years ago} \quad 2 : 1 \Rightarrow 1$$

new ratio

$$\begin{matrix} 7 : 4 \\ 6 : 3 \\ \hline 1 : 1 \end{matrix}$$

1 part = 6 years

$$\begin{aligned} 7 : 4 &= 7 \times 4 : 4 \times 4 \\ &= 28 : 16 \\ &\text{present case} \end{aligned}$$

age after 4 years =

$$28 + 4 = 16 + 4$$

$$32 : 20$$

$$\boxed{8 : 5} \quad b)$$

Coin Ratio in pg: q

$$1) 25p : 10p : 5p$$

$$25x + 20x + 15x = 30$$

$$60x = 30$$

$$1 \text{ part} \quad x = 50$$

$$60p = 30$$

$$x - 30 = \frac{5}{60 \times 10p}$$

we need 5p

its ratio is 3 parts

$$x - 30 = \frac{60p}{50}$$

$$\text{so, } 3 \times 50 = 150 \quad \text{spare coins are here}$$

50P : 25P : 10P

5 : 9 : 4

$$\begin{array}{r}
 296 \\
 179 \\
 \hline
 465 \\
 \hline
 515
 \end{array}$$

$$50 \times 5 : 25 \times 9 : 10 \times 4$$

$$250P : 225P : 40P = 206 \text{ RS}$$

$$\cancel{515P} \quad 206$$

$$\begin{array}{r}
 \cancel{x} \rightarrow 0.40 \\
 \cancel{120} = 0.40
 \end{array}$$

$$515P = 206 \text{ RS}$$

Change paise to £ so  $\div 100$

$$5.15 \text{ RS} = 206 \text{ RS}$$

$$\text{RS} = \frac{206}{5.15}$$

$$\begin{array}{r}
 \cancel{x} = 40 \\
 \text{1 point}
 \end{array}$$

$$50P \Rightarrow 5 \text{ part} = 5 \times 40 = 200 \text{ coins}$$

$$25P \Rightarrow 9 \text{ part} = 9 \times 40 = 360 \text{ coins}$$

$$10P \Rightarrow 4 \text{ part} \Rightarrow 4 \times 40 = 160 \text{ coins}$$

### Profit Loss (Partnership)

A invest 2000 after 6 month B invest 8000  
ratio of profit for 1 year

contribution : and x time

$$2000 \times 12 \text{ months} : 8000 \times 6 \text{ months}$$

$$24000 : 48000 \\ 1 : 2 \text{ by ratio of profit}$$

$$\begin{aligned}
 A : B : C &= 2000 \times 12 : 4000 \times 9 : 10000 \times 2 \\
 &= 24000 : 36000 : 20000 \\
 &= 6000 : 9000 : 5000 \\
 &= [6 : 9 : 5] \Rightarrow \frac{2400}{11200} = \frac{24}{112} = \frac{3}{14} \\
 &\text{P.T.P} = \frac{3}{14}
 \end{aligned}$$

P,Q,R totally invested £50000 after 9 months

P withdrew after 6 month Q withdrew after 12 months R so profit ratio is

$$P : Q : R = 9 : 6 : 12$$

$$[3 : 2 : 4]$$

A : B : C investment ratio = 5 : 3 : 8  
Profit ratio = 10 : 6 : 24

so their investment ratio = ?

$$\begin{aligned}
 \frac{\text{Ratio}}{\text{Capital}} &= \frac{P_1}{t_1} : \frac{B}{t_2} : \frac{C}{t_3} \Rightarrow \frac{10}{5} : \frac{6}{3} : \frac{24}{8} \\
 &= 2 : 2 : 3
 \end{aligned}$$

(Capital ratio & profit)

## divisibility

$$\begin{aligned}2^1 &= 2 \\2^2 &= 4 \\2^3 &= 8 \\2^4 &= 16\end{aligned}$$

3

6

3

12 2  
4 8 3 divisible

## LCM

$$20, 60, 180 \quad (900), 300$$

$$\begin{array}{r} 20, 60, 180, 900, 300 \\ 2 | 10, 30, 90, 45, 15 \\ 3 | 5, 15, 45, 15 \\ 5 | 1, 3, 15, 15 \\ \hline 1, 2, 3, 3, 1 \end{array}$$

take big no & check

whether other all are divisor of 900  
the 900 is LCM

## Easy LCM

$$\begin{array}{c} 20, 24 \\ \uparrow \quad \downarrow \\ 4 \quad 6 \\ \uparrow \quad \downarrow \\ 2^2 \quad 2 \\ \uparrow \quad \downarrow \\ 2^2 \times 5 \end{array}$$

qn

$$\begin{array}{c} 2^3 \times 3 \\ 2^3 \times 3 \\ 2^3 \times 3 \end{array}$$

$$\begin{array}{c} 6^2 \times 5 \\ 6^2 \times 5 \\ 6^2 \times 5 \end{array}$$

take highest power of each nos

$$\begin{aligned}2^3 \times 5^2 \times 3 &= 8 \times 25 \times 3 \\&= 120\end{aligned}$$

## LCM

$$1) 60, 90, 75$$

$$2) 30, 40, 70$$

$$\begin{array}{c}
 60, 70, 75 \\
 | \quad | \quad | \\
 10 \quad 6 \quad 9 \times 10 \quad 5 \times 15 \\
 | \quad | \quad | \quad | \\
 2 \times 5 \quad 2 \times 3 \quad 3 \times 3 \quad 2 \times 5 \\
 | \quad | \quad | \quad | \\
 2^2 \times 5 \times 3 \quad 2 \times 3^2 \times 5 \quad 5^2 \times 3
 \end{array}$$

$$\begin{array}{r}
 \frac{3}{1} \quad \frac{2}{1} \\
 \frac{1}{5} \quad \frac{1}{5} \\
 \hline
 \frac{8}{5} \quad \frac{6}{5} \\
 \hline
 \frac{7}{5} \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \frac{3}{2} \\
 \frac{2}{5} \\
 \frac{3}{6} \\
 \hline
 \frac{15}{0} \\
 \hline
 \frac{7}{5} \\
 \hline
 \frac{9}{0} 0
 \end{array}$$

$$\begin{aligned}
 2^2 \times 3^2 \times 5^2 &= 4 \times 9 \times 25 \\
 &= 900 \text{ way}
 \end{aligned}$$

30, 40, 70

if prime no then multiply

$$10(30, 4, 7)$$

$$\begin{aligned}
 3 \times 4 \times 7 &= 84 \times 10 \\
 &= 840
 \end{aligned}$$

## Number system pg: 10

1) Six bell

2, 4, 6, 8, 10, 12

1<sup>st</sup> penigai no is 12 adhula divisible agaradha  
and 2, 4, 6 is divisible in 12  
so leave that

$$\begin{array}{r}
 8, 10, 12 \rightarrow \text{take LCM} \\
 2 \mid 8, 10, 12 \\
 2 \mid 4, 5, 6 \\
 2 \mid 2, 5, 3 \\
 \hline
 120 \text{ seconds}
 \end{array}$$

$$\text{So } \frac{120}{60} = 2 \text{ min} \quad \text{for every 2 mins in 30m}\\
 \text{it all sing together}$$

On the 0<sup>th</sup> sec it all starts ringing 1<sup>st</sup>

$$\frac{30}{2} = 15 \text{ times it rings}$$

$$\text{So } 1 + 15 = 16 \text{ times it rings in 30min}$$

2) 3, 9, 12, 15

(15) big no

3 is divisible in 15 so omit (3)

$$3 \overline{) 9, 12, 15} \quad \begin{array}{r} 3 \\ 3, 4, 5 \\ \hline 180 \end{array}$$

(180) LCM seconds

$$\frac{180}{60} = 3 \text{ min} \quad \text{so every 3 min is 60 sec}$$

it will all sing together

0<sup>n</sup> second it sings together so 1 time

+ 20 times ~~60 min~~  
3 min

$$1 + 20 = 21 \text{ times if sings in 60 sec}$$

3)

$$250, 300, 150 \rightarrow$$

$$10(25, 30, 15)$$

~~25, 30, 15~~ 15 is in big no 30 so omit

$$5 \overline{) 25, 30} \quad \begin{array}{r} 5 \\ 5, 6 \\ \hline 150 \end{array}$$

150 sec  
seconds

25, 30, 15 15 is in big no 30 so omit

$$\begin{array}{r} 30 \\ 50 \\ \hline 150 \\ 500 \end{array}$$

find which no. is exactly divisible by 45

- (a) 30 min (b) ~~✓~~ 1500 (c) 20 min (d) 15 min  
~~2000~~ 1800 1200 900

$$\frac{1800}{180} = x \quad \boxed{\begin{array}{r} 10 \\ 1500 = \checkmark \\ 180 \end{array}}$$

$$\frac{1200}{150} = x \quad \boxed{\frac{1200}{150} = x}$$

$$\frac{900}{150} = x \quad \boxed{\frac{900}{150} = x}$$

4) 40,72,108 seconds

$$\begin{array}{r} 40,72,108 \\ \hline 2 | 20,36,54 \\ 2 | 10,18,27 \\ \hline 3 | 5,9,27 \\ 3 | 5,3,9 \\ \hline 5,1,3 \end{array}$$

$$\begin{array}{r} 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 3 \\ = 2^3 \times 3^3 \times 5 \\ = 8 \times 27 \times 5 \\ = \frac{1080}{60} \text{ sec} \\ = 18 \text{ min} \\ = 5.20 \\ + 18 \end{array}$$

They said it starts at 5:20:00 hours = 5:38pm

So in option

(a) 5:28:00 hrs  $\rightarrow$  diff. in 5:20 & 8min

$$8 \times 60 = \frac{480 \text{ sec}}{1080} \times$$

(b) 5:30:00 hrs  $\rightarrow$  diff. is 10 min

$$10 \times 60 = \frac{600 \text{ sec}}{1080} \times \frac{108}{1080} \\ = \frac{1080}{1080} \text{ sec}$$

(c) 5:40:00 hrs  $\rightarrow$  diff. is 20 min

$$20 \times 60 = \frac{1200 \text{ sec}}{1080} \times$$

(d) 5 bells

5,10,15,20,25 seconds

(e) by no

5 is divisible in 25 min

$$\begin{array}{r} 10,15,20,25 \\ \hline 5 | 2,3,4,5 \\ \hline 2 | 1,3,2,5 \end{array}$$

$$\begin{array}{r} 3^2 \times 2^2 \times 5 \\ = 25 \times 4 \times 9 \\ = \frac{900}{300} \text{ sec} \end{array}$$

$$\begin{array}{r} 15 \\ 20 \\ 300 \\ \hline 600 \\ = 15 \text{ min} \end{array}$$

$$\begin{array}{r} 125 \times 36 \\ 25 \times 9 \times 5 \times 1 \\ = \frac{150}{900} \end{array}$$

HCF & P: 10

Highest Common Factor

4) 408, 468, 516

check options

(a) 50     $\frac{408}{50} \times$

(b) 36     $\frac{408}{36} \times$

(c) 24     $\frac{408}{24} = 17$ ,  $\frac{468}{24} \times$

(d) 12     $\frac{408}{12} \checkmark$ ,  $\frac{468}{12} \checkmark$ ,  $\frac{516}{12} \checkmark$

1) 1189 - 1073

difference = 116

$$1073 \overline{)1189}$$

$$\begin{array}{r} 1073 \\ \hline 116 \end{array}$$

where to Use HCF & LCM

HCF  $\rightarrow$  puzzles, in which equal pieces are split pannanum na

5m 44cm

$$5 \times 100 + 44$$

544

3m 74cm

$$3 \times 100 + 74$$

374

(a) 86  $\Rightarrow \frac{544}{86} \times$

(b) 42  $\Rightarrow \frac{544}{42} \times$

(c) 38  $\Rightarrow \frac{544}{38} \times$

1544 = 16 ;

any  $\frac{374}{34} = 11$  ✓

Type 2 Pg: 11

$$D \left| \begin{array}{|c|c|} \hline 6 & 9 \\ \hline 15 & 18 \\ \hline \end{array} \right| \quad \textcircled{7}$$

15, 18

$$3(5 \times 6) = \textcircled{90}$$

Given it should leave remainder 4  
when divided by 6, 9, 15, 18

so add 4 to 90

$$90 + 4 \Rightarrow \textcircled{94}$$

$$180 + 4 \Rightarrow 184$$

$$270 + 4 \Rightarrow 274$$

$$360 + 4 \Rightarrow \textcircled{364}$$

This is only divisible by  $\textcircled{7}$   
This no. is divisible by all other

$$\begin{array}{r} 2697 \\ \hline 5 \overline{)2697} \\ 25 \quad \textcircled{1} \\ \hline 19 \\ \hline 15 \\ \hline 4 \\ \hline \textcircled{2} \end{array} \quad \begin{array}{r} 3 \overline{)51643} \\ 2 \overline{)51241} \\ \hline 16 \\ \hline 12 \\ \hline 4 \\ \hline \textcircled{6} \end{array} \quad \begin{array}{r} 3 \times 2 \times 5 \times 2 = \textcircled{60} \\ \hline 624 \\ 4 \overline{)2497} \\ 24 \quad \textcircled{1} \\ \hline 9 \\ \hline 8 \\ \hline 17 \\ \hline 16 \\ \hline 1 \end{array} \quad \begin{array}{r} 838 \\ \hline 3 \overline{)2497} \\ 24 \quad \textcircled{1} \\ \hline 9 \\ \hline 9 \\ \hline 0 \\ \hline \textcircled{1} \end{array}$$

7

2497

take option & add & then check

then 5, 6, 4, 3 are divisible by last digit

$$\textcircled{A} \quad 2497 + 10 = \frac{2507}{5} \times$$

$$\begin{array}{r} 2497 \\ 10 \\ \hline 2507 \\ 5 \\ \hline 11 \end{array}$$

$$\textcircled{B} \quad 2497 + 14 = \frac{2511}{5} \times$$

$$\begin{array}{r} 2497 \\ 14 \\ \hline 2511 \end{array}$$

$$\textcircled{C} \quad 2497 + 23 = \frac{2520}{5} \checkmark$$

$$\begin{array}{r} 2497 \\ 23 \\ \hline 2520 \end{array}$$

$$\textcircled{D} \quad \text{none of these}$$

2 | 5, 6, 4  
 5 | 3, 2  
 6 | 1, 0  
 LCM = 60

2 | 2497  
 5 | 497  
 6 | 97  
 3 | 37  
 6 | 37  
 3 | 37  
 LCM = 60

2 | 2497  
 5 | 497  
 6 | 97  
 3 | 37  
 6 | 37  
 3 | 37  
 LCM = 60

2 | 2497  
 5 | 497  
 6 | 97  
 3 | 37  
 6 | 37  
 3 | 37  
 LCM = 60

2 | 2497  
 5 | 497  
 6 | 97  
 3 | 37  
 6 | 37  
 3 | 37  
 LCM = 60

HCF is always a factor of LCM

Pg: 12. LCM & HCF

5)

$$11 \times 7700 = 275 \times x$$

$$x = 308$$

6)

L CM x HCF ~~= Product of A & B nos~~

$$1368 \times x = 2736$$

$$x = 2$$

8)  $\text{LCM} \times \text{HCF}$  = Product of two nos

$$x \times 9 = 2286$$

$$\boxed{x = 254}$$

(4)

$$A:B = 2:3$$

$$\text{LCM} = 54$$

$$\text{HCF} (\text{product of ratios}) = \text{LCM}$$

$$\text{HCF} (2 \times 3) = 54$$

$$\text{HCF} = \frac{54}{6} = 9$$

$$\boxed{\text{HCF} = 9}$$

$$25, 30$$

$$\frac{5(5 \times 6)}{\text{HCF ratio}} = \frac{150}{\text{LCM}}$$

$$\text{HCF} \times \text{ratio} = \text{LCM}$$

$$\begin{matrix} \text{HCF ratio} \\ 9 [2 \times 3] \\ 18 \quad 27 \end{matrix}$$

$$\begin{array}{r} 27 \\ 18 \\ \hline 45 \end{array}$$

$$= 18 + 27 = 45 \quad \text{b}$$

3)

$$\text{LCM} = 495$$

$$\text{HCF} = 5$$

$$A+B = 100$$

$$A-B = ?$$

$$\text{HCF} (\overset{\text{ratio}}{A \times B}) = \text{LCM}$$

$$5 (A \times B) = 495$$

$$A \times B = \frac{495}{5}$$

$$A \times B = 99$$

5

$$99 = 11 \times 9$$

$$5 [11 \times 9]$$

$$\begin{matrix} 55 \\ 1^{\text{st}} \text{ no} \end{matrix}$$

$$\begin{matrix} 45 \\ 2^{\text{nd}} \text{ no} \end{matrix}$$

Check

$$A+B = 100$$

$$55+45 = 100$$

We need

$$\begin{aligned} A-B &= 55-45 \\ &= 10 \end{aligned}$$

- Pointing to a lady in photograph, Ashwin said Her son's father is the son-in-law of my mother? Now
- 6 Raini related to the baby?
- A Brother
- B Uncle
- C Father

W.Blood Relationship

1)  $HCF \left( \frac{\text{Product of A:B}}{\text{Ratio of A:B}} \right) = LCM$

$$21 [1 \times 4] = 84$$

$$\boxed{21, 84} \quad b \quad \checkmark$$

3)

$$HCF(A \times B) = LCM$$

~~$$12(x \times y) = 336$$~~

$$\downarrow \\ 84$$

~~$$12 \times x = 84 \text{ given}$$~~

~~$$\boxed{x=7} \text{ ratio of } \textcircled{84} \text{ 1st number}$$~~

Sub x in

~~$$12(7 \times y) = 336$$~~

~~$$\boxed{y=196}$$~~

$$LCM \times HCF = \text{numb}_1 \times \text{numb}_2$$

~~$$336 \times 12 = 84 \times x$$~~

~~$$\boxed{x=48} \quad c$$~~

No. of cycle

$$2^1 = 2$$

$$2^2 = 4$$

$$2^3 = 8$$

$$2^4 = 16$$

$$3^1 = 3$$

$$3^2 = 9$$

$$3^3 = 27$$

$$3^4 = 81$$

$$4^1 = 4$$

$$4^2 = 16$$

$$4^3 = \cancel{27}$$

$$4^4 = \cancel{81}$$

$$5^1 = 5$$

$$5^2 = 25$$

$$5^3 = 125$$

$$5^4 = 625$$

$$\begin{array}{r}
 & 2 \\
 & 1 \cancel{6} \\
 & 4 \\
 & \cancel{6} \cancel{4} \\
 & 4 \\
 & \cancel{6} \\
 & 6
 \end{array}
 \begin{array}{r}
 81 \\
 \times 3 \\
 \hline
 243 \\
 \cancel{243} \\
 \hline
 729 \\
 \cancel{729} \\
 \hline
 125 \\
 \cancel{125} \\
 \hline
 625
 \end{array}$$

$$2^5 = 32 \text{ repeat}$$

$$6^1 = 6$$

$$6^2 = 36$$

$$7^1 = 7$$

$$7^2 = 49$$

$$7^3 = 343$$

$$7^4 = 2401$$

$$8^1 = 8$$

$$8^2 = 64$$

$$8^3 = 512$$

$$8^4 = 4096$$

$$9^1 = 9$$

$$9^2 = 81$$

$$10^1 = 10$$

$$10^2 = 100$$

$$\begin{array}{r}
 & 2 \\
 & 1 \cancel{4} \\
 & 8 \\
 & \cancel{5} \cancel{1} \\
 & 2
 \end{array}$$

$$\begin{array}{r}
 343 \\
 \times 7 \\
 \hline
 2401
 \end{array}$$

$$\begin{array}{r}
 625 \\
 \times 7 \\
 \hline
 4375 \\
 \cancel{625} \\
 \hline
 16807
 \end{array}$$

$$\begin{array}{r}
 81 \\
 \times 9 \\
 \hline
 729
 \end{array}$$

how to find last digit

$$7^{146}$$

no of cycles required, we can divide power by 4

7 has 4 cycle

$$\begin{array}{r}
 3 \cancel{6} \\
 4 \sqrt{146} \\
 \underline{-12} \\
 26
 \end{array}$$

$$\begin{array}{r}
 24 \\
 \cancel{2} \\
 \hline
 2
 \end{array}$$

so 2nd cycle last digit  
(i.e) 4<sup>9</sup>

So last digit of  $7^{146} = 9$

$$2) 8^{93}$$

8 has 4 cycles

$$\begin{array}{r} 23 \\ 4 \overline{) 93} \\ 8 \\ \hline 13 \\ 12 \\ \hline 1 \end{array}$$

$\circlearrowleft 1 \rightarrow 1^{\text{st}} \text{ cycle}$  so 8. last digit

$$\boxed{8^{93} = \text{last digit of } 8}$$

$$3) 8^{144}$$

$$\begin{array}{r} 36 \\ 4 \overline{) 144} \\ 12 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 7 \\ 4 \overline{) 1} \\ 4 \\ \hline 0 \end{array}$$

then check if  $8^{\text{base}}$  is even then ~~not~~  
6 is the last digit

if base is odd then remainder is 0  
then last digit is  $\circlearrowleft 1$

Eg.

$$\begin{array}{r} 171^{1431} \\ 171^{1431} \\ 7 \times 171^{1431} \\ 7 \times 7 \times 171^{1431} \\ 4 \times 7 \times 7 \times 171^{1431} \\ 12 \times 4 \times 7 \times 7 \times 171^{1431} \\ 23 \times 12 \times 4 \times 7 \times 7 \times 171^{1431} \\ 20 \times 23 \times 12 \times 4 \times 7 \times 7 \times 171^{1431} \\ 31 \times 20 \times 23 \times 12 \times 4 \times 7 \times 7 \times 171^{1431} \\ 28 \times 31 \times 20 \times 23 \times 12 \times 4 \times 7 \times 7 \times 171^{1431} \\ \hline \end{array}$$

$\circlearrowleft 3 \rightarrow 3^{\text{rd}} \text{ cycle}$

$$\begin{aligned} b^8 &= 36 \\ 2^2 \times 3^2 &\Rightarrow 4 \times 9 \end{aligned}$$

Remainders

BiHx remainder

$$\begin{array}{r} 17 \times 16 \times 18 \\ \hline 15 ) - \end{array}$$

$\Rightarrow 2 \times 1 \times 3 = \frac{6}{6}$

$\Rightarrow \text{remainder} = 0$

Positive remainder

$$\begin{array}{r} 314 \times 317 \times 305 \\ \hline 6 ) - \end{array}$$

Like how big number vancha  
6 od a nearest small  
divisible  $\rightarrow$  above value  
 $314 \rightarrow$  nearest divisible  $\rightarrow$  Small value = 312

$317 \rightarrow 312$

$305 \rightarrow 300$

$$314 - 312 \left| \begin{array}{c} 317 - 312 \\ = 5 \end{array} \right| \begin{array}{c} 305 - 300 \\ = 5 \end{array}$$

$= 2 \times 5 \times 5$

$= \frac{50}{6} \rightarrow$  this value should also be divided by 6

$\Rightarrow \text{remainder} = 2$

Negative remainder

$$\begin{array}{r} 14 \times 13 \times 12 \\ \hline 15 ) - \end{array}$$

$(14-15) \times (13-15) \times (12-15)$

$= -1 \times -2 \times -3$

$= -6$

$15 - 6 = 9$

$$4) \quad \overline{213 \times 211 \times 212} \quad b$$

$$\boxed{3 \times 1 \times 2}$$

$$6 \overline{)213} \quad \begin{array}{r} 3 \\ 3 \\ \hline 3 \end{array} \quad \begin{array}{r} 3 \\ 3 \\ \hline 3 \\ 0 \\ \hline 0 \end{array} \quad \begin{array}{r} 2 \\ 1 \\ 0 \\ \hline 2 \\ 1 \\ 0 \end{array}$$

$$\text{Hence } \frac{6}{6} = \textcircled{0} \text{ remainder}$$

$$5) \quad \overline{43 \times 45 \times 46} \quad 8$$

$$\begin{array}{r} 3 \times 5 \times 6 \\ = \frac{90}{8} \end{array}$$

$$= \textcircled{2} \text{ remainder}$$

$$40 \text{ base} \quad \begin{array}{r} 3 \\ 1 \\ 8 \\ \hline 9 \\ 0 \end{array}$$

$$8 \overline{)90} \quad \begin{array}{r} 11 \\ 8 \\ \hline 10 \\ 8 \\ \hline 2 \\ 0 \\ 8 \\ \hline 4 \\ 0 \end{array}$$

$$6) \quad \overline{49 \times 47 \times 46} \quad 10$$

$$\begin{array}{r} 49-40 \\ = 9 \times 7 \times 6 \\ \hline 10 \end{array}$$

$$40 \text{ base} \quad \begin{array}{r} 2 \\ 4 \\ 7 \\ \hline 3 \\ 7 \\ 8 \end{array}$$

$$= \frac{378}{10} \Rightarrow \boxed{8 \text{ remainder}}$$

$$\begin{array}{r} 49 + 47 + 46 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 1 \times -3 + 4 \\ -12 \\ \hline 10 \end{array}$$

$$\begin{array}{r} -12 \\ -10-12 \\ \hline -2 \\ -10-2 \\ \hline 8 \end{array}$$

remainder

$$V) \frac{2^{147}}{3}$$

When  $2 \div 3$  positive remainder is  $2^{\uparrow}$

negative remainder is  $-1 \rightarrow \text{base } 3$

$$\frac{2^{147}}{3} \approx \frac{(-1)^{147}}{3} = \frac{-1}{3} = \boxed{1 \text{ remainder}}$$

$$3 - 1 = 2 \text{ remainder}$$

$$2) \frac{5^{156}}{4}$$

$$\boxed{1} \text{ remainder}$$

$$4 \overline{)159} \\ 12 \\ \hline 39 \\ 36 \\ \hline 3$$

$$3) \frac{2^{159}}{9}$$

$$\frac{(-2)^{159}}{9} = \frac{(-2)^{53}}{a} = (-1)^{53} \rightarrow \text{cycle}$$

$$= a - 1 = 8 \rightarrow \text{rem}$$

$$2) \frac{6^{537}}{37} \Rightarrow (26^{268} \times 6)$$

$$(6^2)^{268} \times 6^1$$

$$37$$

$$\Rightarrow (36)^{268} \times 6^1 = (-1)^{268} \times 6^1$$

$$= 1 \times 6$$

$$= \boxed{6}$$



$$\begin{array}{c}
 \begin{array}{r}
 \overset{596}{7} \\
 \times 80 \\
 \hline
 596
 \end{array}
 \end{array}$$

find nearest relation  
on a difference -1 or +1  
or +1 or -1

$$\begin{array}{r}
 (-7^2)^{298} \\
 \hline
 80
 \end{array}
 \quad
 \begin{array}{r}
 298 \\
 2 \overline{) 596} \\
 4 \\
 \hline
 18 \\
 16 \\
 \hline
 2
 \end{array}$$

$$= \frac{49^{298}}{80} = (-1)^{298} = \boxed{1}$$

$$\begin{array}{r}
 2^4 \\
 \times 5 \\
 \hline
 10
 \end{array}$$

prime no & power kii relation esunak  
difference 1 esunak & base should  
not be divisible by divisor

Remainder always = 1

$$\begin{array}{r}
 2^4 = 16 \\
 \hline
 5
 \end{array} = \boxed{1} \text{ remainder}$$

$$\begin{array}{r}
 3^4 \\
 \times 5 \\
 \hline
 15
 \end{array}$$

prime no & power is -1 than

denominator & base 3 not divisible

checkin's

$$\begin{array}{r}
 81 \\
 \hline
 5
 \end{array} = \boxed{1} \text{ remainder } \checkmark$$

# Interview Qn

Q) What is a process? What are diff states of process?

- Set of instruction is called program
- Programming execution is process
- Our task has been moved to main memory from secondary memory - 1<sup>st</sup> step
- 2<sup>nd</sup> - execute using processor
- Multiprocessing - loading many prog to main memory & allocating memory units
- For single process
  - new
  - ready (main memory in prog encl)
  - running (memory allocate, evaluate)
  - terminate

2) PCB (contains every info of a process)

- \* Process Control Board
- \* for each process separate PCB created
- \* it contains all info of that particular process.

Process State
Process needs CPU
Program Counter (PC)
Registers
Memory units
List of open file

3) Process table

\* Collection of PCB

\* each PCB will be linked to its separate process

4) Thread

- contains Thread id

- small piece of thread

- part of a particular process

## Context Switching

- execution will change from one process to other
- we need to save state of current running process

## Mode Switching

kernel mode

User mode

## Zombie process

- edhukku one process create acho adhoda vela mudijusun
- but PCB ta esundhu terminate aoru kachchuet
- that is zombie process
- fault of parent process which did not terminate child process which is finished.

## Orphan process

- child process running la enkku
- But parent process terminate aoru kachchuet

## Translation lookaside buffer (TLB)

- related to virtual memory
- = Time taken to switch between User to kernel mode is less than switch bet. 2 Process

fork - create process  
kill - terminate "  
exec - run the process

int main()

{ fork(); → child process create exam  
printf("Hello world"); → parent process  
return 0;

}

Parent process has "Hello world" print arg  
Child process has " " print arg

$\boxed{\text{fork}() = 2^n - 1}$  → only for ~~the~~ no. of child process

(\*) Parent process seen ana ~~it~~ will return 1  
child 0

function call is a child process

## Scheduling

- Preemptive
- Non preemptive

Process      Burst time

P1

6

P2

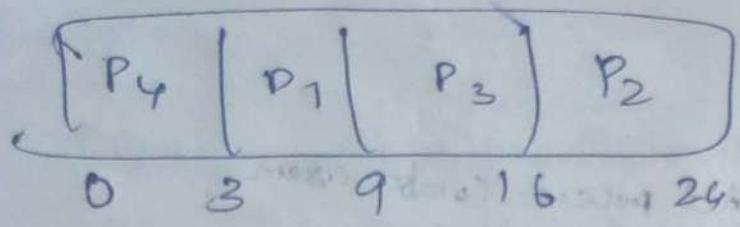
8

P3

7

P4

3



Avg waiting time =  $\frac{(3+16+9+0)/4}{7}$

1	1	$P_{out} = 0$
2	2	
3	2	
4	1	

Time & distance pg: 12

1) speed ratio = 6 : 7

$$S \propto \frac{1}{T}$$

Time ratio = 7 : 6

1 part = 12 min

6 part =  $6 \times 12$

= 72 min

2) Speed =  $\frac{3}{5}$

so time =  $\frac{5}{3}$  yd diff = 2

$2 P = 20$

$\boxed{1 P = 10}$

$\boxed{3 P = 30 \text{ min}}$

D = ?

$$T = 50 \text{ min} \Rightarrow \frac{50}{60} = \frac{5}{6}$$

$$\rightarrow S = 48 \text{ km/hr}$$

$$S = \frac{D}{T} \Rightarrow D = S \times T$$

$$= \frac{48 \times 5}{6} \\ = (40) \text{ km}$$

$$S = \frac{D}{T}$$

$$= \frac{40}{\left(\frac{4}{6}\right)}$$

$$40 \text{ min} = \frac{4}{6} \text{ hr}$$

$$= \frac{40 \times 6}{4}$$

$$= 60 \text{ km/hr}$$

$$40 = x + 10$$

$$= \frac{40 + 10}{60} \\ = \frac{50}{60} \\ = \frac{5}{6}$$

$$(40) \text{ km}$$

$$40 = \frac{20}{3} \text{ hours}$$

$$= 60 \text{ km/hr}$$

Difference in time question Pg 13

Given

Let 8.00 am base

day 1 6km/hr  $\rightarrow$  12 mph at  $\rightarrow$  8.12 am

day 2 9km/hr  $\rightarrow$  8 min fast  $\rightarrow$  7.52 am } diff = 20 min

Speed ratio  $\Rightarrow$  day 1 : day 2

$$6 : 9$$

Time ratio  $\Rightarrow$

$$\frac{6}{9} : \frac{9}{9}$$

$$1 \text{ part} = 20 \text{ min}$$

$$\begin{array}{l} 6:9 \\ 2:3 \end{array}$$

Consider day 1 to find distance

$$\text{time 3 part} = 3 \times 20$$

$$= [60 \text{ min}] \text{ travel p.m./hr}$$

$$\text{apd 60 min} = 1 \text{ hr}$$

so avg 1 hr la 6km/hr la

then 6 km travel p.m./hr

$$\boxed{\text{Distance} = 6 \text{ km}}$$

2)

Let  $8,000 \text{ cm base}$ 

Day 1       $36 \text{ km/hr}$  10 min late  $\rightarrow 8:40 \text{ am}$  } diff =  
                 } 30 min

Day 2       $72 \text{ km/hr}$  10 min fast  $\rightarrow 8:10 \text{ am}$

Speed ratio

day 1      day 2  
               36      72  
               : 2

Time ratio

1 : 1  
               : 1  
               1      1

1 part = 30 min.

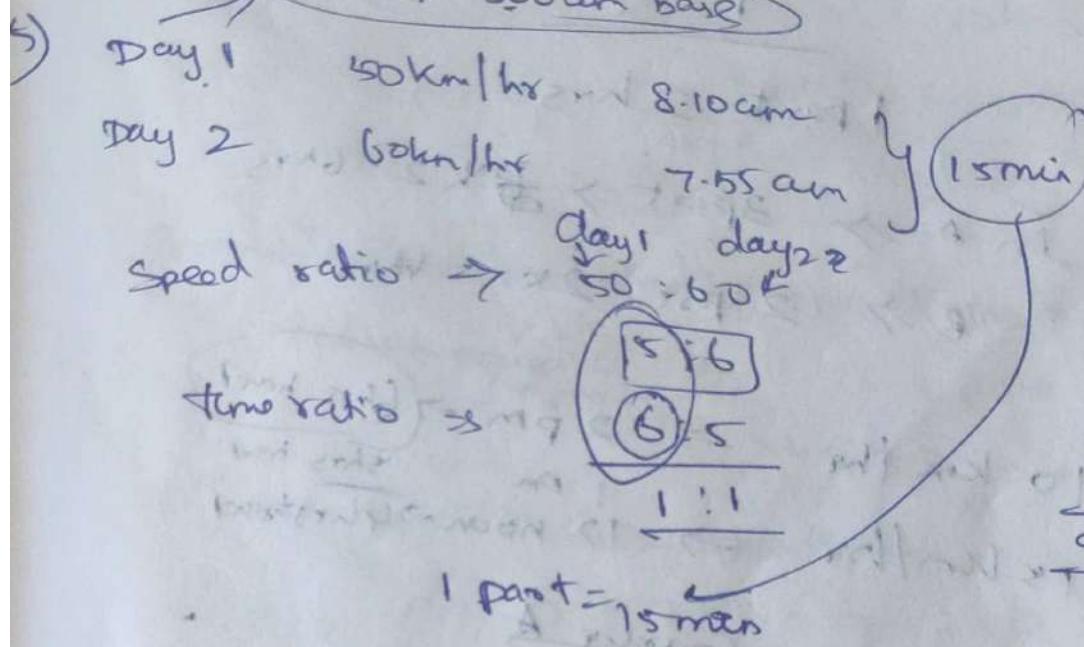
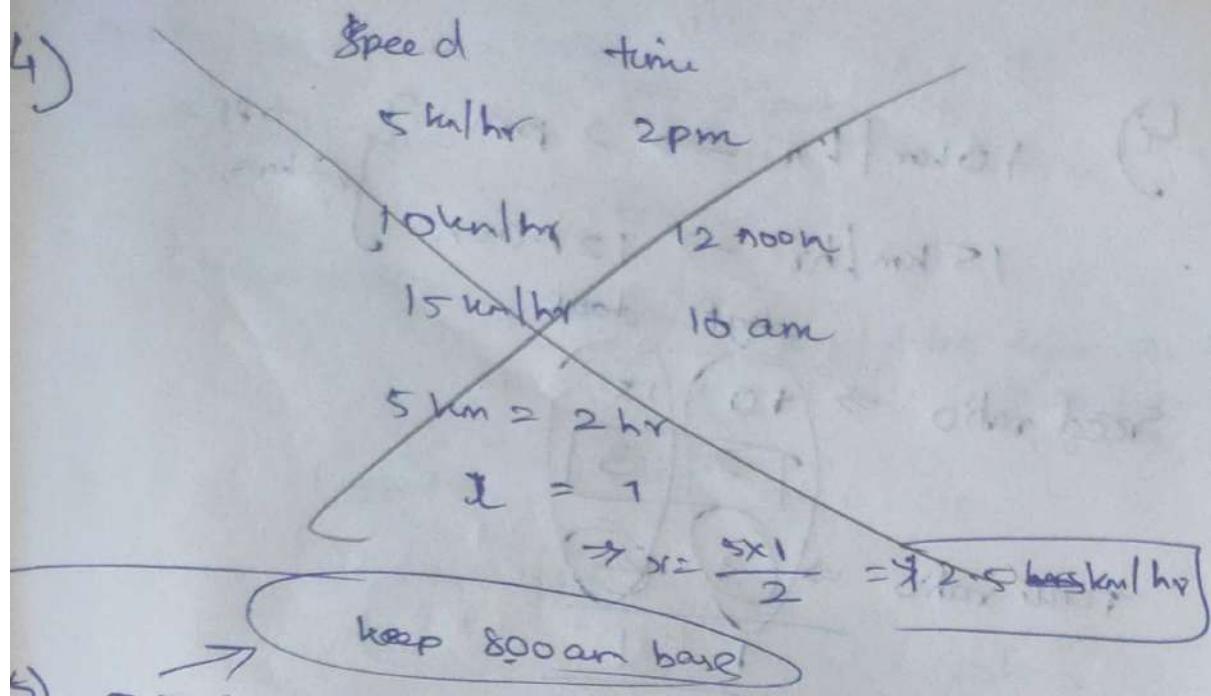
Consider day 1

So day 1 la 2 part time have para

$$\text{So } = 2 \times 30 = 60 \text{ min Elas}$$

$$\begin{aligned}
 & \cancel{72} \cancel{36} \\
 & \cancel{36} \cancel{36} \text{ rem} = 60 \text{ min} \\
 & x = 100 \text{ min} \\
 & x = 100 \times 36 \cancel{36} \\
 & x = 60 \text{ km}
 \end{aligned}$$

We know  $60 \text{ min} = 1 \text{ hr} = 36 \text{ km}$



so in day 1 he travel 6 part in

50 km/hr so

$$6 \text{ part} = 6 \times 15 = 90 \text{ min}$$

$$50 \text{ km} \approx 60 \text{ min}$$

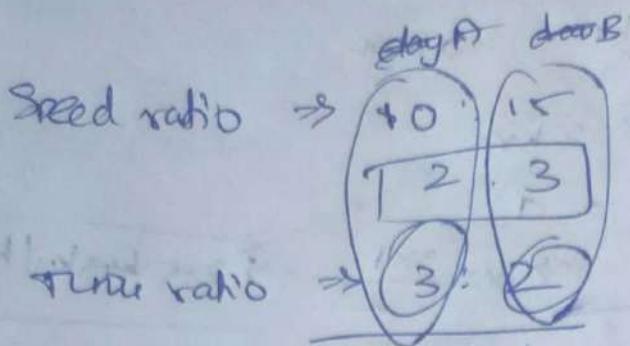
$$x = 90 \text{ min}$$

$$x \Rightarrow \frac{360}{90} = \frac{4}{1}$$

$$= 15 \times 5$$

$$= 175 \text{ km} \quad (\text{a})$$

15 km/hr  $\rightarrow$  12 noon



$$\text{In A} \Rightarrow 3 \text{ part} \Rightarrow 3 \times 2 = 6 \text{ hrs}$$

$$B \Rightarrow 2 \text{ part} = 2 \times 2 = 4 \text{ hrs}$$

$$\begin{aligned} A &\Rightarrow 10 \text{ km/hr} & \Rightarrow 2 \text{ pm} \rightarrow 6 \text{ hrs travel} \\ && 1 \text{ pm} & \xrightarrow{\text{shrs travel}} \\ B &\Rightarrow 15 \text{ km/hr} & \rightarrow 12 \text{ noon} \rightarrow 4 \text{ hrs travel} \end{aligned}$$

Consider A

$$S = D/T \Rightarrow D = S \times T$$

$$D = 10 \times 6$$

$$D = 60 \text{ km} \quad \text{total distance}$$

We need speed to reach at 1 pm

so  $\Rightarrow$  5 hrs we need to travel

$$S = D/T = \frac{60 \text{ km}}{5 \text{ hr}}$$

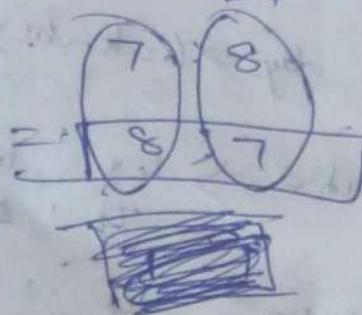
$$S = 12 \text{ km/hr}$$

we need to travel for 5 hrs to reach at 1 pm

Total journey time = 10 hrs  
i.e. part 1 + part 2

Given speed ratio = 21 : 24

time ratio



Take time as it  
is given total  
time is 10 hrs

$$\text{total part} = 8 + 7$$

$$\Rightarrow 15 \text{ part} = 10 \text{ hrs}$$

$$15 \text{ part} = 600 \text{ min}$$

$$\Rightarrow 1 \text{ part} = 40 \text{ min}$$

So ~~1<sup>st</sup> part speed is (i.e) 21 km/hrs~~ ~~1/a women~~  
~~2nd part speed is (i.e) 24 km/hrs~~ ~~1/a men~~  
So ~~1<sup>st</sup> part~~ ~~is 8 part~~

$$= 8 \times 40 = 320 \text{ min}$$

2<sup>nd</sup> part speed is ~~(i.e) 24 km/hrs~~ ~~1/a~~.

$$= 7 \times 40 = 280 \text{ min}$$

So

$$\text{Part 1} \Rightarrow 21 \text{ km} = 60 \text{ min}$$

21 km/hr

$$x = 320 \text{ min} \quad \frac{4}{16} \quad \frac{7}{7} \quad \frac{112}{112}$$

$$x = \frac{320 \times 7}{60} = 112 \text{ km}$$

Part 2

Speed

24 km/hr

$$24 \text{ km} = 60 \text{ min}$$

$$\frac{3}{28} \quad \frac{4}{4} \quad \frac{112}{112}$$

$$y = 280 \text{ min}$$

$$y = \frac{280 \times 7}{60} = 112 \text{ km}$$

$$x + y = 112 + 112$$

$$= 224 \text{ km} \quad \boxed{\text{total}}$$

6)

Base time 8.00 am

Speed ratio today  $\Rightarrow 45 \text{ km/hr} \Rightarrow 8-10 \text{ am}$   $\frac{\text{days}}{\text{days}} = \frac{6}{4}$   
 $\text{days} \Rightarrow 60 \text{ km/hr} \Rightarrow 8.00 \text{ am}$

Speed ratio  $\Rightarrow 45 : 60$ 

$$\frac{B}{A} : 4$$

$$\text{time ratio} = \frac{4}{6} : 3$$

$$1 : 1$$

$$\boxed{1 \text{ part} = 6 \text{ min}}$$

day 1  $\Rightarrow 45 \text{ km/hr} \Rightarrow 4 \text{ part time}$ 

$$= 4 \times 6 = 24 \text{ min} \rightarrow \text{given } 10 \text{ min late}$$

day 2  $\Rightarrow 60 \text{ km/hr} \Rightarrow 3 \text{ part time}$ 

$$= 6 \times 3 = 18 \text{ min} \rightarrow 10 \text{ min late}$$

$$-18 - 4 = 14$$

$$\frac{45}{x} = \frac{60}{24} \Rightarrow x = \frac{45 \times 24}{60}$$

$$S = D/t \Rightarrow D = Sxt$$

$$\boxed{x = 18 \text{ km}}$$

$$\text{total Distance} = 45 \text{ km/hr} \times 24$$

$$\boxed{1080 \text{ km}}$$

$$\frac{45}{x} = \frac{60}{24} \Rightarrow x = \frac{45}{60}$$

$$\frac{3}{4} \times 24$$

$$\boxed{x = 18 \text{ km}}$$

$$\frac{18}{(x+6)} \Rightarrow 45 = \frac{18 \times 60}{x+6}$$

$$x+6 = \frac{18 \times 60}{45}$$

$$x+6 = 24$$

$$x = 24 - 6$$

$$\boxed{x = 18 \text{ min}}$$

Excluding stoppage Pg: 13

1) excluding stoppage = 54 km/hr

including stoppage = 36 km/hr

54 km.  $\frac{60}{\text{min.}}$  → because full 60 min can travel  
~~36 km~~  $x$  → but enga all 60 min travel  
 men travelled ne kandepukka ne  

$$x = \frac{10}{\frac{60 \times 36}{\text{stop}}} = [60 \text{ min}]$$

~~36 km/hr speed la in~~

• 60 min la 40 min dha vandi odedhee  
 meekhe 20 min stop aghadhe  
 so  $\Rightarrow 60 - 40 = [20 \text{ min}]$  stoppage time

2) excluding stoppage = 42 km/hr

including " = 35 km/hr

42 km = 60 min

42 km travel aghadhe  
 60 min continuous ah  
 travel panna

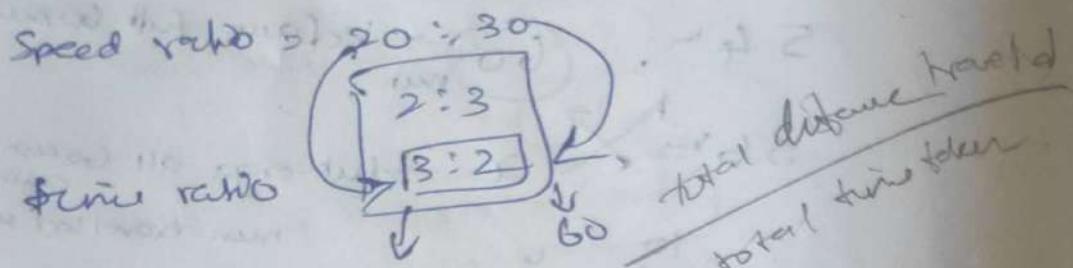
35 km  $\rightarrow x \text{ min}$

$$x = \frac{10}{\frac{60 \times 38}{\text{stop}}} = [50 \text{ min}]$$

so 50 min travel aghadhe then  $60 - 50 = 10 \text{ min}$   
 stoppage time

## Average Speed Pg. 14

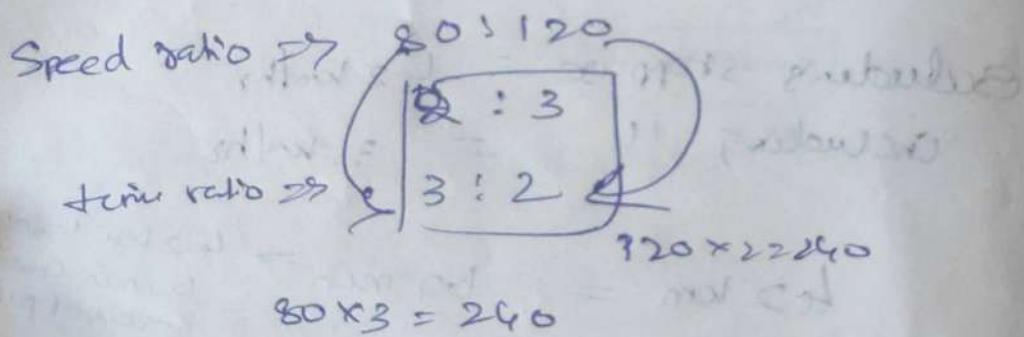
- 1) Town 1 to Town 2  $\Rightarrow$  20 km/hr  $\Rightarrow$  2 parts  
 Town 2 to Town 1  $\Rightarrow$  30 km/hr  $\Rightarrow$  3 parts



$$3 \times 20 = 60$$

$$\frac{60+60}{3+2} \Rightarrow \frac{120}{5} = 24 \text{ km/hr}$$

- 2) A to B  $\Rightarrow$  80 km/hr  
 B to A  $\Rightarrow$  120 km/hr



$$80 \times 2 = 160$$

$$\frac{160 + 240}{(total\ parts)(3+2)} \Rightarrow \frac{160 + 240}{5} = \frac{400}{5} = 80 \text{ km/hr}$$

5)  $30 \text{ km/h}$  speed to  $12 \text{ min}$  travel + pause

$$30 \text{ km} = 60 \text{ min}$$

$$x = 12 \text{ min}$$

$$x = \frac{30 \times 12}{60} = [6 \text{ km}]$$

$$45 \text{ km} = 60 \text{ min}$$

$$x = 8 \text{ min}$$

$$x = \frac{45 \times 8}{60} = [6 \text{ km}]$$

$$\frac{30 \times 12 + 45 \times 8}{12+8}$$

$$[36 \text{ km/hr}]$$

$$\text{total distance he travelled} = 6 + 6 = [12 \text{ km}]$$

$$\text{total time he travelled} = 12 \text{ min} + 8 \text{ min} = 20 \text{ min}$$

~~$$S = D/T$$~~

$$12 \text{ km} = 20 \text{ min} \quad (\frac{2 \text{ km}}{20 \text{ min}} \text{ la travel + pause})$$

$$x = 260 \text{ min}$$

$$\Rightarrow x = \frac{60 \times 12}{20}$$

$$[x = 36 \text{ km/hr}]$$

4)

~~$$S = D/T \Rightarrow T = D/S$$~~

$$T = \frac{10}{12}$$

0 10

2 10

4)  $12 \text{ km} \Rightarrow 60 \text{ min.} \rightarrow$  because 12km/hr  
 $10 \text{ km} = x \rightarrow$  we need time for  
 $x = 50 \text{ min}$

$$10 \text{ km} = 60 \text{ min.}$$

$$12 = x$$

$$x = \frac{60 \times 12}{10}$$

$$x = 72 \text{ min}$$

$$\text{total time travelled} = 50 + 72$$

$$= 122 \text{ min}$$

$$\text{total distance} = 10 + 12 = 22 \text{ km}$$

~~$\text{avg speed} = \frac{22}{122} \text{ km/h}$~~

$$22 \text{ km} = 122 \text{ min}$$

$$x = 60 \text{ min}$$

$$x \Rightarrow \frac{60 \times 22}{122}$$

$$x = 10.81$$

$$\begin{aligned} x &= 60 \\ 10 &= 2 \\ 12 &= 72 \\ 10 &= 50 \\ 12 &= 72 \\ 12 \times 50 + 10 \times 72 &= 600 + 720 \\ 50 + 72 &= 122 \\ 12 &= 10.81 \text{ km/h} \end{aligned}$$

$$\begin{array}{r}
 50 \rightarrow \\
 300 \quad \leftarrow 30 \\
 \hline
 720 \quad \rightarrow \frac{9}{80} \Rightarrow ① \\
 300 \quad \frac{52.5}{80} = 5.25 \\
 \hline
 = 5 \text{ hrs } 15 \text{ min}
 \end{array}$$

~~$$\begin{array}{r}
 180 \quad 9 \\
 180 \quad 12 \\
 \hline
 120 \quad 12 \\
 120 \quad 12 \\
 \hline
 0
 \end{array}$$~~

$$\begin{array}{r}
 127 \\
 120 \\
 \hline
 7 \\
 540 \\
 \hline
 14 \\
 12 \\
 \hline
 2
 \end{array}$$

$$= 2 \text{ days}$$

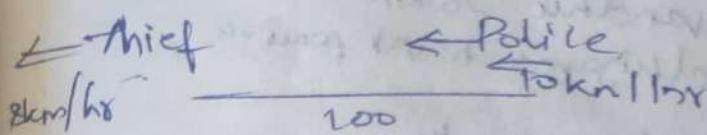
~~$$\begin{array}{r}
 180 \quad 9 \\
 180 \quad 12 \\
 \hline
 120 \quad 12 \\
 120 \quad 12 \\
 \hline
 0
 \end{array}$$~~

$$\begin{array}{r}
 9 \\
 12 \\
 \hline
 21 \\
 12 \\
 \hline
 9
 \end{array}$$

$$= 9 \text{ hrs}$$



## Relative Speed Pg: 13



Same direction so subtract =  $10 - 8 = 2 \text{ km/hr}$

$$= 2 \text{ km/hr} = 2000 \text{ m/hr}$$

$$2000 \text{ m} = 60 \text{ min}$$

$$100 \text{ m} = x$$

$$\Rightarrow x = \frac{60 \times 100}{2000} = 3 \text{ min}$$

~~$$\begin{array}{l}
 \text{10 km (speed of police)} \\
 10000 \text{ m} = 60 \text{ min} \\
 x = 3
 \end{array}$$~~

Asked how far thief will be running before police catch him

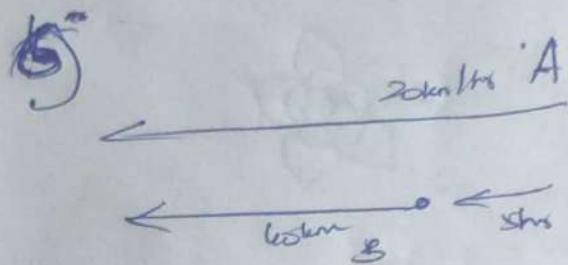
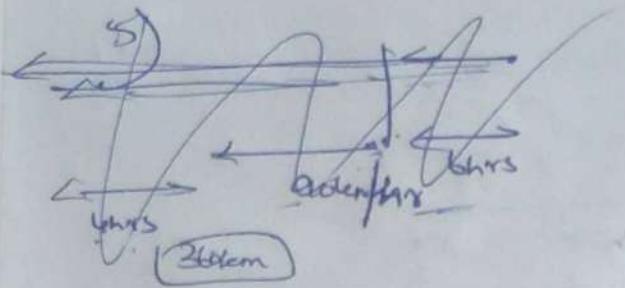
$$8000 \text{ m} = 60 \text{ min}$$

$$x = 3 \text{ min}$$

$$x = \frac{600}{8000 \times 3}$$

$$x = 600 \text{ m}$$

we need to run more to escape



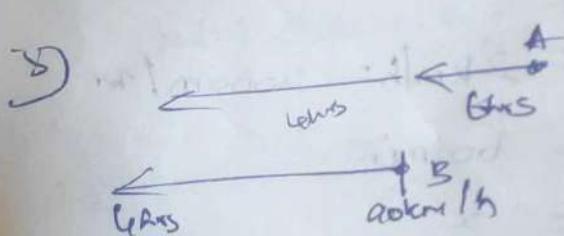
$$5 \text{ hrs la A} = 20 \times 5 = 100 \text{ km downstream}$$

A	B	C
100	0	0m
120	40	1 hr
140	80	2 hr
160	120	3 hr
180	160	4 hr
200	200	5 hr
220	240	6 hr

downstream  
in 6 hrs

so  $3 \text{ hrs la B vandheu } 20 \text{ km } \& \text{ ah}$   
vista achnigama travel pennele

$$3 \times 60 = 180 \text{ km}$$



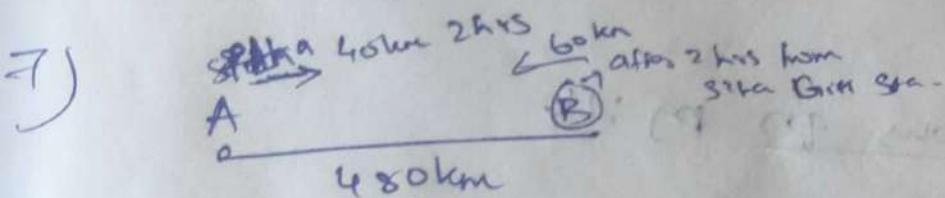
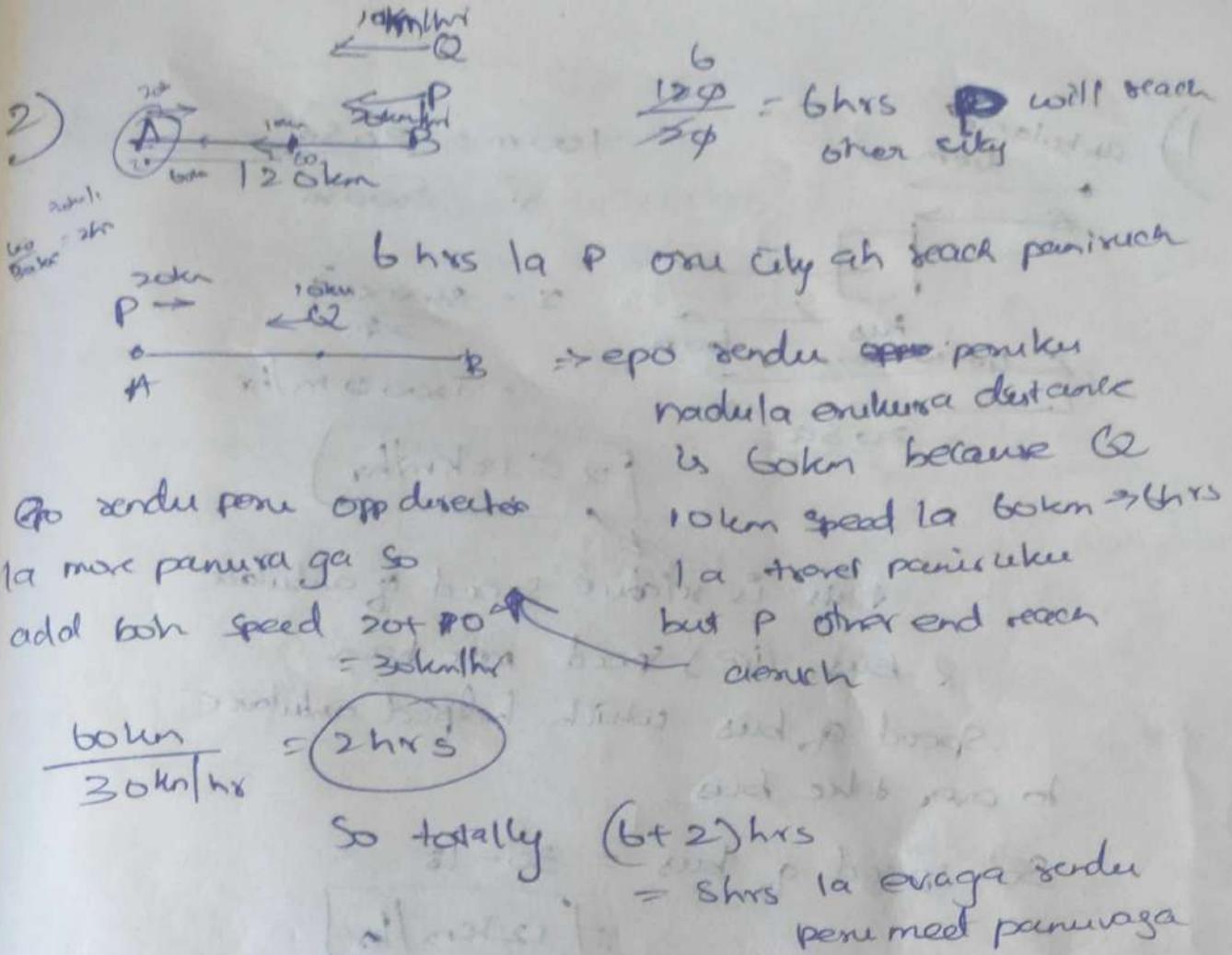
4 hrs la  $90 \text{ km/hr}$  la travelpanna 'B'  
Vandheu 'A' ah catch pannu

$$\text{so } A \& B = \text{vendune } 360 \text{ km dha travel}$$

But  $B = 90 \text{ km/hr}$  la 4 hrs la  
 $360 \text{ km travelpanna}$

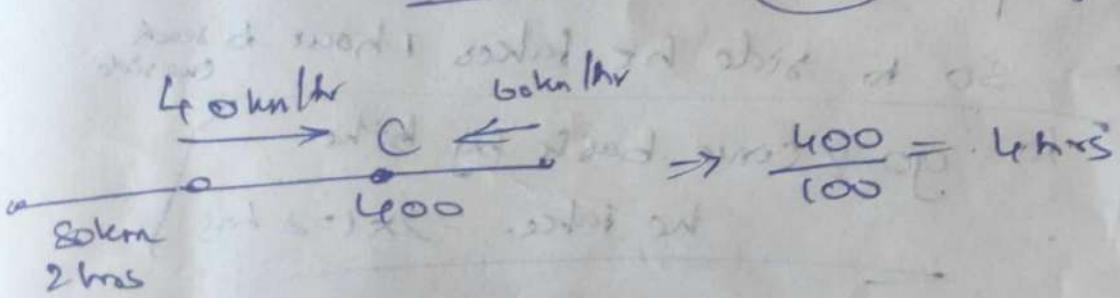
~~but~~  $A = 360 \text{ km at Corex panna } 5 \text{ hrs}$   
agnakku so speed is

$$S = \frac{D}{T} = \frac{360}{10} = 36 \text{ km/hr}$$



so sita =  $40 \times 2 = 80 \text{ km/s}$  already travelled

so  $480 - 80 = 400 \text{ km}$  remaining kms

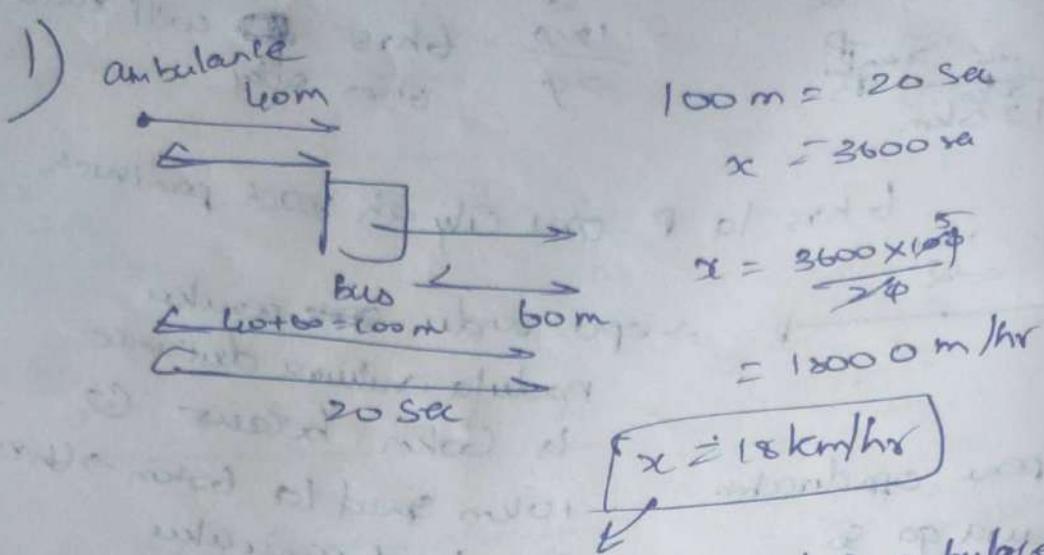


so sita =  $2 + 4 = 6 \text{ hrs}$  travel peniruh C reach ciga

Gita = only travel = 6 hrs

so diff is =  $6 - 4$

differe  $\neq$   $2 \text{ hrs}$  ~~the meet~~  
 ans



This is relative speed of ambulance & bus (i.e.) speed more than Speed of bus which helped ambulance to overtake bus

So speed of bus =  $30 - 18$   
 $\therefore 12 \text{ km/hr}$

### Miscellaneous QN pg 114

1)  $\frac{2}{W} + \frac{2}{W} = 4 \text{ hrs}$

$\frac{2}{W} + \text{ride} = 3 \text{ hrs}$

So to side he takes 1 hour to search <sup>on side</sup>

| to go & come back by bike  
 he takes. =  $2 \times 1 = 2 \text{ hrs}$

Avg speed = total distance  
total time taken

$$\begin{aligned}30 &= 60 \\20 &= x \\ \Rightarrow 20 &= \frac{2}{3} \times 60 \\ &\Rightarrow 20 = 40\end{aligned}$$

total km = 300 km

$$30 \text{ km/hr speed } 1 \text{ or } \frac{2}{3} \text{ of } 300 \text{ km travel part } - 50 = 200 \text{ km}$$

60 km/hr speed 1/3 remained,  $\frac{1}{3}$  part a car part  
= 100 km

3)

$$\begin{array}{l} \text{none} \\ \text{Main} \end{array} \rightarrow 45 \text{ km/hr}$$

$$\begin{array}{l} 45 \\ 9 \\ \hline 405 \end{array}$$

$$\frac{200 \times 6 \text{ hr } 40 \text{ min} + 100 \times 1 \text{ hr } 40 \text{ min}}{6 \text{ hr } 40 \text{ min} + 1 \text{ hr } 40 \text{ min}}$$

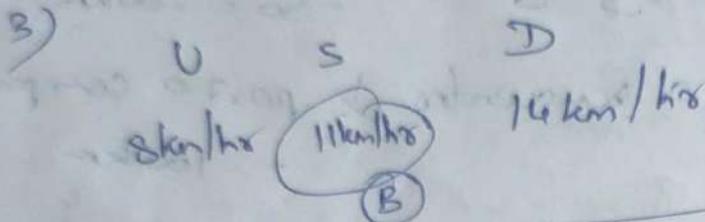
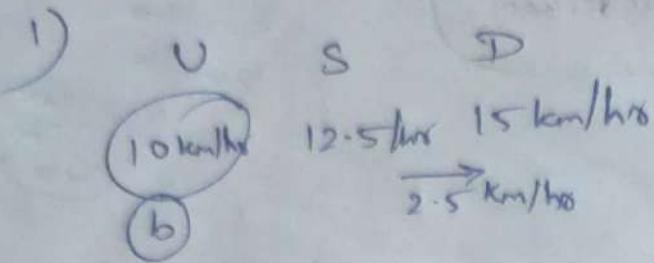
$$= \frac{200 \times 400 + 100 \times 100}{400 + 100}$$

$$= \frac{80000 + 10000}{500}$$

$$\begin{array}{r} 80 \\ 100 \\ \hline 160 \end{array}$$

$$3 \text{ hrs } = 180 \text{ min.}$$

## Boats & streams



8)  $V \quad S \quad D$  [Given  
mirubi varsa no stream pagal 1 hr  
 $\frac{1}{12}$  time agadha part =  
so,  $12 \text{ part} = 12 \times 3 = 36$   
done]

30 km/hr  
33 km/hr  
36 km/hr  
1 hrs  
3 km/hr  
 $\rightarrow 30 : 33 : 36$   
 $10 : 11 : 12$

21)  $V \quad S \quad D$

4 km/hr  
8 km/hr  
 $\rightarrow 4 \text{ km/hr}$   
12 km/hr

$$\frac{8 \text{ km}}{4} = 2 \text{ hrs}$$

B

25)  $V \quad S \quad D$

12 km/hr  
A  
15 km/hr  
 $\rightarrow 1.5 \text{ km/hr}$

10)  $V \quad S \quad D$

17 km/hr  
22 km/hr  
 $\rightarrow 5 \text{ km/hr}$   
27 km/hr  
 $\frac{54}{27} = 2 \text{ hrs}$

$$\begin{array}{c}
 S \quad D \\
 4.4 \text{ km/hr} \\
 \text{shores} \\
 \text{B} \quad 4.95 \text{ km/hr} \\
 22 \text{ km} / 4 \text{ hr} \\
 5.5 \text{ km/hr}
 \end{array}$$

$$\begin{array}{r}
 5.5 \\
 4 \overline{) 2} \\
 20 \\
 \underline{-20} \\
 0
 \end{array}$$

$$\begin{array}{r}
 4.4 + 5.5 \\
 \hline
 2 \\
 = \frac{9.9}{2}
 \end{array}$$

(4) ~~upstream~~  
mulka kilometer pog  $11\frac{1}{4}$   $\Rightarrow \frac{45}{4}$  min ayakku

daanste een mulka kilometer pog  $4\frac{1}{2}$   $\Rightarrow \frac{15}{2}$  min ayakku

$$\begin{array}{r}
 3/4 \text{ km} \times 15 \\
 \hline
 4 \times 15 = \frac{45}{4}
 \end{array}$$

$$\checkmark \text{ for full pos} + \frac{4 \times 15}{4 \times 15} = \frac{45 \times 15}{4 \times 15} = \frac{675}{60}$$

$$\frac{3}{4} \text{ of } 1 \text{ km} = 11\frac{1}{4} \text{ min}$$

$$1 \text{ km} = 60 \text{ min}$$

$$\begin{array}{r}
 4 \text{ km} = 60 \text{ min} \\
 \hline
 0.75 \text{ km}
 \end{array}$$

$$\begin{array}{r}
 \text{Upstream} \\
 \hline
 \frac{3}{4} \text{ of } 1 \text{ km} = 7.5 \text{ min}
 \end{array}$$

$$1 \text{ km} = \cancel{60 \text{ min}}$$

$$\begin{array}{r}
 x = \frac{7.5 \times 1}{0.75} \times \frac{10}{75} \\
 x = 10 \text{ min}
 \end{array}$$

$$1 \text{ km} = 10 \text{ min}$$

$$\begin{array}{r}
 6 \text{ km} = 60 \text{ min} \\
 \text{downstream}
 \end{array}$$

$$\begin{array}{r}
 S \quad D \\
 4 \text{ km} \quad 6 \text{ km/hr}
 \end{array}$$

$$\begin{array}{c} 2x \xrightarrow{0.5t} 1.5x \xrightarrow{0.5t} x \\ \frac{2x+x}{2} = \boxed{\frac{3x}{2}} \end{array}$$

Still water : stream

$$\begin{array}{c} 1.5 \quad 0.5 \\ \boxed{3 : 1} \quad \textcircled{4} \end{array}$$

9)

$$\begin{array}{c} U \quad S \quad D \\ 8\text{hrs } 48\text{min} \quad 4\text{hrs} \\ \cancel{(8\text{hrs } 48\text{min}) + 4\text{hrs}} \\ \cancel{= 12\text{ hrs}} \\ \cancel{= 384\text{ min}} \end{array}$$

$$\begin{array}{r} 60 \\ 60 \\ \hline 48 \\ 48 \\ \hline 528 \\ 240 \\ \hline 384 \\ \hline 768 \\ \hline 2 \end{array}$$

$$U \quad S \quad D \\ 528\text{ min} \quad 384\text{ min} \quad 240\text{ min}$$

The method

$$\begin{array}{c} U \\ 8\text{hrs } 48\text{min} \end{array} \quad \begin{array}{c} D \\ 4\text{hrs} \end{array}$$

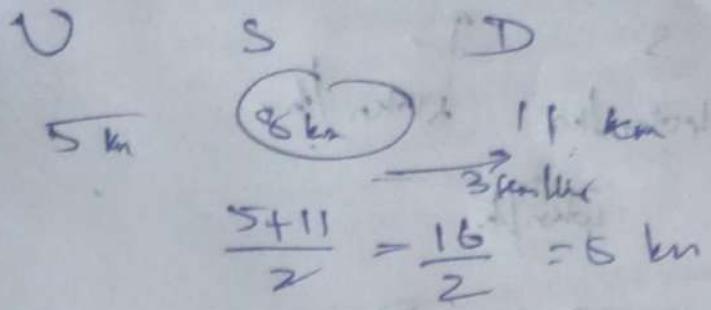
in form of 12  
1 hr = 60 min  
12 hrs = 720 min  
12 min = 40 min  
median  $\frac{48}{12} = \frac{4}{3}$

12  $\Rightarrow$  odd a multiple is even

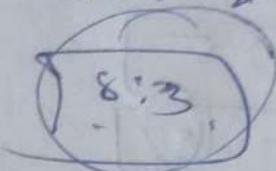
$$44 : 20$$

$$44 \div 4 \Rightarrow 11 : 5 \Rightarrow \text{time ratio}$$

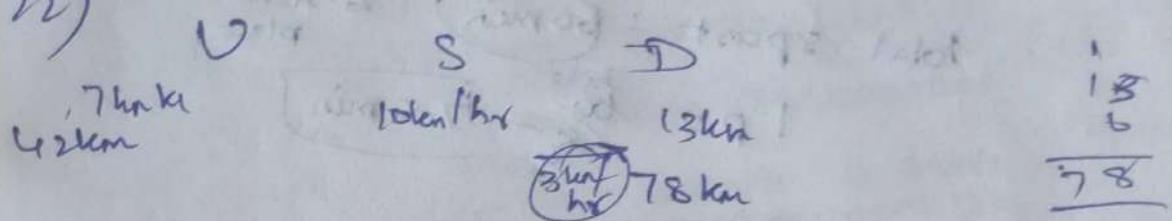
$$15 : 11 \Rightarrow \text{speed ratio}$$



ratio of still water & speed of current



22)



kutum machi pa manasatal pota

13)

U      →      D

$$4 \text{ km/hr} \quad 5 \text{ km/hr} \quad 6 \text{ km/hr}$$

$\xrightarrow{1 \text{ km/hr}}$

(2) solved

Ratio of U : D

$$4 : 6$$

Speed ratio  $\frac{1}{2} : \frac{3}{2} \rightarrow \text{total speeds} = 60 \text{ m/s}$

time ratio  $\frac{3}{2} : \frac{1}{2} \rightarrow 1P = 12 \text{ mins}$

so in upstream he have 1  $\rightarrow 3 \times 12 = 36 \text{ min}$

" " downstream in a  $\rightarrow 6 \times 12 = 72 \text{ min}$

Given in still water = 8 km/hr

in downstream = 6 km/hr

$$6 \text{ km} = 60 \text{ m/s}$$

$$x = 24$$

$$x = \frac{60 \times 24}{66} = \frac{10}{11}$$

$$P = 2.4 \text{ kmph}$$

20)  $U$   $S$   $D$   
 Botn/hr  $\rightarrow$  Botn/hr  $\rightarrow$  Botn/hr  
 $\overbrace{\text{Botn}/\text{hr}}$

$$\text{Speed ratio} = U : D$$

$$30 : 50$$

$$\boxed{3 : 5}$$

$$\text{Time ratio} \rightarrow \boxed{5 : 3}$$

Total spent = 60 min  $\rightarrow$  given 1 hour  
 to travel to a place.

$$1 P = \frac{60}{8} = 7.5 \text{ min}$$

So a person walks 3 parts in downstream

$$= 3 \times 7.5$$

$$= 22.5 \text{ min}$$

Wander Downstream

$$\therefore S_D = 60 \text{ min}$$

$$x = 122.5 \text{ mm min}$$

$$\therefore x = \frac{22.5 \times 50}{64}$$

$$\boxed{x = 13.75 \text{ km}}$$

$$U \quad S \quad D$$

~~3x time~~  $\frac{2x}{x} = \frac{x}{x}$

$$\frac{3x+x}{2} = \frac{4x}{2}$$

~~Speed of stream~~  $= x = 3 \text{ km/hr}$

$$U \quad S \quad D$$

~~5km/hr~~  $8 \text{ km/hr}$   $11 \text{ km/hr}$

$\frac{8 \text{ km}}{3 \text{ km}}$

speed ratio  $= \frac{U:D}{5:11}$   
 time ratio  $= \frac{5}{11} = \frac{5}{6}$

Time ratio  $= \frac{3}{1} : 1$

Speed ratio  $= 1 : 3$

diff in ratio  $6P = 3 \text{ km}$

$1P = \frac{3}{6} = \frac{1}{2} \text{ hrs}$

$\frac{1}{2} \text{ hrs} = 30 \text{ min}$

hrs

$11 : 5$

$\frac{11}{2} : \frac{5}{2}$

$= \frac{5+8}{5} : \frac{2+5} = 2.5 : 1.5$

we need  $D = S \times T$

$$= 5.5 \times 5$$

$$= 27.5 \text{ km}$$

b)

~~8~~

$$U \quad S \quad D$$

~~12 - 8 km/hr~~  $14 \text{ km/hr}$   $15.2 \text{ km/hr}$

$\frac{14}{8} = \frac{15.2}{12}$

$U : D$

Speed ratio  $= 12 : 8 : 15.2$

$\Rightarrow 6 : 4 : 7.6$

$3 : 2 : 3.8$

$1.6 : 1.9$

$380 : 320$

$380 + 320 = 700 \text{ hrs}$

$380 : 320$

$380 + 320$

$\boxed{700 \text{ hrs}}$

7)  $66 \text{ km/hr}$   
 $66 \text{ km/hr} = 66 \times \frac{5}{18} = 18.33 \text{ m/s}$

asked for  $12 \text{ sec} = 12 \times 18.33$   
 $\boxed{220.0 \text{ m}}$

Type 1

Pg 17

5)  $s = \frac{D}{T}$  Given  
 ~~$D = \text{constant}$~~   $s = 40 \text{ km/hr}$   
 $= 40 \times \frac{5}{18} = 11.11 \text{ m/s}$   
 $T = 18 \text{ sec}$

$$s = \frac{D}{T} \Rightarrow D = s \times T$$

$$= 11.11 \times 18$$

$\boxed{D = 200 \text{ m}}$

10)  $T = 12 \text{ sec}$

$D = 160 \text{ m}$

$$s = \frac{D}{T} = \frac{160}{12} = 13.33 \text{ m/s}$$

$$= 13.33 \times \frac{18}{5}$$

$$= 47.98 \approx \boxed{48 \text{ km/hr}}$$

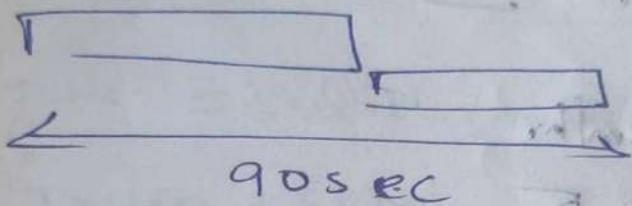
$$6) S = 50 \text{ km/hr} \\ = 50 \times \frac{5}{18} \text{ m/sec}$$

$$T = 9 \text{ sec}$$

$$D = S \times T$$

$$= 50 \times \frac{5}{18} \times 9 \\ = 125 \text{ m}$$

$$7) T = 10 \text{ sec}$$



train length make cross bridge = 10 sec  
train + bridge cross bridge = 90 sec

$$\text{bridge cross bridge} = 80 \text{ sec}$$

$$800 \text{ m cross path} = 80 \text{ sec}$$

$$1 \text{ sec} = 10 \text{ m}$$

$$10 \times \frac{18}{5}$$

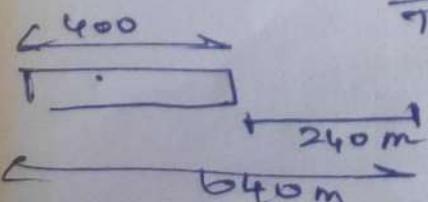
$$S = 10 \text{ m/s}$$

$$S = 10 \times \frac{18}{5} = 36 \text{ km/hr}$$

$$8) D = 240 \text{ m (train length)}$$

$$T = 12 \text{ sec}$$

$$S = \frac{D}{T} = \frac{240}{12} = 20 \text{ m/s}$$



$$\Rightarrow S = \frac{D}{T} \\ T = \frac{D}{S} = \frac{22}{20} = 11 \text{ sec}$$

4) train length cross aga = 4 sec (pole) alone  
 train + bridge length of 300 m cross aga = 7 sec

so it take

3 sec to cross 300 m bridge

$$S = \frac{D}{T} = \frac{300}{3} = 100$$

Pole at cross aga same dha train distance

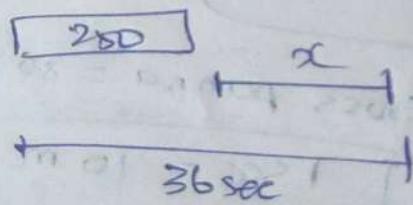
$$\text{So } \Rightarrow 4 \text{ sec} \times 100 \text{ m} \\ = 400 \text{ m} \quad \boxed{\text{length of train}}$$

9) speed = 52 km/hr

$$= 52 \times \frac{5}{18}$$

$$\boxed{T_s = 14.4 \text{ m/s}}$$

length of platform = 250m



$$S = \frac{D}{T} \Rightarrow 14.4 = \frac{250+x}{36}$$

$$\boxed{x = 268.4}$$

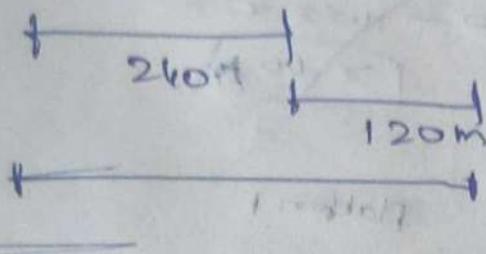
$$\boxed{T_s = 270 \text{ m}}$$

M)

$$\text{Given } D = 120 \text{ m}$$

$$T = 6 \text{ s}$$

$$S = \frac{D}{T} = \frac{120}{6} = 20 \text{ m/s}$$



$$S = \frac{D}{T}$$

$$T = \frac{D}{S} = \frac{180}{20}$$

$$\therefore T = 9 \text{ seconds}$$

Ans: 16 Basics

3)

Time = 8 seconds (to pass a pole)

$$T_{\text{train}} = 8 \text{ second}$$

$$T_{\text{train}} + 200 \text{ m} = 28$$

so to pass 200m long bridge

$$\text{we need } 28 - 8 = 20 \text{ sec}$$

$$S = ? \quad \text{Speed of train} = \frac{D}{T}$$

$$= \frac{200}{20} = 10 \text{ m/s}$$

$$= 10 \times \frac{18}{5} = 36 \text{ km/hr}$$

1 sec. train 10 m passes

So 8 second  $\text{km} = \frac{10 \times 8}{1800}$  length of train

① 80m, 36 km/hr

5)

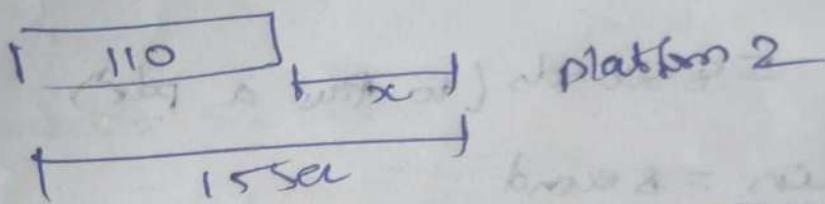
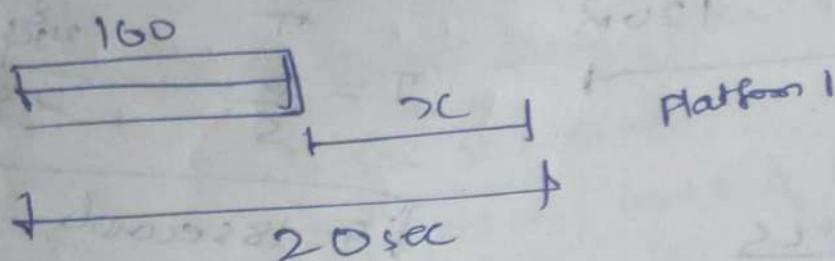
$$50 \text{ m} \Rightarrow 5 \text{ sec C}$$

$$\boxed{1 \text{ sec} = 10 \text{ m}}$$

$$S = \frac{D}{T} \Rightarrow 10 \text{ m/s} = \frac{160 + x}{20}$$

$$200 - 160 = x$$

$$\boxed{x = 40 \text{ m}}$$



$$\text{diff in second} = \cancel{20 \text{ sec}} \quad 20 - 15 = 5 \text{ second}$$

$$\text{diff in distance} = \cancel{160 - 110} = 50 \text{ m}$$

$$50 \text{ meter} = 5 \text{ sec}$$

$$\boxed{1 \text{ sec} = 10 \text{ m}}$$

$$S = \frac{D}{T} \Rightarrow 10 \text{ m/s} = \frac{160 + x}{20}$$

$$200 = 160 + x$$

$$\boxed{x = 40 \text{ m}}$$

length of train is  $\boxed{40 \text{ m}}$

Type I P: 17

8)

Given

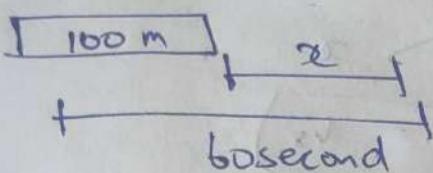
$$\text{Time} = 15 \text{ sec}$$

$$D = 125 \text{ m}$$

$$S = \frac{D}{T} = \frac{125}{15} = \frac{25}{3} \text{ m/s}$$

$$S = \frac{25}{3} \times \frac{18}{5} = 150 \text{ km/hr}$$

12)



$$\text{Speed} = 45 \text{ km/hr}$$

$$= 45 \times \frac{5}{18} = 12.5 \text{ m/s}$$

$$S = \frac{D}{T} \Rightarrow 12.5 = \frac{100+x}{60}$$

$$750 = 100 + x$$

$$\therefore x = 650 \text{ m} \quad \text{length of train}$$

$$S = \frac{D}{T} \rightarrow \text{to cross p.d. time (calculated time)}$$

$$T = \frac{D}{S} \Rightarrow \frac{650}{12.5} = 52 \text{ seconds}$$

el. m. f. 1.3

## Relative Speed: pg: 17

1)



60 km/hr      40 km/hr

Total Speed = 60 + 40 = 100 km/hr (add because oppn dir)

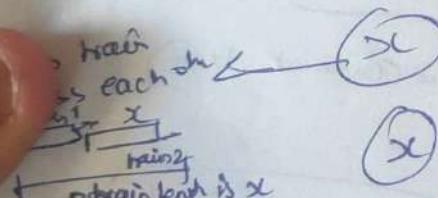
$$\text{Train A length} = 1.10 \text{ km} \quad \text{Train total length} = 2 \text{ km} \\ \text{L.B.} = 0.9 \text{ km} \quad = 2000 \text{ m}$$

$$150000 \xrightarrow[2000]{\cancel{x}} 3600 \rightarrow 1 \text{ hr} \\ \Rightarrow \boxed{\cancel{x} = 40}$$

3) 2 train opp direct.

$$46 - 36 = 10 \text{ km/hr}$$

$$10000 \text{ m} \quad 3600 \text{ sec}$$



$$\cancel{x} = 100$$

$x$  is 2 train length so 1 train length

$$= 100/2 = \boxed{50 \text{ meter}}$$

8)

$$\boxed{100} \rightarrow 45 \text{ km/hr}$$

$$\boxed{125} \rightarrow 60 \text{ km/hr}$$

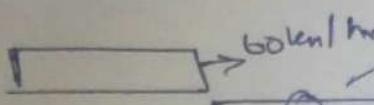
$$15 \times \frac{5}{18}$$

$$60 - 45 = 15 \text{ km/hr}$$

$$= \boxed{4.17 \text{ m/s}}$$

$$S = \frac{D}{T} \Rightarrow T = \frac{D}{S}$$

$$T = \frac{100+125}{4.17} = \frac{225}{4.17} = 53.9 \approx \boxed{54 \text{ sec}}$$



enka + la person enak  
①      ②

enka full length cross  
ayam

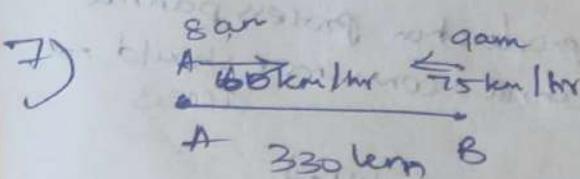
Speed of train =  $75 - 60 = 15 \text{ km/hr}$  (same direction)

$$= 15 \times \frac{5}{18} = 4.17 \text{ m/s}$$

length of fastest train travel  $\approx 30 \text{ sec}$

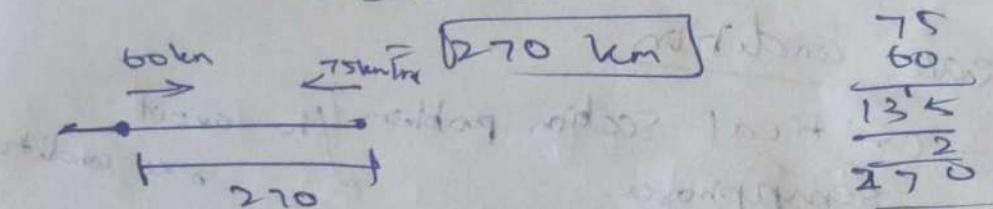
$$\Rightarrow e \\ = 4.17 \times 30 \\ = 125.1 \text{ m}$$

$\sqrt{125 \text{ m}}$  fastest train length



8 am A starts agudha 60 km/hr

$$\text{so } \Rightarrow 330 - 60$$



$$60 + 75 = 135 \text{ km/hr} \quad (\text{opposition add})$$

$$\text{so } \frac{270}{135} = 2 \text{ hrs} \quad \text{they meet after 9 am}$$

so

$$9 \text{ am} + 2 \text{ hrs} = 11 \text{ am} \quad \text{they meet} \quad \frac{2-4}{120} \times 120 = 24$$

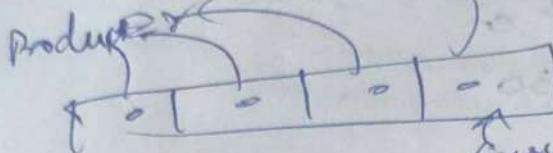
4:9

## OS

### Process synchronization

We can read 2 data at same time  
but can't write 2 data.

will produce



consume &

producer produce panna panna consumer  
access paravaga

but producer - production process panna  
panna consumer should not  
access

producer - should stop if row filled  
consumer - should wait if empty  
until new product produced.

### Race condition

- critical section problem to avoid  
- semaphores.

### Solution for Critical Section prob

- \* mutual exclusion
- \* MUTEX → allows only one proc to enter
- \* progress → it should check each time process is running in CS or not  
If not in critical section it can allow other to enter CS.
- \* barriers waiting time.

Semaphore 1. Most used now and shows

\* Counting semaphore

\* Binary Semaphore

Synchronisation

Wait

Signal

## Permutation & Combination

1) How many ways "CLAIM" arranged

2) "PLACE" → Take all letters

How many don't start with "AE"

$$A E \quad 3 \quad 2 \quad 1 \quad 3 \times 2 \times 1 = 6$$

$$5 \times 4 \times 3 \times 2 \times 1 = 120 - b$$

$$P L A C E \quad 5! = 120 \quad = 114 \rightarrow \text{Letters that don't start with "AE"}$$

3) How many words can be formed with "SIGNATURE"

Where vowels come together

S I G N A T U R E

4-vowels - I A U E

$$I - - - - - \quad 6! \\ 1! \times 5! \rightarrow \text{end has group of vowels ah un add as 1! to 5! = 5!}$$

$$\begin{array}{r} 720 \\ 24 \\ \hline 28.80 \\ 1440 \\ \hline 17280 \end{array}$$

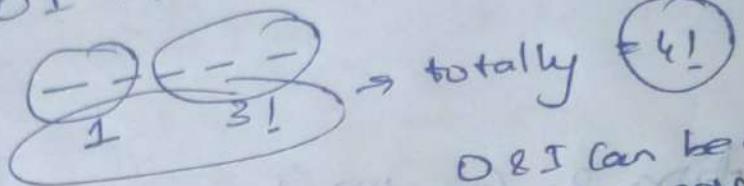
I A U E → Can be arranged within them self  $\Rightarrow 4!$

$$4! \times 4! \Rightarrow 720 \times 24 = 17280$$

4) was many words form from letter KOHLI where vowels don't come together

KOHLI

OI → 2 vowel



O & I can be arranged within themselves  $\Rightarrow$  2!

$$4! \times 2! \Rightarrow 4 \times 3 \times 2 \times 1 \times 2 \times 1$$

$(4 \times 3 \times 2 \times 1) \times (2 \times 1) = 48$  → vowels come together

~~Q11~~

~~48~~

72

vowels don't come together

$$72 - 48$$

$$= 120 - 48$$

= 72 ways

5) ~~Q12~~

How many letters can be formed in BEGIN where place of vowel not changed

B E G I N

fixed position

$$B E \underline{I} \underline{G} \underline{N} \Rightarrow 3 \times 2 \times 1$$

= 6 ways  $\Rightarrow 3!$

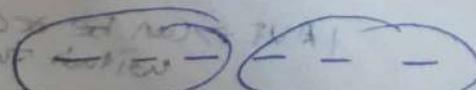
$\frac{2}{6}$   
 $\frac{2}{6}$   
 $\frac{2}{6}$   
 $\frac{2}{6}$   
 $\frac{2}{6}$   
 $\frac{2}{6}$

6) Orange

vowels not together

ORANGE

O A E - 3 vowels



4!

$\frac{5}{5}$   
 $\frac{4}{4}$   
 $\frac{3}{3}$   
 $\frac{2}{2}$   
 $\frac{1}{1}$

DAE can be conserve within them  
3!  
 $\Rightarrow 4! \times 3! \Rightarrow 24 \times 6$

= 144 ways vowels can together

totally  $6!$   $\Rightarrow 720$

Orange can be arranged where vowels don't come

together =  $720 - 144$

= 576 ways

## 7) SUCCESS

Vowels arranged alphabetical order

O R A E U A

$7!$

$U E \rightarrow$  alphabetical order

$E U \rightarrow$  10 ways

$\frac{7!}{3! 2! 2!} \rightarrow$

$E \& U$  out as 1  
2, within there are

3 repeat 3 times  $\rightarrow$  3 repeat 2 times

$\frac{5040}{6 \times 2 \times 2}$  ways

## 8) CALENDAR

Vowels arranged in alphabetical order

Vowels  $\Rightarrow$  A E A  $\Rightarrow 3!$

$8!$

~~8~~  $\times 3!$

$$\Rightarrow \frac{8 \times 7 \times 6 \times 5 \times 4 \times 3!}{2 \times 3!}$$

$\frac{6720}{3360}$

find no of arrangement 2, 3,

10) How many 3 digit no with distinct digits

~~8 9 10~~ →  
 9 0 8 → 2 nos used so  $\frac{10-2}{8} = 8$   
 because 0 excluded but  
 front used norm excluded  
 so 8 ways

10-

$$1 \times 9 \times 8 = 72$$
 ways

11) Find no. of 3 digit no. such that least one of digits is 6 (with repetitions).  $\frac{10-1}{9} = 9$

1-Six  
thus w/o 6  $\frac{9}{9} = 81$   
 $\frac{8}{8} = 72$

$$\frac{9 \cdot 9 \cdot 8}{\text{distinct dist}} = 168$$

$$\frac{8 \cdot 9 \cdot 8}{225} = 72$$

$$\frac{225}{26} \rightarrow 2250$$

2-Six

$$\frac{2 \cdot 9}{2} = 9$$

$$\frac{252}{26} \text{ ways}$$

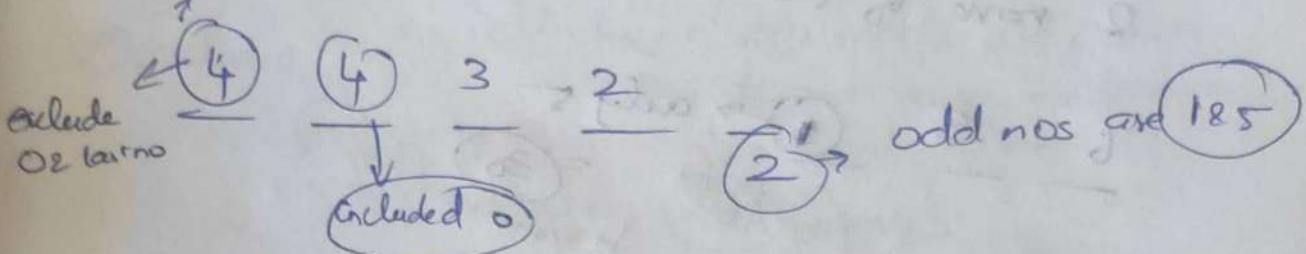
$$\frac{2 \cdot 9 \cdot 8}{225} = 9$$

$$\frac{8 \cdot 9 \cdot 8}{225} = 8$$

3 Six

$$\frac{3 \cdot 2 \cdot 1}{1} = 1$$

12) How many 5 digit odd no. can be formed using digit 0, 1, 2, 5, 6, 8 if each digit occurs at most once in each number?



13) How many 3 digit no. can be formed by 0, 2, 5, 8, 7 which is divided by 5 & <sup>number</sup> ~~starting~~ digit is not repeated.

~~3 3 2 2 0 8 2~~  
Take separately for 0 & 5

for 0 in last  
 $\frac{4}{3} \quad \frac{3}{1}$  → 0 here  $\Rightarrow 12 \rightarrow 4 \times 3$

for 5 in last  
 $\frac{3}{3} \quad \frac{3}{1} \rightarrow 5$  here  
 $\Rightarrow 3 \times 3 \times 1 = 9$

$$12 + 9 = 21 \text{ ways}$$

14) How many distinct 3 digit no. can be formed using 3, 1, 2, 3

$$\frac{3}{3} \quad \frac{2}{2} \quad \frac{1}{1} \Rightarrow 3 \times 2 = 6 \text{ ways}$$

How many 3 digit nos can be formed with  
 5, 6, 7, 8, 9 which are divisible by 5  
 & none of the digits are repeated

$$\begin{array}{r} 6 \quad 5 \\ - \quad - \\ \hline \end{array} \xrightarrow{\text{only } 5} \begin{array}{l} \text{Out} = 30 \\ 4+5+7 = 16 \end{array}$$

3 digit even form

1, 2, 3, 4, 6, 7

no repetition

$\begin{array}{l} 2 \quad 4 \quad 6 \\ \text{Even} \end{array}$

$$\begin{array}{r} 5 \quad 4 \quad 3 \\ - \quad - \quad - \\ \hline \end{array} \Rightarrow \boxed{160 = 5 \times 4 \times 3 \text{ ways}}$$

4 digits form

using 0, 1, 2, 3

repetition allowed

$$\begin{array}{r} 6 \quad 4 \\ \frac{2}{6 \quad 4} \\ \frac{3}{119 \quad 2} \end{array}$$

$$\begin{array}{r} 3 \quad 4 \quad 4 \quad 4 \\ - \quad - \quad - \quad - \\ \hline \end{array}$$

$$= 3 \times 4 \times 4 \times 4 = \boxed{192 \text{ ways}}$$

repetition allow

nos formed bet 2000 & 4000 can be

selected from digit 1 to 5

1 2 3 4 5

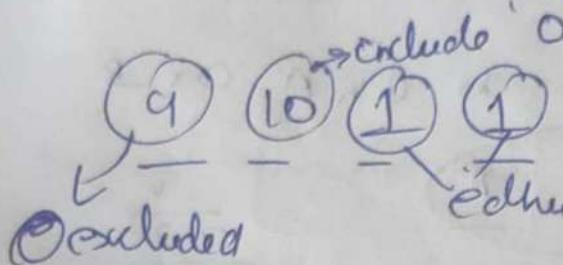
$$\begin{array}{r} 2 \quad 5 \quad 5 \quad 5 \\ - \quad - \quad - \quad - \\ \hline \end{array} \xrightarrow{\frac{125}{2}} \boxed{250 \text{ ways}}$$

2 or 3 → magnitude 2000 to 4000

total 8 values so 2 way

$\boxed{200 \text{ ways}}$

How many 4 digit palindromic nos. are there?



edukuna munadi we penn  
nos dha engum enkannu  
to form abba  
so  $\Rightarrow 9 \times 10 = 90$  ways

How many 5 digit palindromic even nos. are there



0, 1, 2, 3, 4, 5, 6, 7, 8, 9

with repetition 0 also allowed

O excluded

& 2, 4, 6, 8 last 1 or vanchi dha even nos so

Front 1 am 4 ways dha

$$4 \times 10 \times 10 = 400 \text{ ways}$$

How many ways 5 prizes (1, 2, 3, 4, 5) can be given to 5 girls (A, B, C, D, E) such that each girl gets a prize.

Ans

5 prize & 5 girls na

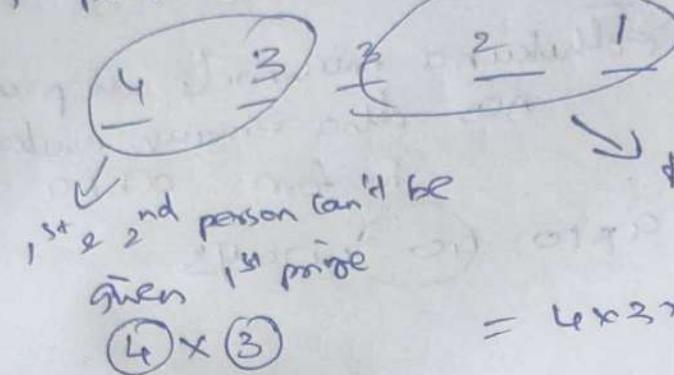
$$5! = 120 \text{ ways}$$

How many ways 5 boys stand in row

$$5! = 120 \text{ ways}$$

how many ways 5 prize given to 5 girls when

1<sup>st</sup> prize can't be given to Girl A or B



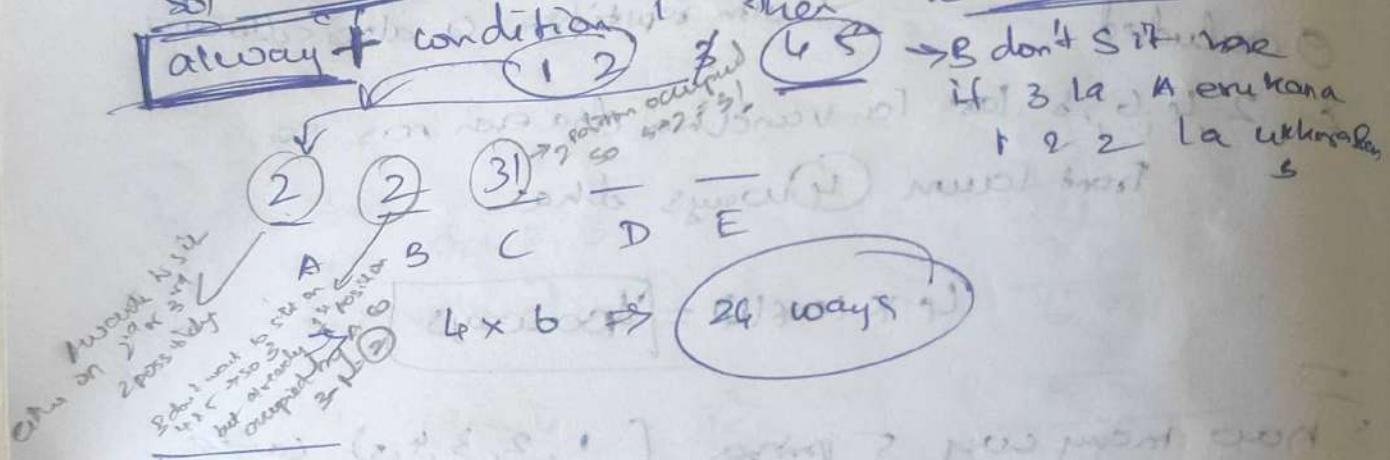
$$\begin{array}{r} 3 \\ 1 \\ 4 \\ \hline 72 \end{array}$$

they can have 1<sup>st</sup> prize  
so +1

$$= 4 \times 3 \times 3 \times 2 \times 1 = 72$$

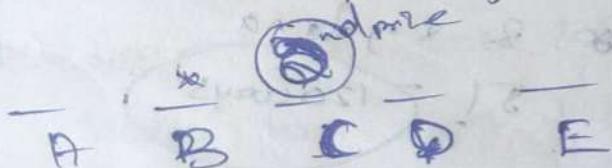
5 chairs A want to sit on either 2<sup>nd</sup> or 3<sup>rd</sup>  
Chair, B doesn't want to sit in 4<sup>th</sup> or 5<sup>th</sup> chair.

Sol always + condition 1<sup>st</sup> then 1<sup>st</sup> Gataha.



5 prizes 5 girls

Girls 1<sup>st</sup> prize can't be given to Girls A or B  
2<sup>nd</sup> prize given to C



C = 1  $\Rightarrow$  2<sup>nd</sup>  $\Rightarrow$  1 ways  $\Rightarrow$  C has 1 way due  
1<sup>st</sup>  $\Rightarrow$  D & E  $\Rightarrow$  2 ways  $\Rightarrow$  1<sup>st</sup> prize can give to  
3<sup>rd</sup> prizes  $\Rightarrow$  3 ways

C has 1 way due

A & B & C is occupied  
so D & E  $\Rightarrow$  2 ways

After 3 prizes left  
3 Girls left  
so  $\Rightarrow$  3 ways

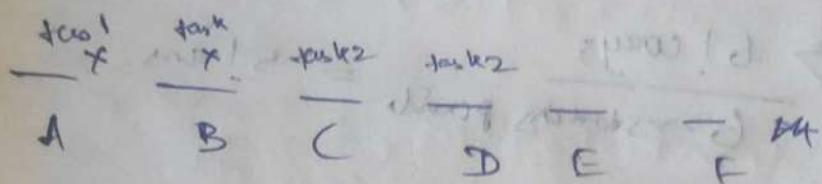
$$= 1 \times 2 \times 3, \\ = 2 \times 6 = 12$$

6 task & 6 person

-task 1 → can't be assigned to either person 1 or 2

task 2 → can't be assigned to person 3 or 4

Every person is to be assigned 1 task  
How many ways?



task 2 → 2 ways

task 1 → A & B, 1a podakurdaalhu & (C 2D) la 1 place  
because task 2 edukkum  
Doin, so 3 ways

remaining 4 tasks & 4 person

$$= 144 \text{ ways}$$

$$\text{no. of ways} = 2 \times 3 \times 4!$$

$$= 6 \times 24$$

$$\begin{array}{r} 2 \\ 24 \\ 6 \\ \hline 144 \end{array}$$

= 144 ways

If u have 5 rings & 3 fingers  $\Rightarrow 3^5 = 243$

If u have 3 rings & 5 fingers  $= 5^3 = 125$

12 & 3 top 112 ways

total task & other ways 125

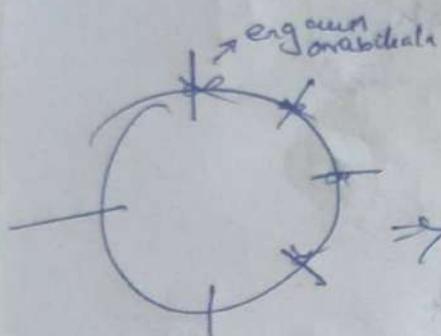
3 & 5 top 125

$$12 \times 125 = 1500$$

Six managers, 1 chair, circular table

No. of arrangement = ?

⇒ Circular arrangement =  $(n-1)!$



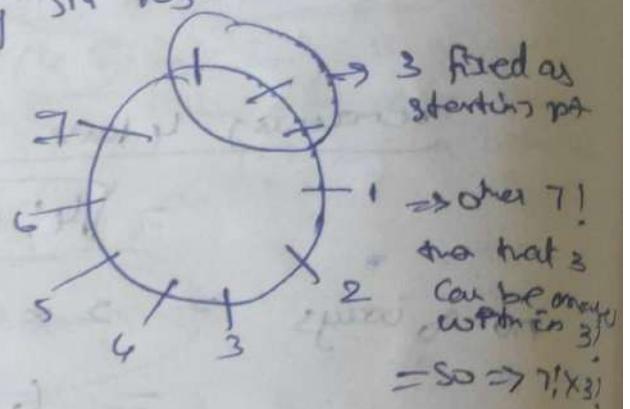
$$= (6-1)!$$

$$= 5! = 120 \text{ ways}$$

$$\Rightarrow \frac{6! \text{ ways}}{6 \rightarrow \text{starting point}} = 5! \text{ ans}$$

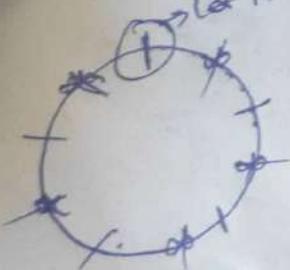
=  
How many ways 10 sit state around circular  
table so 3 sit already sit together.

$$\Rightarrow [7! \cdot 3!]$$



=  
How many way 5 African & 5 Indian can be  
seated along circular table, so they occupy  
alternate positions.  
Let it be Indian

if Indian mean  
 $5! \times 5! \times 2!$



$$= [4! \times 5! \times 2!]$$



20 members - Circular arrangement, 3 member always occurs together

$$= 17! \cdot 3!$$

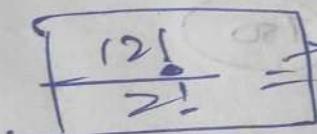


= 21 student in workshops ranking  
if student ranked 1 to 12, how many way can they choose & if  
1)  $A > B$   
2)  $A > B > C > D$

A is greater than B

if it is not given padding A menadi enke the afro padidi enke.

Enga epo cut aenun  $\frac{1}{2}$  so



given

$$\frac{12!}{4!}$$

$A > B > C > D$

3 digit nos formed from 1 to 14 if  $H > T > D$  without repetition

$$\frac{9}{8} \frac{8}{7} \frac{7}{6} \rightarrow$$

$$\frac{9 \times 8 \times 7}{3!}$$

ans

no. of ways 7 heads string into necklace?

Hint

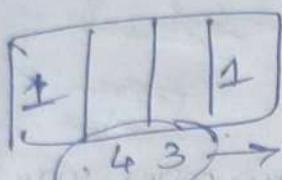
When it comes to necklace, keychain etc - you divide by

2! because they are standard  
can't move start & end pt.

Sol

$$\frac{7!}{2!}$$

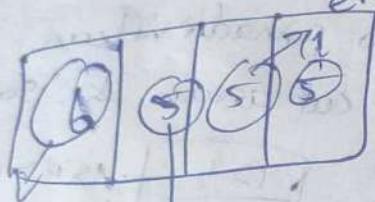
flag having 4 vertical strips. It can be painted with 6 colours, if two colours are blue & white.



$$6 \times 6 \rightarrow \text{without repetition} \Rightarrow 6 \times 5 = 30 \text{ ways}$$

$$6 \times 6 \rightarrow \text{with repetition} \Rightarrow 6 \times 6 = 36 \text{ ways}$$

flag having 4 vertical strips, it can be painted with 6 colours. If no two same colours are adjacent to each other.



$$\Rightarrow 6 \times 5 \times 5 = 150$$

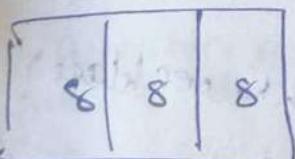
$$\frac{12}{6} = 2$$

$$= 125 \times 6$$

$$= 750$$

All colour  
menadie enukudathu  
palkkuda enukudathu

In how many ways 8 prizes can be given to 3 boys, if all boys are equally eligible of getting a prize.



$$\Rightarrow 8^3 = 512 \text{ ways}$$

No. of ways a group of 2 men & 4 women be made out of total 6 men & 7 women

$$4C_2 \times 7C_4$$

$$\Rightarrow \frac{4!}{2! 2!} \times \frac{7!}{4! 3!}$$

$${}^nC_r = \frac{n!}{(n-r)! r!}$$

$$= 6 \times 35 = 210$$

${}^nC_r$  = expand till  $r$  times eg if  $n=7$  then expand till  $r=3$  then put  $r!$

$\checkmark$

~~8 men & 7 women~~

There are 15 persons in group. They handshake,  
Find no. of handshake.

$$= \frac{15}{2} C_2 = \frac{15!}{2!13!} = \frac{15 \times 14 \times 13!}{2 \times 13!} = \frac{15 \times 14}{2} = \frac{105}{1}$$

$\boxed{105}$  ways

In party total handshake =  $\boxed{120}$  handshake.

If person hand shake with every other person, find  
no. of persons.

$$n C_2 = 120 \Rightarrow \frac{n!}{2!(n-2)!} = 120$$

$$\Rightarrow n! = 240 \times (n-2)!$$

~~$n = 240$~~

$$n \times (n-1) \times (n-2)! = 240 \times (n-2)!$$

$$n \times (n-1) = 240$$

$$n^2 - n = 240$$

$$n^2 - n - 240 = 0$$

$\begin{array}{r} -240 \\ -1 \\ \hline 16 \end{array}$

$$\begin{array}{r} 2 | 240 \\ 2 | 120 \\ 2 | 60 \\ 2 | 30 \\ 3 | 15 \\ 5 | 5 \end{array}$$

$$(n-1)(n+1),$$

$$\Rightarrow n=16 \quad n=-15$$

No. of people is  $\boxed{16}$  people

~~$3 \rightarrow 8 \times 2 \times 8$~~

There are 8 men & 7 women. In how many ways groups of 5 people can be made, such that at least 3 men are there in group?

Sol

$$\begin{aligned} & \left( {}^8C_3 \times {}^7C_2 \right) + \left( {}^8C_4 \times {}^7C_1 \right) + \left( {}^8C_5 \times {}^7C_0 \right) \\ & \Rightarrow \left( \frac{8!}{5!3!} \times \frac{7!}{5!2!} \right) + \left( \frac{8!}{4!4!} \times \frac{7!}{1!6!} \right) + \left( \frac{8!}{5!3!} \times \frac{7!}{0!7!} \right) \\ & \Rightarrow \left( \frac{8 \times 7 \times 6 \times 5 \times 4!}{5!3!2!} \times \frac{7 \times 6 \times 5!}{4!2!} \right) + \left( \frac{8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{4!4!3!2!1!} \times \frac{7 \times 6 \times 5!}{3!5!} \right) \\ & \quad + \left( \frac{8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{5!3!2!1!} \times \frac{7 \times 6 \times 5!}{0!7!} \right) \\ & \Rightarrow (56 \times 21) + (70 \times 7) + (8) \\ & \Rightarrow 1176 + 490 + 8 \\ & = 1674 \quad \text{Ans} \\ & \quad 1722 \quad \text{Cross out} \end{aligned}$$

$$\begin{array}{r} 1 \\ \frac{56}{21} \\ \frac{112}{1176} \\ \frac{490}{490} \\ \hline 1674 \end{array}$$

Indian Cricket team has 16 players. It includes 2 wicket keepers & 5 bowlers. In how many ways can Cricket team of 11 members be formed if we have selected

1 wicket keeper & at least 4 bowlers?

Sol

16 - (2 wicket keeper) - 5 bowlers = 9 cricket players

Team will win  $\times$       2nd team to final  $\oplus$

$$\begin{aligned} & \left( {}^2C_1 \times {}^5C_4 \times {}^9C_6 \right) + \left( {}^2C_1 \times {}^5C_5 \times {}^9C_5 \right) \\ & \Rightarrow \left( 2 \times 5 \times \frac{9 \times 8 \times 7 \times 6 \times 5!}{5! \times 3 \times 2 \times 1} \right) + \left( 2 \times 1 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 \right) \\ & = (0 \times 84) + (2 \times 126) \Rightarrow 840 + 252 = 1092 \end{aligned}$$

Suppose 7 stu stay in half allotted 7 beds.

Anju doesn't want bed ~~near~~ next to Anju because

Anju snores. Then how many ways,

easy

$$\left\{ \begin{array}{l} {}^5C_4 = {}^5C_1 \\ {}^{10}C_8 = {}^{10}C_2 \end{array} \right.$$

Total 15 stu  
10 are boys  
5 girls.

Group of 4 stu. to be formed. In how many ways  
group can be formed, seen next (at least 1 girl).

$$\begin{aligned} & \left( {}^5C_1 \times {}^{10}C_3 \right) + \left( {}^5C_2 \times {}^{10}C_2 \right) + \left( {}^5C_3 \times {}^{10}C_1 \right) \\ & + \left( {}^5C_4 \times {}^{10}C_0 \right) \\ \Rightarrow & \left( \frac{5 \times 4!}{4! \times 1!} \times \frac{10 \times 9 \times 8 \times 7!}{8! \times 2! \times 1!} \right) + \left( \frac{5 \times 4! \times 3!}{3! \times 2! \times 1!} \times \frac{10 \times 9 \times 8!}{8! \times 2!} \right) \\ & + \left( \frac{5 \times 4! \times 3!}{3! \times 2!} \times \frac{10 \times 9!}{9! \times 1!} \right) + \left( \frac{5 \times 4!}{4! \times 1!} \times \frac{10!}{10!} \right) \end{aligned}$$

⇒ 1155 ways

Committed 5 members to be formed out of 6 men & 5 women

i) atleast 1 woman

$$\binom{5C_1 \times 4C_4}{1} + \binom{5C_2 \times 4C_3}{2} + \binom{5C_3 \times 4C_2}{3} \\ + \binom{5C_4 \times 4C_1}{4} + \binom{5C_5 \times 4C_0}{5}$$

$$\Rightarrow \binom{5 \times 1}{1} + \binom{\binom{5 \times 4}{2} \times \frac{4}{2}}{2} + \binom{5^4 \times 4 \times 3}{3} \\ + \binom{5 \times 4}{4} + \binom{1 \times 1}{1}$$

$$\Rightarrow 5 + 80 + 240 + 20 + 1$$

$$\Rightarrow \boxed{346} \text{ ways} \quad \boxed{346}$$

Find no. of intersection pt in 12 straight lines

Set

We need 2 lines to form intersect so

$$12C_2 \Rightarrow \frac{12 \times 11}{2} = 66$$

$1 \text{ line} = 0$ $2 \text{ lines} = 1$ $3 \text{ lines} = 3$ $4 \text{ lines} = 6$	$4C_2 = \frac{4 \times 3}{2} = 6$	$\frac{12}{1} = 12$ $\frac{12}{2} = 6$ $\frac{12}{3} = 4$ $\frac{12}{4} = 3$
---	-----------------------------------	---

For no. of intersect pt in 9 circles:

$$= 2 \text{ circle} = 2 \text{ pts}$$

$$= 3 \text{ circle} = 6 \text{ pts}$$

$$1 \text{ circle} = 0 \\ 2 \text{ circle} = 2 \\ 3 \text{ circle} = 6 \\ 4 \text{ circle} = 12$$

thus is 2 times the lines

$$9C_2 \times 2$$

$$\rightarrow \frac{9 \times 8}{2 \times 1} \times 2 \rightarrow 36 \times 2$$

$$\Rightarrow \boxed{72} \text{ ways}$$

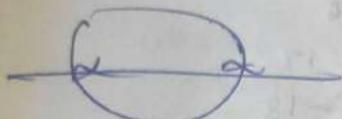
Find max no. of intersect pt of 12 curves &

15 straight line

pt is straight line

$$1 \text{ line} = 15C_2 = 105 \quad \text{incident manenat}$$

$$1 \text{ pt in Circle} = 12C_2 = 132$$



$$15C_1 \times 12C_1 \times 2 = 15 \times 12 \times 2 \\ = 360$$

$$105 + 132 + 360$$

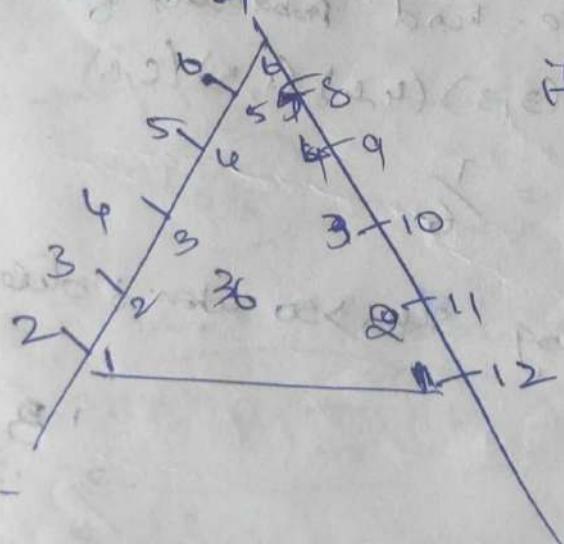
$$\textcircled{597}$$

$$\begin{array}{r} 1 \\ 2 \\ 15 \\ 24 \\ \hline 60 \\ 30 \\ \hline 360 \\ 132 \\ \hline 105 \\ \hline 597 \end{array}$$

## Probability

### 2Dile

$$(2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)$$

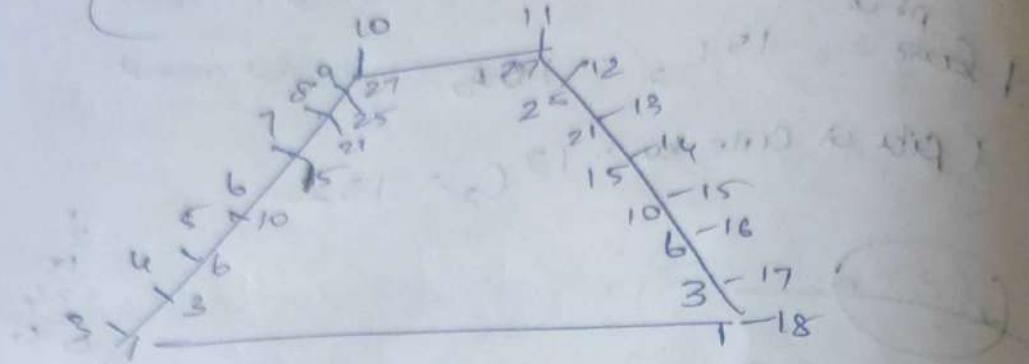


If sum 2 varadu evalona

$$\frac{2}{36}$$

$$\text{sum 3 na} = \frac{3}{36}$$

(3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18)



Find probability, sum is a prime no. & less than 8 when 2 dice are thrown simultaneously

$$2, 3, 5 \text{ & } 7 \rightarrow \text{prime no less than 8}$$

$$\frac{1}{36}, \frac{2}{36}, \frac{3}{36}, \frac{4}{36}$$

$$\frac{1+2+4+6}{36} = \frac{13}{36}$$

In single throw 2 dice. Find probability of doublet

(1,1) (2,2) (3,3) (4,4) (5,5) (6,6)

$$= \frac{6}{36} = \frac{1}{6}$$

What probability of getting sum > 50 when 3 dice are thrown

$$\text{For odd, even} = \frac{1}{2}$$

135

$$\frac{3}{6} \cdot \frac{2}{6}$$

$$= \frac{1}{2} \times \frac{1}{3} \Rightarrow \frac{1}{6}$$

find probability of 1 head when 2 coins are tossed simultaneously

Q:

if 5 coins tossed & we need 3 heads

then

$$\frac{5!}{3! \cdot 2!}$$

we need  
3 head

$$\left(\frac{1}{2}\right)^5$$

$$\left(\frac{1}{2}\right)^5 \rightarrow 5 \text{ times need}$$

$$\left(\frac{1}{2}\right)^2 \rightarrow \text{probability of getting head}$$

2 head  
comprimo

$$\Rightarrow \frac{5! \times 2^2 \times 3!}{3! \cdot 2!} \left(\frac{1}{2}\right)^5$$

$$\Rightarrow 10 \left[\frac{1}{2}\right] \Rightarrow \boxed{\left(\frac{10}{32}\right)} \rightarrow$$

$$\Rightarrow 2^2 \times \frac{1}{2}$$

4 coins tossed, find probability of no heads

$$4^2 \Rightarrow 16 \rightarrow \text{total part}$$

1 → TTTT → no head

$$=\frac{1}{16}$$

4 coin tossed, probability of exactly 2 tails

HHHT, TTHH → 2 ways

$$= 4^2 - 16 \Rightarrow \frac{2}{16} = \frac{1}{8}$$

$$\frac{4!}{2! \cdot 2!} \left[\frac{1}{2}\right]^4 \Rightarrow \frac{4 \times 3 \times 2!}{2 \times 2!} \left[\frac{1}{2}\right]^4$$

$$\Rightarrow 6 \left[\frac{1}{16}\right]$$

When 5 coin tossed, what is probability exactly 4 heads

$$HHHHTT, HTHTHH \rightarrow 2$$

$$b_1^2 = 36$$

$$= \frac{2}{36} = \frac{1}{18}$$

5 coin, i) at least 3 head

ii) at most 3 heads

$$5^2 = 25$$

at least 3 head

at least 3 head

$\frac{7}{25}$  ~~we before part formula~~

$H_3 T_2 + H_4 T_1 H_1$   
HHHTT  
HTTHHH  
HHHHHT  
THHHHH  
HHHHHT

at least 3 heads

$$\frac{5!}{3!2!} + \frac{5!}{4!1!} + \frac{5!}{5!0!} = 15$$

word "SOCIETY" are placed in row. what is probability that 3 vowels come together.

$$\begin{matrix} O & I & E \\ \text{total} \\ = 5! \\ \text{within them} \\ = 3! \end{matrix}$$

$$\begin{matrix} - & - & - & - \\ !! & & & 4! \\ \text{total} = 5! \\ 4! \end{matrix}$$

$\rightarrow$  in probability we need to put total denominator

$$= \frac{5!6}{7!} = \frac{6!}{7!} = \frac{6!5!}{7 \times 6!} = \frac{1}{7}$$

$$Boy = 0.82$$

$$Girl = 0.68$$

what is probability of having  
2 girls

B

6

$$\frac{52}{100}$$

$$\frac{48}{100}$$

$$= \frac{48}{100} \times \frac{48}{100}$$

$$= \frac{12}{25} \times \frac{12}{25} =$$

$$\frac{144}{625}$$

In exam

$$A \text{ pass} = \frac{1}{7} = 14\%$$

$$B \text{ pass} = \frac{2}{9} = 21\%$$

what is probability of both getting pass

$$= \frac{1}{7} \times \frac{2}{9} = \frac{2}{63}$$

$$\text{Husband pass} = \frac{1}{7}$$

$$\text{Wife pass} = \frac{1}{5}$$

Prob man only 1 selected

$$\frac{4}{7}$$
  
$$\frac{4}{5}$$

~~Husband~~  
select

$$\frac{1}{7}$$
  
$$\frac{1}{5}$$

not select

$$\frac{6}{7}$$
  
$$\frac{4}{5}$$

at least 1 selected

$$1 - \left( \frac{6}{7} \times \frac{4}{5} \right)$$

$$= 1 - \frac{24}{35}$$

$$= \frac{11}{35}$$

$$= \frac{1}{7} \times \frac{4}{5} + \frac{6}{7} \times \frac{1}{5} = \frac{10}{35}$$

only 1 person selected.

1. Father-in-law  
brother of son of B's son. Then how is A related to B?

A. Grandson

B. Sister  
C. Cousin  
D. Mother

E. Aunt

2. Pointing to a lady in photograph, Rajini said 'Her son's father is the son-in-law of my mother'. How is Rajini related to the lady?  
A. Brother  
B. Uncle  
C. Father  
D. None

$$\text{both selected} = \frac{1}{7} \times \frac{1}{5} + \frac{1}{35}$$

$$\text{none selected} = \frac{6}{7} \times \frac{4}{5} = \frac{24}{35}$$

Urn contains 6 red, 5 blue, 2 green marbles,  
if 2 taken, probability of both are red.

$$P(\text{2 red}) = \frac{21}{26} \times \left[ \frac{6}{13} \times \frac{5}{12} \right] \rightarrow \text{reduce } 6-1 \rightarrow \frac{5}{26}$$

1st draw 1 red ball drawn probability  
2nd draw 1 red ball drawn probability

$$(Q) \rightarrow \text{order does not matter if replacement is done}$$

$$\frac{6C_2}{13C_2} = \frac{6 \times 5}{\cancel{2}} = \frac{6 \times 5}{\cancel{13} \times \cancel{12} \cancel{2}} = \frac{6 \times 5}{12 \times 11} = \frac{5}{22}$$

bag contains 12 white & 18 black balls,  
box contains 5 red, 4 green, 6 black balls.

3 balls taken. Find probability all are red color?

$$\frac{3!}{3!} \left[ \frac{5}{18} \times \frac{4}{17} \right] * \frac{3}{16} = \frac{1}{3} \times \frac{21}{13} = \frac{21}{39} = \frac{7}{13}$$

$$(Q) \rightarrow \frac{5C_3}{15C_3} = \frac{5 \times 4}{15 \times 14} = \frac{20}{105} = \frac{4}{21}$$

$$\frac{5C_3}{15C_3} = \frac{5 \times 4}{15 \times 14} = \frac{5 \times 4}{105} = \frac{2}{21}$$

box contains 5 red, 4 green, 6 black balls.

3 ball taken none is red

NO 1

$$= \frac{10C_3}{15C_3}$$

$$\frac{10 \times 9 \times 8}{3 \times 2} = \frac{720}{30}$$

$$= \frac{10 \times 9 \times 8}{15 \times 14 \times 13}$$

$$\frac{15!}{7!3!}$$

$$= \frac{24}{91}$$

$$\frac{24}{91} F$$

Same above qn

Probabilities of 1 ball red & 2 balls green.

$$\frac{5C_1 \times 4C_2}{15C_3}$$

$$\frac{35}{13} \frac{13}{105} \frac{105}{35} \frac{35}{455}$$

Same atleast 1 ball ball red

$$\frac{C_1 + C_2 + C_3}{15C_3}$$

$$\frac{5C_1 \times 5C_2 \times 5C_3}{15C_3}$$

$$= \frac{5+10+10}{455} = \frac{28}{455} = \frac{5}{91}$$

$$\frac{\frac{5}{1} \times \frac{5 \times 4}{2} \times \frac{5 \times 4 \times 3}{3 \times 2}}{15 \times 14 \times 13}$$

$$= \frac{5 \times 2 \times 5 \times 4}{7 \times 13} = \frac{200}{91}$$

$$\frac{5 \times 5 \times 2 \times 5 \times 2}{15 \times 14 \times 13} = \frac{50}{273}$$

$$= \frac{5C_1 + 5C_2 + 5C_3}{15C_3}$$

$$= \frac{5 + (5 \times 4) + (5 \times 4 \times 3)}{910} = \frac{65}{910}$$

he bet 6 times, if he bet with half money he have always  
 if he bet with half money he have always  
 If with he gets 2 times bet  
 If loss 11 losses that bet and

$$\frac{64}{2} = \textcircled{32} \rightarrow 1^{\text{st}} \text{ bet loss}$$

$$= \textcircled{16} \rightarrow 2^{\text{nd}} \text{ bet loss}$$

$$= \textcircled{8} \rightarrow 3^{\text{rd}} \text{ bet loss}$$

$$= \textcircled{4} \rightarrow 4^{\text{th}} \text{ win}$$

$$= \textcircled{2} \rightarrow 5^{\text{th}} \text{ win}$$

$$= \textcircled{1} \rightarrow 6^{\text{th}} \text{ win}$$

$\rightarrow$  he left with.

~~Bag contains 1 to 100~~

G : B

bags 21 sum

S : 2

15 : 6 bags

$$7P = 21$$

$$\begin{array}{r} 7 \\ \times 1 \\ \hline 7 \end{array}$$

$$6C_1 \times 15C_2$$

$$\Rightarrow \frac{6}{1} \times \frac{15 \times 14}{2} \Rightarrow \textcircled{630}$$

$$21C_3 \Rightarrow \frac{21 \times 20 \times 19}{3 \times 2} = 70 \times 19$$

$$= \frac{630}{1339}$$

Probability

$$\begin{array}{r} 70 \\ 19 \\ \hline 539 \\ 70 \\ \hline 1339 \end{array}$$

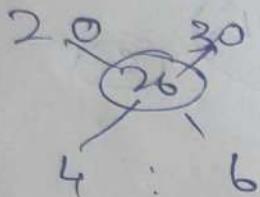
$$\begin{array}{r} 15 \\ 21 \\ \hline 105 \\ 21 \\ \hline 630 \end{array}$$

on circular arrng. 3 already sit there

(12/11) !  
3!  
 $\frac{12!}{3!} \times 3!$  ans.

### Mixture & allegation

Ex:-



$4:6$   
 $2:3$  → 2 part of 20 & 3 parts of 30  
added to get 26

Ex:-

### Class work

(2)

$$\begin{array}{ccc} 3.25 & & 3.80 \\ & \swarrow & \searrow \\ & 3.50 & \\ & \swarrow & \searrow \\ 0.30 & & 0.25 \end{array}$$

$$0.30 : 0.25$$

$$30 : 25$$

$6:5$  (b)

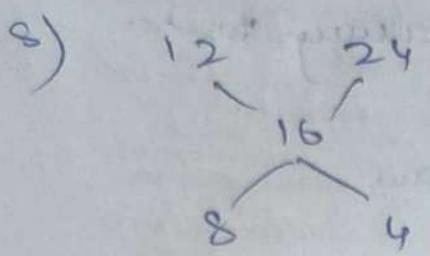
$$\begin{array}{ccc} 12.30 & & 10.30 \\ & \swarrow & \searrow \\ & 15 & \\ & \swarrow & \searrow \\ 3.30 & & 2.70 \end{array}$$

$$3.30 : 2.70$$

$$\begin{array}{ccc} 330 & & 270 \\ & \swarrow & \searrow \\ & 11:9 & \\ & \swarrow & \searrow \\ 11 & & 9 \end{array}$$

(b)

$$\begin{array}{ccc} 14 & & 17 \\ & \swarrow & \searrow \\ & 16 & \\ & \swarrow & \searrow \\ 1 & 2 & @ \end{array}$$

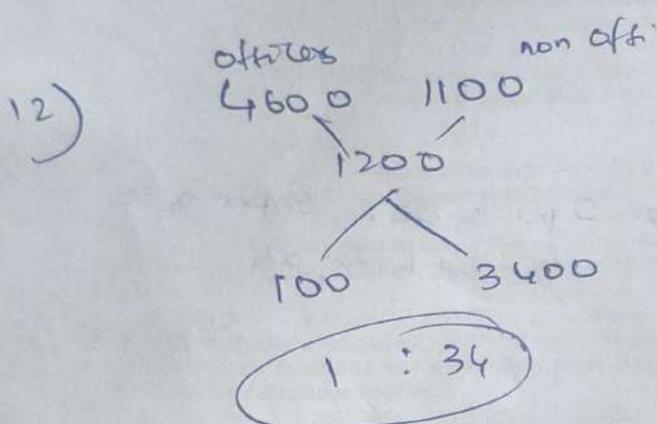


$$2 : 1$$

$$3P = 600 \Rightarrow$$

$$1P = 200$$

24 is 1 part  $\Rightarrow$  so  $200 \text{ kg}$ . C



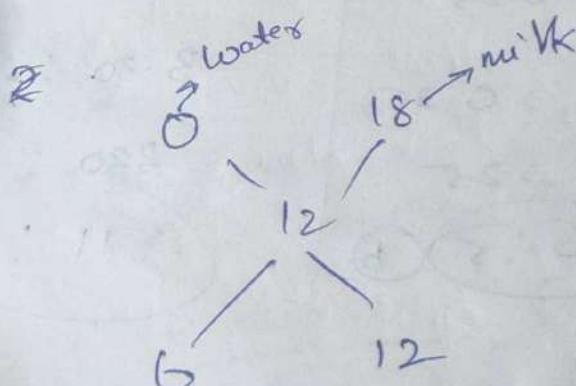
$$1 : 34$$

$$\begin{array}{r}
 2 \\
 34 \\
 \times 15 \\
 \hline
 170 \\
 34 \\
 \hline
 510
 \end{array}$$

$$1P = 15 \text{ owners}$$

$$\text{then } 34 \text{ part} = 34 \times 15$$

510 after offer



$$6 : 12$$

$$1 : 2$$

1)

$$\begin{array}{ccc}
 50 & 58 & \\
 \swarrow & \searrow & \\
 58 \cdot 30 \rightarrow \text{with profit} & & 110 = 58 \cdot 30 \\
 110 \cdot x & & 100 = x \\
 \hline
 0 \cdot 30 & 8 \cdot 30 &
 \end{array}$$

$$\begin{aligned}
 x &= \frac{58 \cdot 30 \times 100}{110} \\
 &= \frac{5830}{110} \\
 &= 53
 \end{aligned}$$

$$\begin{array}{ccc}
 50 & 58 & \\
 \swarrow & \searrow & \\
 53 & & \\
 \boxed{5 : 3} & & \\
 \hline
 & 0 & 25
 \end{array}$$

6)

$$\begin{array}{ccc}
 9 & 6 & \\
 \swarrow & \searrow & \\
 1 & 8 & \\
 \circled{1} : 2 & & \\
 \hline
 & 0 & 25
 \end{array}$$

$$\begin{aligned}
 120 &= 8 \cdot 60 \\
 100 &= x \\
 x &= \frac{8 \cdot 60 \times 100}{120} \\
 &= \frac{840}{120} \\
 &= 7
 \end{aligned}$$

Model - 2 \*

(1) 48 head, 140 legs

hens = 2 legs

Cows = 4 legs

hens

96

cows

192

$\frac{3}{4}$   
 $\frac{4}{4}$   
 $\frac{192}{140}$

$\frac{52}{52}$

$\frac{13}{13}$   
 $\frac{140}{96}$   
 $\frac{10}{44}$

$$\begin{array}{ccc}
 140 & & \\
 \swarrow & \searrow & \\
 52 & 44 & \\
 \hline
 \end{array}$$

$$24P = 48$$

$$\boxed{1P = 2}$$

$$\begin{aligned}
 \text{hens} &= 13P = 13 \times 2 \\
 &= 26 \text{ hens}
 \end{aligned}$$

$$\begin{array}{ccc}
 \circled{13} : \circled{13} & & \\
 \text{hens} & \text{cows} & \\
 \hline
 \end{array}$$

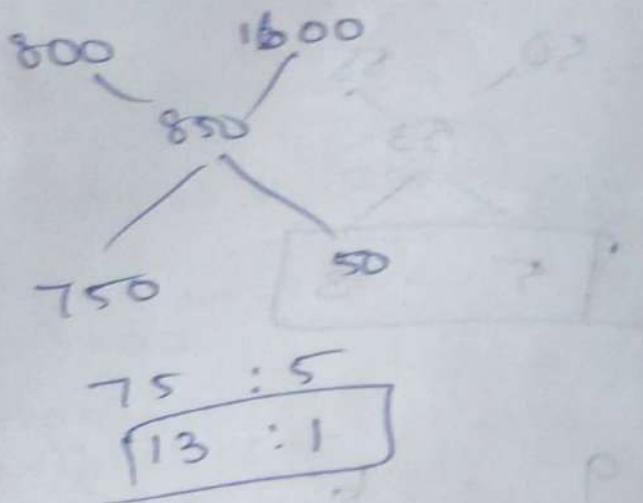
2) Total head = 600

total legs = 850

pennants = 2 legs

dears = 4 legs

take assumption of 600 as 8 parts then dears



$$14P = 400$$

$$1P = \frac{200}{14} = \frac{100}{7}$$

$$\text{No. of dears} = 1 \text{ part} = \frac{28.5}{7} = 2$$

2 dears

450 liters to milk & water

containing milk : water ratio 9 : 1

how much water should be added to  
milk to make ratio of milk & water

3 : 1

$$450, 1\text{lit}$$

$$10P = 450$$

$$1P = 45 \text{ lit}$$

$$9 : 1$$

9 : 1  $\Rightarrow$  only milk is clear

make it equal

$$3 : 1 \times 3$$

$$9 : 1$$

$$9 : 3$$

$$1P = 45 \text{ lit}$$

$$82P = 90 \text{ liters}$$

mixture is 20kg spirit & water containing 10% water

How much water to be added to make percentage

of water raise to 25% (given) & initial

$$\text{Sol} \quad \frac{10\%}{10\%} = 20 \text{ kg}$$

Spirit : water  $\frac{10\%}{10\%} = 2 \text{ kg}$  given 90% but spirit is 90%.

$$9 : 1$$

$$9 : 1$$

$$9 : 3 \rightarrow \text{new ratio}$$

diff is (2)  $\rightarrow$  part required

we know 1 part = 2kg

then 2 part =  $2 \times 2$

= 4kg water to be added

to make 10% to 25%

mixture of 45kg contains spirit & water

water is 20% how much water to be added  
to make it 25% water

Sol

water 20% na spirit 80%.

Spirit : water

$$80 : 20$$

$$sp = 45 \text{ kg}$$

$$1\% = 9 \text{ kg}$$

$$4 : 1$$

100% 25%  $\rightarrow$  new

same

$$3 : 1$$

doubt

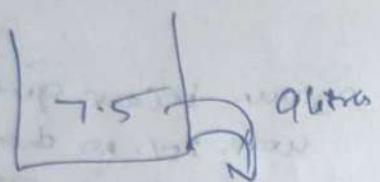
we need to calculate for this since  
 $12+3=15$   $15 \times 3 = 45$  ans

$$x 4 \Rightarrow 12 : 4$$

so 9 kg water should be added to mixture to make it 20% water to 25%

Ratio of milk & water  $7:5$

When a litre of water drawn off & filled with B(water), new ratio  $6:1$   
find total quantity of mixture



A : B

7 : 5

1 : 1

new ratio

1 : 7 : 5

other wise

$\times 2 \rightarrow 7 : 7$

1 : 7 : 5

$\underline{7 : 7}$

total part we need.

$16 P = 14 \times 6.5$

$= 91$  litres

$2 P = 91$  litres

$1 P = 4.5$  litres

$= 63$  litres

new mixture

Corn contain A:B = 7:5

when 9 litre taken out & filled with B

new ratio  $\Rightarrow 7:9$ . How many litres of  
A was contain by can initially?

A:B = 7 : 5

7 : 9 (differs)

$4 P = 9$  litre

$1 P = \frac{9}{4}$  litre

$1 P = \frac{9}{4}$

$7 P = \frac{9}{4} \times 7$

$= \frac{63}{4}$

$= 15.75$

$\frac{63}{4}$

$= 15.75$

$\frac{63}{4}$

$= 15.75$

$\frac{63}{4}$

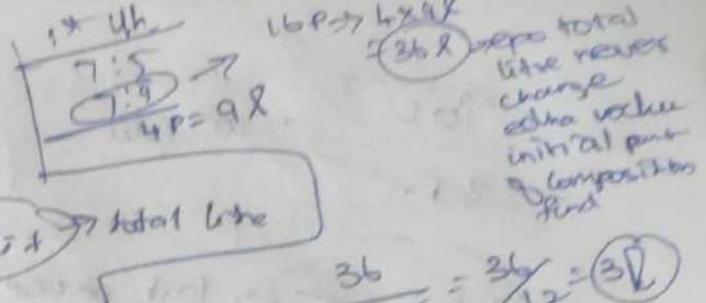
Old ratio of a mix(A) envato

$7 \times 9 = 63$

$= 15.75 \Rightarrow A$  mix initially

$= 15.75 \Rightarrow A$  mix initially

$$7+5=12 \text{ part}$$



reps total  
litre never  
change  
extra volume  
initial part  
composition  
find

$$4 \text{ parts} \rightarrow 98 \text{ lit}$$

$$16 \text{ part} = 36 \text{ lit} \rightarrow \text{total litre}$$

$$\text{Munadi } 7:5 = 7+5 = 12 \text{ part}$$

$$12 P = 36$$

$$1 P = 3$$

$$36 = \frac{36}{12} = 3 \text{ L}$$

$$7 P = 7 \times 3 = 21 \text{ lit A}$$

initially,

$$\text{milk Oda initial ratio} = 7P$$

$$\Rightarrow 7 \times 3 = 21 \text{ litres}$$

### Model 1 3

1) 90 litre petrol, 9 litres

taken out & replace by kerosene  $\Rightarrow 165.61 \text{ lit petrol}$

done 2 more time (3 times)

So  
Ans:

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

2 more time nu qn la  
baandha 3 times nu  
meanin

$$= 65.61 \text{ lit petrol remaining.}$$

3) ~~80~~

milk 1<sup>st</sup> is 30 lit

6 litre taken & filled with water

process repeat 3 times

$$\frac{6}{30} = \frac{1}{5} \Rightarrow 20\%$$

$$30 \times \frac{80}{100} \times \frac{80}{100} \times \frac{80}{100}$$

$$= \frac{30 \times 8 \times 8 \times 8}{100} = 15.36 \text{ litres}$$

$$\begin{array}{l}
 \text{90L} \rightarrow 110 \text{ after} \\
 81 \\
 16: 65 \rightarrow \text{last part} \\
 16: 81 \rightarrow \text{done 4 times} \\
 \hline
 16 : 81 \\
 2 : 3 \\
 \text{left. 1 part} = 8.6+ \\
 \text{max 3 part} = 24.6+
 \end{array}$$

### Deadlock

	Total Resource	
1) Tape Drives = 12	Max Needs	Current Allocated
P0	10	5
P1	4	2
P2	9	2

$\rightarrow 5 + 2 + 2 = 9$   
 Tape Drive - 9  
 $= 12 - 9$   
 $= 3$

P0 kueni 5 resource venu so leave

P1 kui 2 dha venu so nema koi 3 ka execute  
 so allocate it so edhu  
 finish avenir

Process finish avenir ka yes release  
 again

then go to P0  $\rightarrow$  5 vacuum  $\rightarrow$  3  $\rightarrow$  balance 2

again do  $\rightarrow$  so P0 full

Go to P2  $\rightarrow$  we need

$$7 \rightarrow 3 \text{ allocated } 7 - 3 = 4$$

$$4 - 3 = 1 \rightarrow \cancel{P=1-3} = \text{finished}$$

## Banker's algorithm (safe sequence)

3 resource type

A (10 units), B (5 units) & C (3 units)

	Allocation	Max	Availability
	ABL	ABC	ABC
P0	0 10	7 5 3 743 need	(3 3 2) → extra available we can a process complete again
P1	2 0 0	3 2 2 122 need	1 0 0
P2	3 0 2	9 0 2 600 need	
P3	2 1 1	2 2 2 011 need	
P4	0 0 2	4 3 3 431 need	

$$A = (0 + 2 + 3 + 2 + 0 + ) \text{ available } (3) = 10$$

$$B = 1 + 0 + 0 + 1 + 0 + 2 \Rightarrow 5$$

$$C = 0 + 0 + 2 + 1 + 2 + 2 \Rightarrow 7$$

order of completeness:

(P1, P3, P4, P0, P2)

(3 2 2) at P1 allocate pone it need 122

P1 finish and due 200 release so add  
~~offer~~ with 332 = (532) available

Offer P1 complete = (532) des available

Check edmu ku allocate panna process finish over  
 $532 > 011$

P3 → require (0 1 1) → so allocate offer it

release (2 1 1) → of allocated res of P3

$$\text{so } 532 + 211 = 743 \quad \frac{532}{211} \quad \frac{743}{743}$$

P4 → ~~offer~~ 431 < 743 allocate then release

$$002 \rightarrow 50 \text{ add } 002 + 743 \\ = 745$$

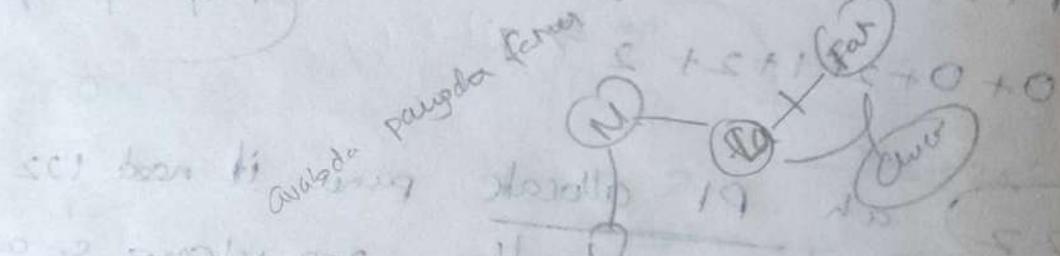
allocate to P0 → 745 > 43 → after flush

$$17 release 010 \Rightarrow 745 + 10 = 755$$

Ex: P1 Request (1, 0, 2)

	Allocation	Need	Available
	ABC	ABC	ABC
P0	010	743	230
P1	302	600	334
P2	302	011	010
P3	211	431	07
P4	002	1652	005
		1652	59

	Allocation			Max	
	x	y	z	x	
P0	0	0	1	8	
P1	3	2	0	6	2
P2	2	1	1	3	0
				115	27
				600	19



REDC stigma 19 19

not seen

seen 10 06 110 110 88

per 110 + 110 02

not seen 100 00 00 00 00

110 110 110 110 110

110 110 110 110 110

## Blood relation

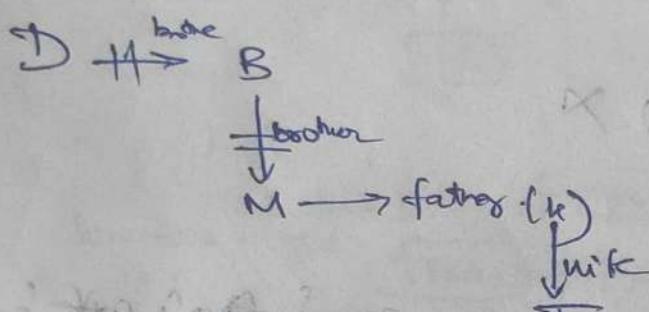
Paternal - mother side

Paternal - father side

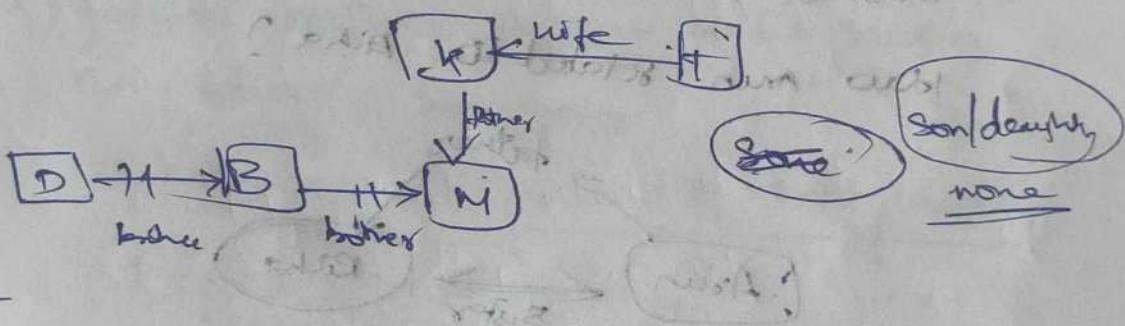
Nephew - name brother/sister's son

Niece - " " " daughter

Cousin - name father/mother's brother/sister  
son/daughter



Draw like tree

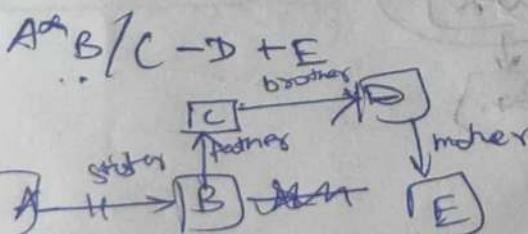


P+Q  $\rightarrow$  P  $\xrightarrow{\text{sister}}$  G

P/k  $\rightarrow$  P father  $\xrightarrow{\text{sister}}$  G

P+Q  $\rightarrow$  P mother  $\xrightarrow{\text{sister}}$  G

P-G  $\rightarrow$  P brother  $\xrightarrow{\text{sister}}$  Q



A is E's Grandparent

Q 1<sup>st</sup> → see Gender

2<sup>nd</sup> → see Generation gap

A is aunt to E → where 1 generation gap

first see Gender

then

a) A-B+C [D+E X]

o o o  
A or B / C + D-E

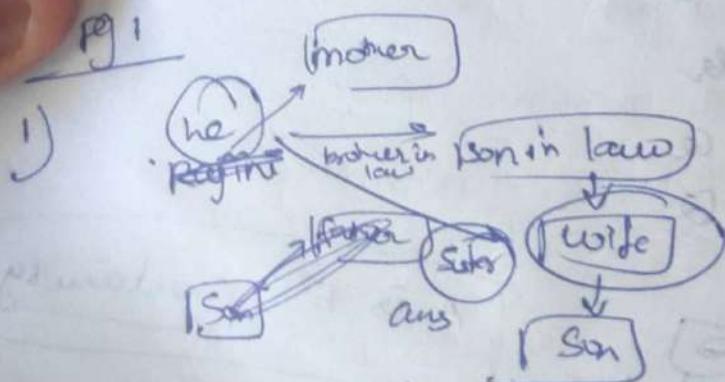
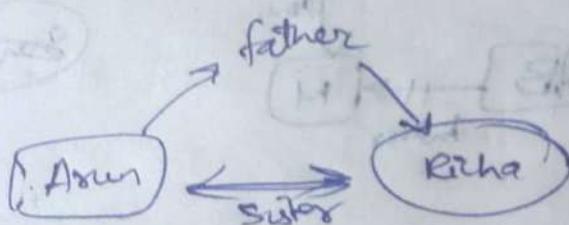
c) A/B+C+D-E X

D A+B-C+D/E  
1 0 0 1 ② X

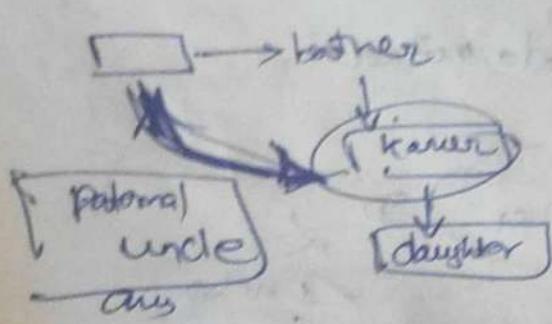
then see generation gap  
for B & D

3) Richa is only daughter of Arun's father's wife's  
mother in law's daughter i.e. only brother.

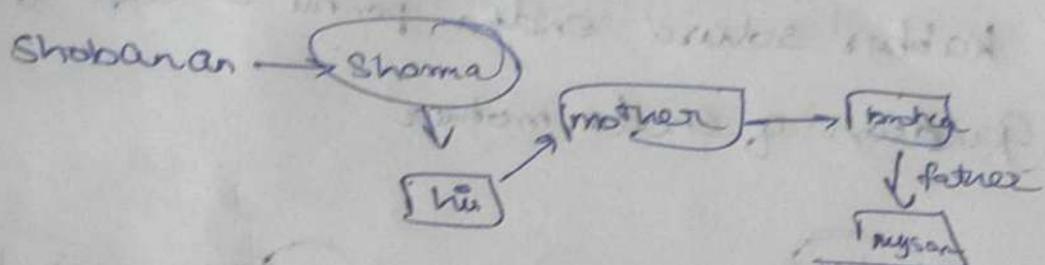
How are they related to Richa?



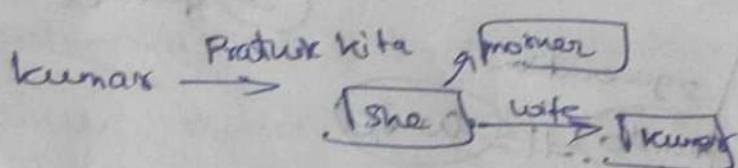
Rajni is brother of lady



3)



4)

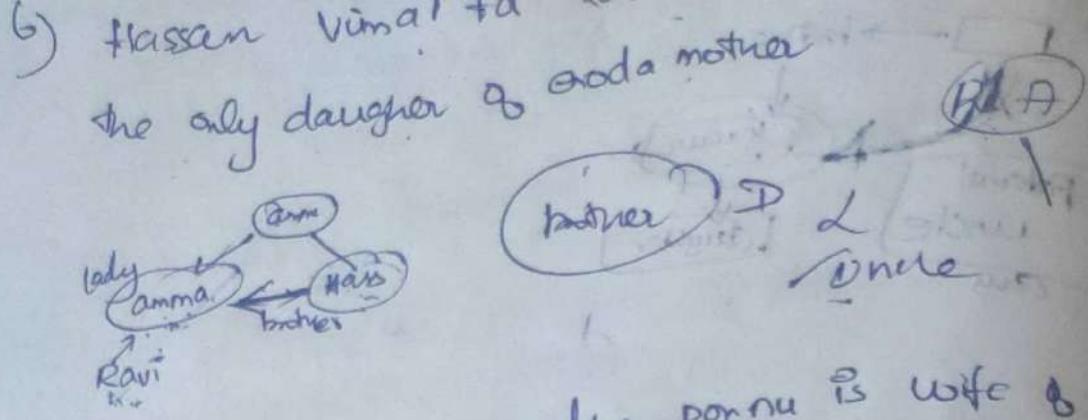


kumar, pratikrita oru lady ah kabi  
 eva gathha mother of my wife's daughter  
 nu svara ~~so evaga~~  
 so kumar ~~is~~ husband of that lady  
 (d) Ans none

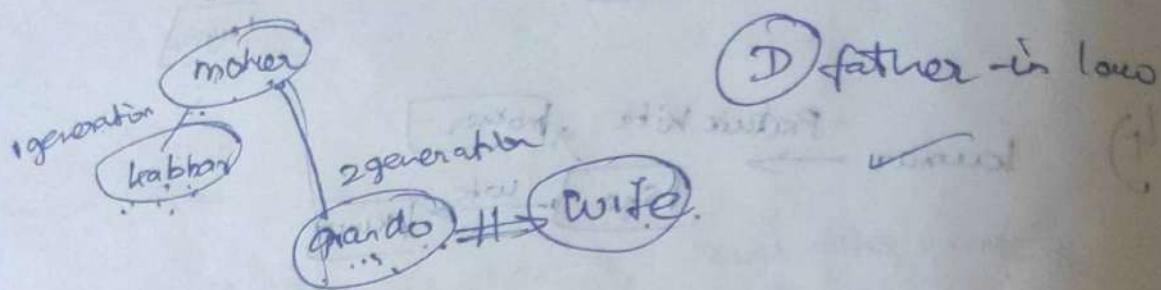
5) Ajay manjula va patadhru ava son of  
 father of avanoda daughter's mother nu tenjukura

So Ajay → oda wife oda - kuda pasandhava

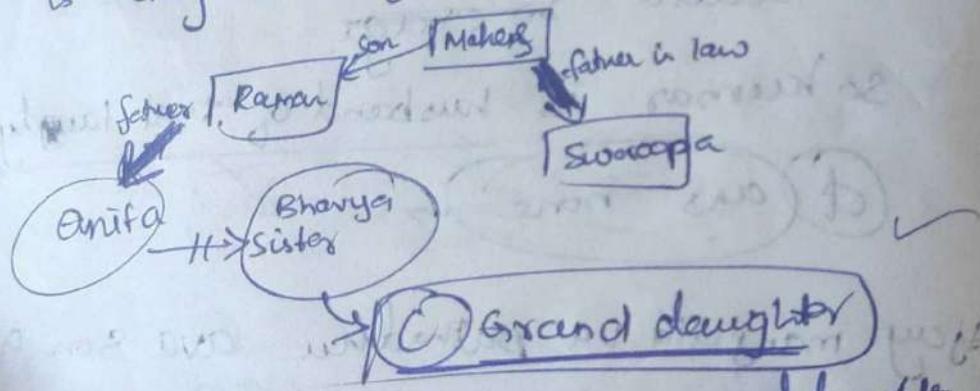
(A) Brother-in-law



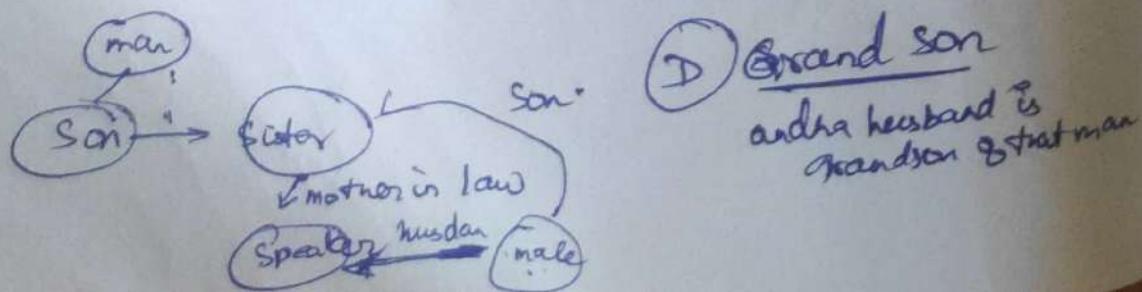
7) kabbar solura endha ponnu is wife &  
grandson of endha mother



8) Swaroopa solura Anita oda father is Remer  
is only son of endha father in law. brother.

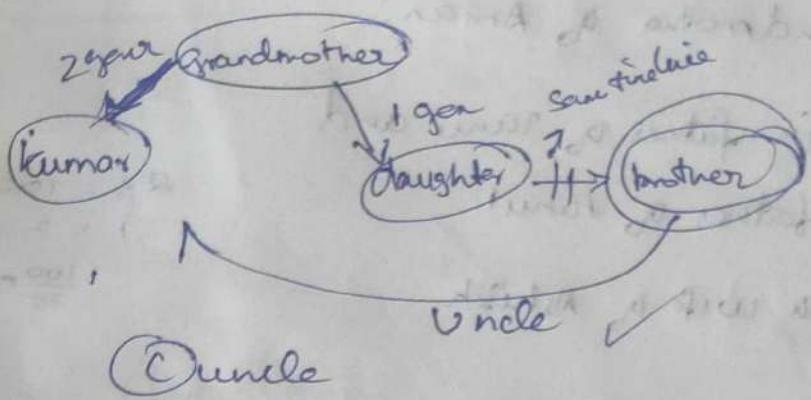


9) odu picture ah postu obu women solura  
endha man oda son's sister is endha  
mother in law

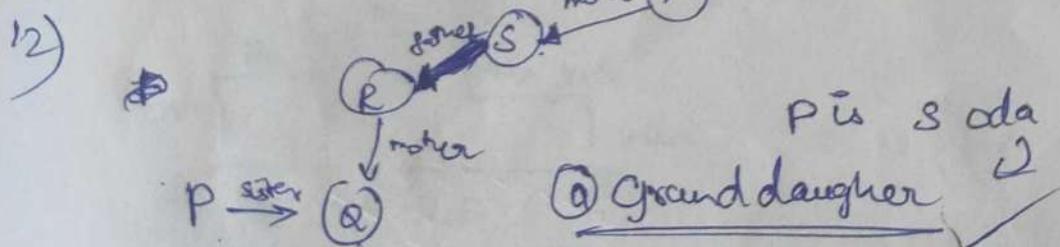
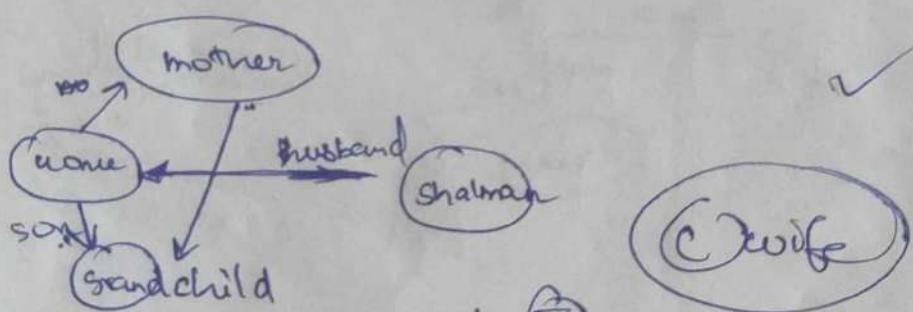


10) Kumar And ta Saura On Friday

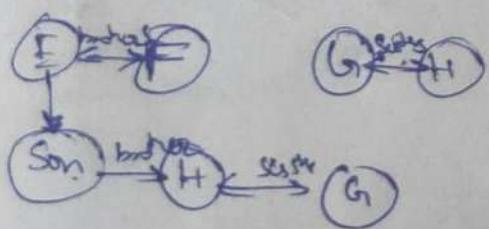
I defeated only brother & daughter &  
broda grandmother.



11) Shalman our picture la enkura wenee ah  
pather. evaloda mother. has only one  
grandchild whose mother is ensta coife.



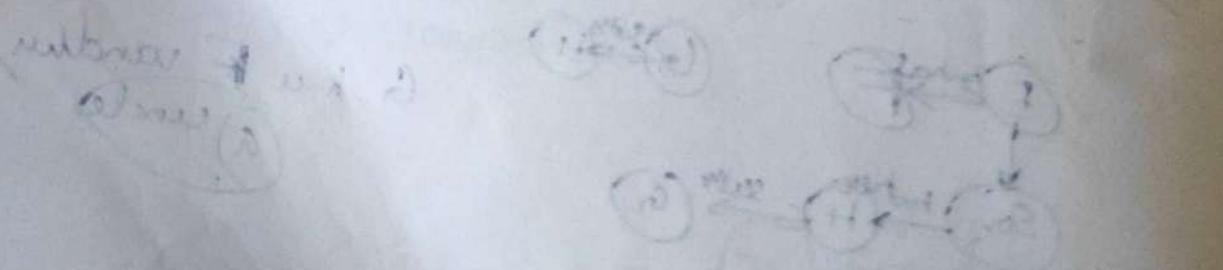
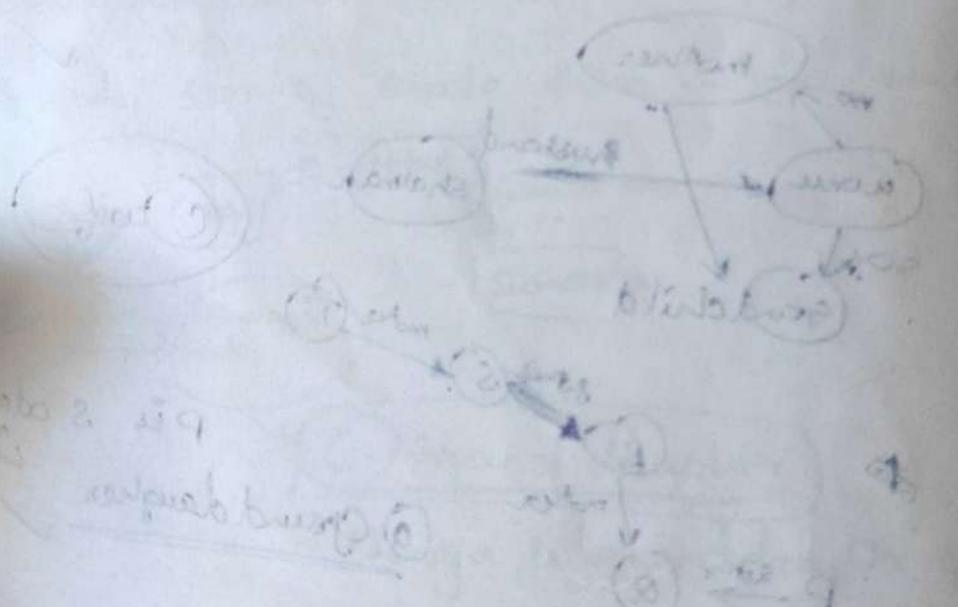
13)



G k u F vandy  
① Uncle

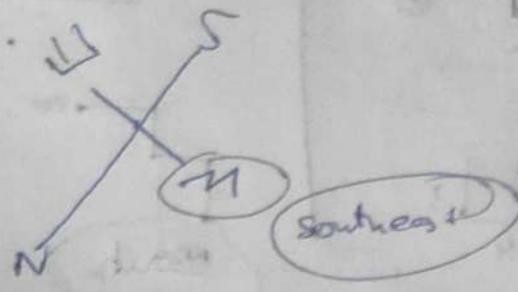
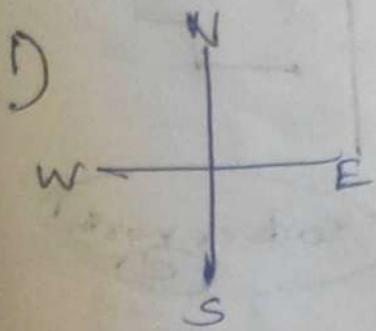
- 14)  $\frac{1}{x}$  of Rahul's son is son of Amar's father's sister.  
 \* Rahul's son is son of Diya who is mother of Jagat  
 \* Sahil is son of Diya who is mother of Jagat  
 \* grandmother of Amar  
 \* Ashi is father of Rani and grandfather of Rahul  
 \* Dnyan is wife of Ashish  
 $\frac{1}{x} = \frac{1}{23}$   
 $x = 23$

In next number of solving two more  
 1st one is ration between working  
 force hours & non working hours

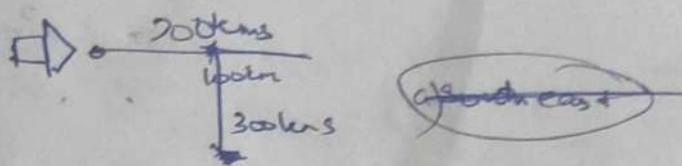


Direction

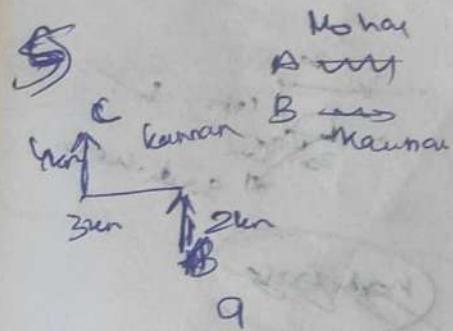
pg: 2



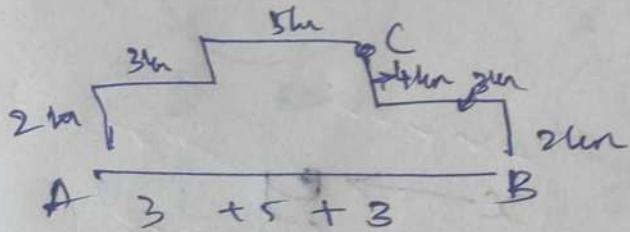
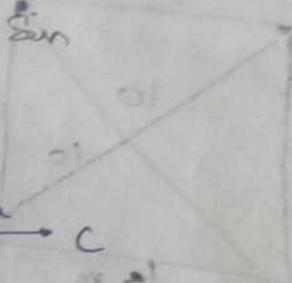
$$\begin{aligned} & \text{Diagram shows a right-angled triangle with legs of 100m and 60m.} \\ & x^2 = 100^2 + 60^2 \\ & x^2 = 10000 + 3600 \\ & x^2 = 13600 \\ & x = \sqrt{13600} \end{aligned}$$

2)  
3)

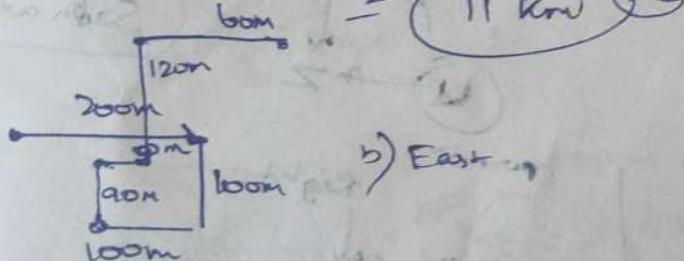
4)



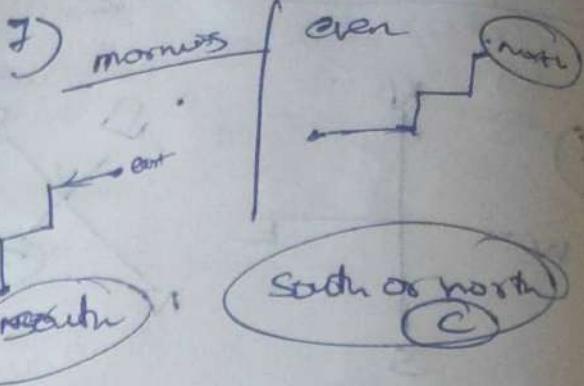
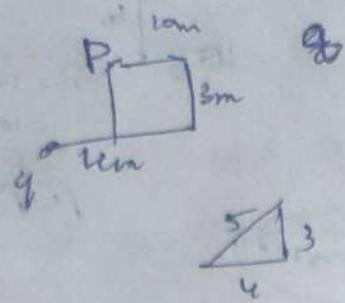
South



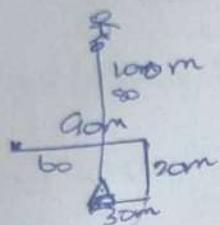
5)



8)

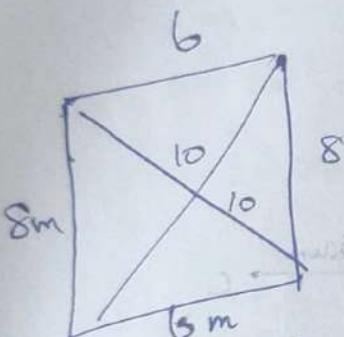


9)

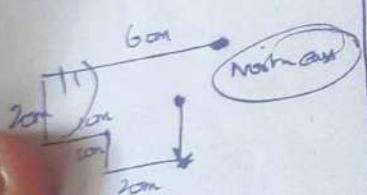


$$\begin{aligned} & \triangle 80 \\ & x^2 = 60^2 + 80^2 \\ & x = \sqrt{60^2 + 80^2} \\ & x = \sqrt{10^2(6^2 + 8^2)} \\ & x = 10\sqrt{36 + 64} \\ & x = 10\sqrt{100} \\ & x = 100 \end{aligned}$$

10)



$$\begin{aligned} & = 6+8+6+8+10 \\ & = 32 \end{aligned}$$



11)

12)



13)

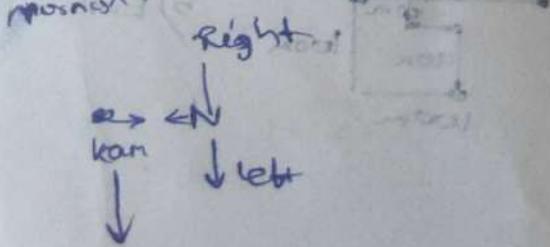
x, y

~~Q.E.D.~~

x → y

u → z

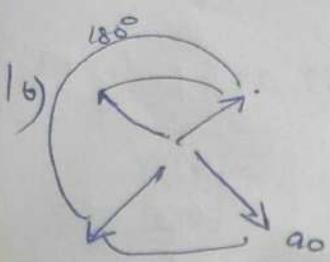
South west



14)

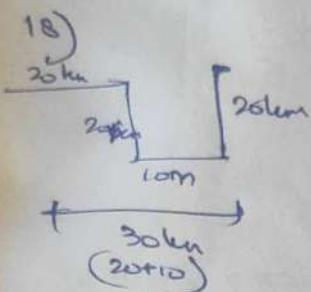


right  
N  
Km  
left



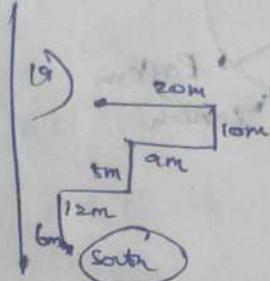
South east

17)



30km

(20+10)



20m

26m

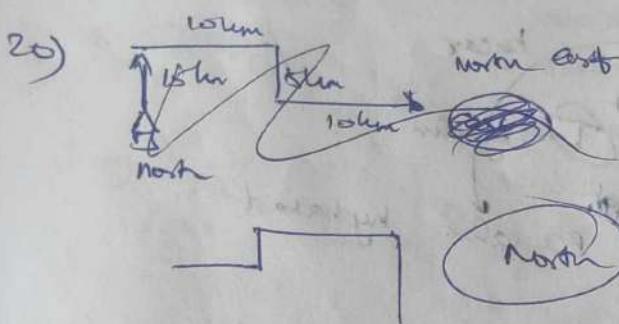
12m

9m

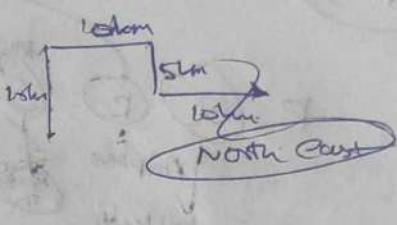
6m

South

H  
IS



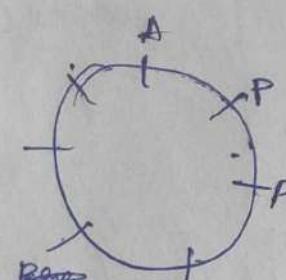
North



North East

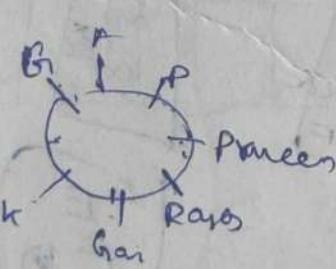
Puzzle Pg 17

Q2-16



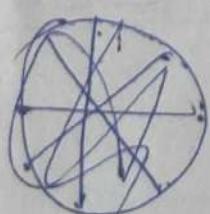
Abhi  
Praveen  
Rajesh

Ganesh  
Praveen  
Rajesh  
Mahesh  
Rajesh  
Ganesh



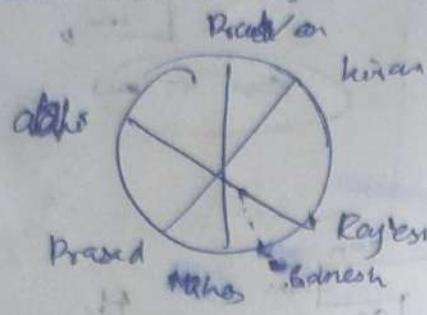
A  
Praveen  
Rajesh  
Ganesh

K  
Mahesh



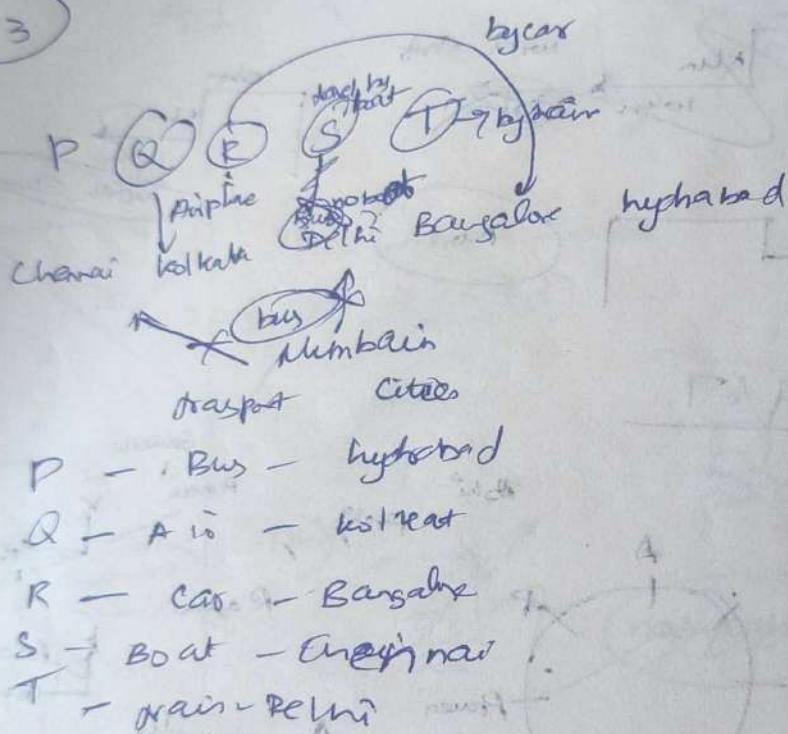
A  
Bashad  
Kiran  
Dips  
Ganesh  
Munshi

Pg: 7 Purple

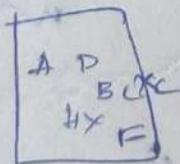


M: b

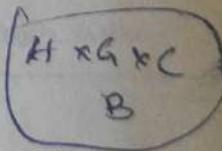
1-3



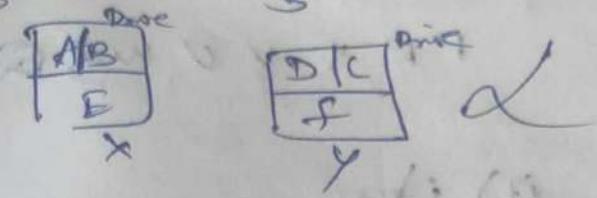
A  
 M  
 R  
 K



I - G

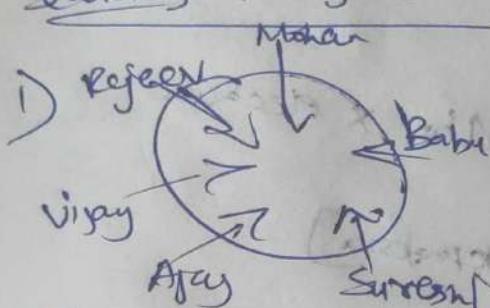


Q-4) ABC DEF



C) B

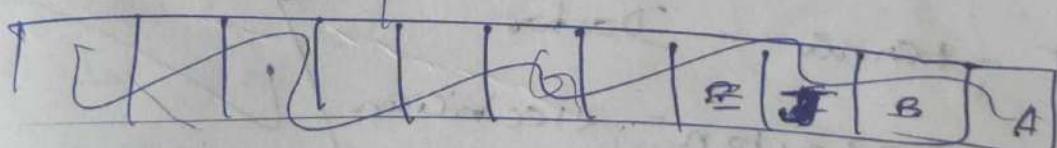
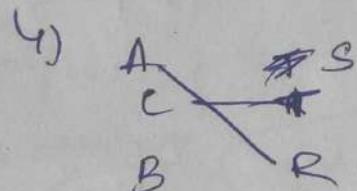
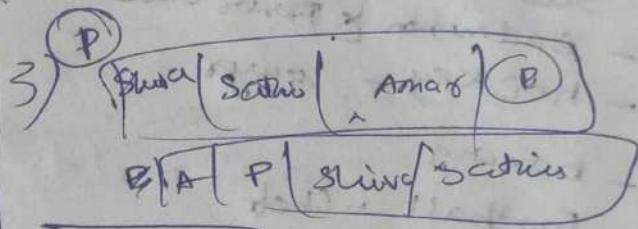
Seating arrangement



Mohan Babu Sur Ajay  
Rejeen Vijay  
Surjeet

- i) Mohan
- ii) ~~Rejeen~~ 2nd right
- iii) Surjeet
- iv) Rajeev
- v)

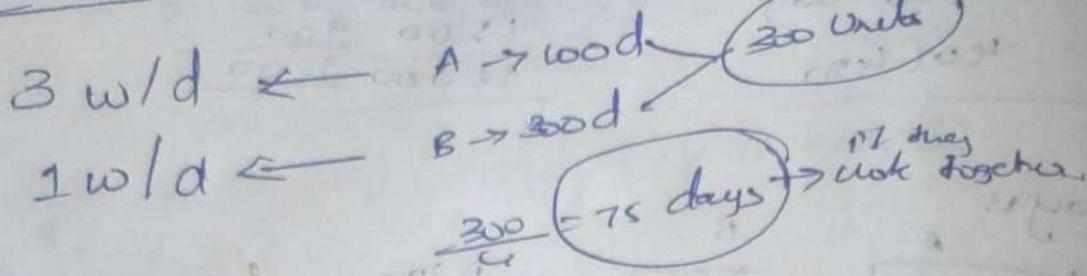
Mohan Babu Sur Ajay Vijay Rajeev



~~Q-5) D F~~ = C H D F G H E G B A  
E - A J B - G

E K A T B I G C H D \*

### Model 1



A + B will complete a task in 12 days  
 B alone complete a task 12 days. In how many days A alone complete?

$$\frac{1}{3+12} = \text{len} = 12$$

$$\frac{1}{3} \text{ unit/d} \leftarrow A+B \rightarrow 3d$$

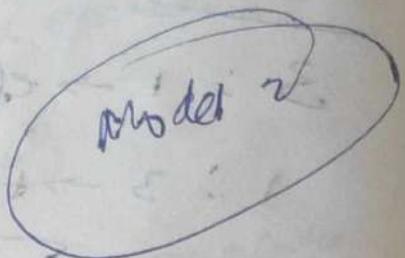
$$\frac{1}{12} = 1 \text{ unit/d} \leftarrow B \rightarrow 12d$$

$$a+b=4 \text{ u/d}$$

$$a+1=4$$

$$\begin{cases} a=3 \text{ u/d} \end{cases}$$

### Model 2



$$\frac{1}{2} \text{ days}$$

### Model 3

$$A+B=12 \text{ days each work}$$

$$B+C=16 \text{ day}$$

$$A+C=15 \text{ days}$$

$$LCM = 240$$

$$2 \left\{ \begin{array}{l} 12, 16, 15 \\ 8, 18, 15 \end{array} \right.$$

$$3 \left\{ \begin{array}{l} 24, 8, 5 \\ 1, 4, 5 \end{array} \right.$$

$$\frac{1}{240} \text{ day}$$

$$\frac{240}{12} \Rightarrow 20 \text{ u/d} \leftarrow A+B=12 \text{ days}$$

$$\frac{240}{16} \Rightarrow 15 \text{ u/d} \leftarrow B+C=16 \text{ days}$$

$$\frac{240}{15} \Rightarrow 16 \text{ u/d} \leftarrow A+C=15 \text{ days}$$

$$5 \times 5 = 25 \text{ days extra work}$$

$$= (a+b)(b+c) + (a+c)$$

$$51 = 2(a+b+c)$$

$$\therefore a+b+c = \frac{51}{2} = 25.5 \text{ u/d}$$

$$a+(b+c) = 25.5 \text{ u/d}$$

$$a+15 = 25.5$$

$$\therefore a = 10.5 \text{ u/d} \Rightarrow \frac{240}{10.5} =$$

days la A  
make cards  
work on  
Plastic frame  
22 ~~20~~ 18 days

$$a+c = 15$$

$$c = 15 - 10.5$$

$$\therefore c = 4.5 \text{ u/d}$$

$$a+b+c = 25.5 \text{ u/d}$$

$$10.5 + b + 4.5 = 25.5$$

$$\therefore b = 10.5 \text{ u/d}$$

Model : 4

250 women 16 days

8 hrs

500 women ? days  
16 hrs

$$\frac{M_1 D_1 H_1}{W} = \frac{M_2 D_2 H_2}{W}$$

$$\frac{250 \times 16 \times 8}{1} = \frac{500 \times 2 \times 16}{3} \rightarrow 3 \text{ time work}$$

$$\therefore 8 = \frac{2}{3} \quad x = 12 \text{ days}$$

$$\therefore x = 12 \text{ days}$$

attempt

$$A \rightarrow 30 \text{ days} \rightarrow \text{LCM } (600)$$

$$B \rightarrow 60 \text{ days}$$

in 1 day

$$\frac{600}{30} \rightarrow 2 \text{ units/day} \rightarrow A$$

$$\frac{600}{60} \rightarrow 1 \text{ unit/day} \rightarrow B$$

$$a \rightarrow 24$$

$$b \rightarrow 10$$

$$2 \text{ d} \rightarrow \frac{2}{24} \text{ unit}$$

$$x 200 \quad x 200$$

$$6 \text{ days} \leftarrow 600 \text{ units}$$

Time & work

pg: 11

1)

$$A \rightarrow 30 \text{ days}$$

$$B \rightarrow 60 \text{ days}$$

120 days later

In 1 day

$$A \Rightarrow \frac{120}{30} \rightarrow 4 \text{ units/day}$$

$$B \Rightarrow \frac{120}{60} = 2 \text{ units/day}$$

In 1 day

$$A+B = 4+2 \text{ units/day}$$

= 7 units/day

So

$$\frac{120}{7} = [17\frac{1}{7}] \text{ days}$$

2)

$$A \rightarrow 24 \text{ days}$$

$$B \rightarrow b \text{ days}$$

$$C \rightarrow 12 \text{ days}$$

LCM 24

$$\text{In 1 day A complete work} = \frac{24}{24} = 1 \text{ unit/day}$$

$$\text{In 1 day B complete work} = \frac{24}{6} = 4 \text{ unit/day}$$

$$\text{In 1 day C complete work} = \frac{24}{12} = 2 \text{ unit/day}$$

$$A+B+C = 1+4+2 = 7$$

$$\text{So } \frac{24}{7} = 3\frac{3}{7} \text{ days}$$

(3)

$$A+B = 35 \text{ days}$$

$$A = 60 \quad \cancel{B=420} \text{ days}$$

$$\frac{60, 35}{12, 7} \quad \frac{35}{70}$$

$$\frac{35}{420}$$

for 1 day A+B do  $\Rightarrow \frac{120}{420} = 12 \text{ unit/day}$

$$\text{" A do } \Rightarrow \frac{7}{120} = 7 \text{ unit/day}$$

$$A+B=12$$

$$\boxed{B=5 \text{ unit/day}}$$

$$\text{So } \frac{84}{420} = 84 \text{ days}$$

(4)

$$A+B=8 \text{ days}$$

$$B+C=12 \text{ days}$$

$$A+B+C=6 \text{ days}$$

$$4 \frac{12,8}{3,2} = 24$$

$$A+B \text{ do work in 1 day} = \frac{24}{8} = 3 \text{ unit/day}$$

$$B+C \text{ do work in 1 day} = \frac{24}{12} = 2 \text{ unit/day}$$

$$A+B+C = \frac{24}{6} = 4 \text{ unit/day}$$

$$A + \boxed{B+C} = 4$$

$$A + 2 = 4$$

$$\boxed{A = 2 \text{ unit/day}}$$

$$A + B = 8$$

$$2 + B = 8$$

$$\boxed{B = 6 \text{ unit/day}}$$

$$B+C = 12$$

$$1 + C = 12$$

$$\boxed{C = 1 \text{ unit/day}}$$

$$A + C = 2 + 1 = 3 \text{ unit/day}$$

$$\text{So } \frac{24}{3} = 8 \text{ day}$$

5) sol

A can do a piece of work in = 16 hrs

$$B+C = 3 \text{ hr}$$

$$A+C = 2 \text{ hr}$$

$$2 \overline{) (4,3,2)} \\ 2,3,2$$

$$\text{In 1 day } A \text{ can do} = \frac{12}{4} = 3 \text{ unit/hr}$$

$$B+C = \frac{12}{3} = 4 \text{ unit/hr}$$

$$A+C = \frac{12}{2} = 6 \text{ unit/hr}$$

$$A+C = 6$$

$$B+C = 4$$

$$\boxed{C = 3 \text{ unit/hr}}$$

$$B+C = 4$$

$$B+3 = 4$$

$$\boxed{B = 1 \text{ unit/hr}}$$

$$\text{So } \frac{12}{1} = 12 \text{ hrs}$$

it take 12 hrs for B alone to complete a job.

6) A+B can do a work in = 72 days

B+C " " = 120 days,

A+C " " = 90 day

$$\text{LCM} = 360$$

In 1 day A+B do work =  $\frac{360}{72} = 5 \text{ unit/day}$

14 B+C =  $\frac{360}{120} = 3 \text{ unit/day}$

11 A+C =  $\frac{360}{90} = 4 \text{ unit/day}$

$$\begin{array}{r} 2 | 120, 72, 90 \\ 3 | 60, 36, 45 \\ 5 | 20, 12, 15 \\ 3 | 4, 12, 3 \\ 4 | 4, 4, 1 \\ \hline 1, 1, 1 \end{array}$$
$$\begin{array}{r} 120 \\ 360 \\ \hline 360 \end{array}$$

$$(A+B) + (B+C) + (A+C) = 5 + 3 + 4$$

$$2(A+B+C) = 12$$

$$\boxed{A+B+C = 6}$$

$$A+3 = 6$$

$$A = 3 \text{ unit/day}$$

so

$$\frac{120}{3} = 120 \text{ days}$$

7)

A can do a work in = 15 days

B " " = 10 days

$$\begin{array}{r} 15, 10 \\ 3, 2 \\ \hline 30 \end{array}$$

(LCM)

A can do a in 1 day =  $\frac{30}{15} = 2 \text{ unit/day}$

B " " =  $\frac{30}{10} = 3 \text{ unit/day}$

Total 30 LCM work

$$3 \times 5 = 15 \text{ days}$$

~~30 - 15 = 15 days~~ work remaining that

should be done by A =  $\frac{15}{2} \text{ days}$

8) A can do a work in = 18 days  
 $\therefore \text{In } 1 \text{ day } A \text{ do a work} = \frac{1}{18}$  days  
 B " " = 15 days  
 $\therefore \text{In } 1 \text{ day } B \text{ do a work} = \frac{1}{15}$  days

$$\text{LCM} = 90$$

$$3 \left( \begin{matrix} 18, 15 \\ 6, 5 \\ 90 \end{matrix} \right)$$

$$\text{In } 1 \text{ day } A \text{ do a work} = \frac{90}{18} = 5 \text{ unit/day}$$

$$\text{In } 1 \text{ day } B \text{ do a work} = \frac{90}{15} = 6 \text{ unit/day}$$

90 total work

$$B \text{ do not do } 10 \text{ day} = 10 \times 6 = 60$$

$90 - 60 = 30$  work remains which should be done by A

No 6 days needed by A to complete remaining work

$$= \frac{30}{5} = 6 \text{ days}$$

9) P do a work in = 15 days

$$Q \text{ " " } = 10 \text{ days}$$

$$\text{LCM} = 30$$

$$\text{In } 1 \text{ day } P \text{ do} = \frac{30}{15} = 2 \text{ unit/day}$$

$$\text{In } 1 \text{ day } Q \text{ do} = \frac{30}{10} = 3 \text{ unit/day}$$

for 2 day they work together =  $2 + 3 = 5 \text{ unit/day}$

$$\text{so } 5 \times 2 = 10 \text{ work done}$$

$$30 - 10 = 20 \text{ work remaining}$$

This 20 work should done by P in

$$= \frac{20}{2} = 10 \text{ days}$$

$$\text{Total days need} = 2 + 10$$

$$= 12 \text{ days}$$

19) A + B do a work in = 30 days  
 B + C do a work in = 24 days  
 C + A do a work in = 20 days

LCM = 120

3	30, 24, 20
10	10, 8, 20
2	1, 8, 2
	1, 4, 1

A 120 LCM

In 1 day A + B do =  $\frac{1}{30}$  = 1 unit/day  
 " " B + C do =  $\frac{1}{24}$  = 1/24 unit/day  
 " " C + A do =  $\frac{1}{20}$  = 1/20 unit/day

For 10 days (A + B + C) work together so =  $A + B + C$   
 $2(A + B + C) = 15$   
 $A + B + C = 7.5 \text{ unit/day}$   
 So 10 day net =  $7.5 \times 10 = 75$   
 ~~$120 - 75 = 45$~~   
 ~~$= 45 \text{ work remaining}$~~   
 ~~$45 / 4 = 11.25$~~   
~~Remaining work done by A~~  
 ~~$= 45 / 2.5 = 18 \text{ days}$~~

1) A + B do a work in = 30 days

They worked together for 20 days & then B left

After 20 days A finish the job - total 40 days

~~A's~~ Day needed by A alone to complete = ?

LCM = 120

A + B do work in 1 day =  $\frac{120}{30} = 4 \text{ unit/day}$

A + B work together for = 20 days

$= 20 \times 4 = 80 \text{ work done}$

$120 - 80 = 40 \text{ remaining}$

$\frac{40}{A} = 20 \Rightarrow A = 2 \text{ unit/day}$

Total time required by A alone to do a work =  $\frac{120}{2} = 60 \text{ days}$

$$12) \text{ A couple work in } \rightarrow 45 \text{ days}$$

$$\text{B " } = 40 \text{ day}$$

$$\text{LCM} = 360$$

$$\begin{array}{r} 45 \\ \times 8 \\ \hline 360 \end{array}$$

$$\text{In 1 day A does } = \frac{360}{45} = 8 \text{ unit/day}$$

$$\begin{array}{r} 45 \\ \times 8 \\ \hline 360 \end{array}$$

$$\text{In 1 day B does } = \frac{360}{40} = 9 \text{ unit/day}$$

$$A+B \text{ 1 day} = 8+9 = 17 \text{ unit/day}$$

$$\begin{array}{r} 215 \\ 260 \\ 189 \\ \hline 176 \end{array}$$

$$\begin{array}{r} 23 \\ \times 9 \\ \hline 189 \\ \hline 207 \\ 153 \\ \hline 153 \end{array}$$

$$\begin{array}{r} 176 \\ \hline 17 \\ 12 \\ \hline 9 \\ \hline 9 \\ 0 \end{array}$$

$$\text{B alone do remaining work in } 23 \text{ days so}$$

$$= 23 \times 9 = 207$$

$$= 360 - 207$$

$\Rightarrow 153 \rightarrow$  is done by  
 $A+B$  in some days

$$A+B = 17 \text{ unit/day so}$$

$$\frac{153}{17} = 9 \text{ days}$$

$$13) \text{ A do a job in } = 25 \text{ days}$$

$$\text{B " } = 20 \text{ days}$$

$$\text{LCM} = 100$$

$$\begin{array}{r} 25 \\ \times 4 \\ \hline 100 \end{array}$$

$$\text{In 1 day A do } = \frac{100}{25} = 4 \text{ unit/day}$$

$$\text{B " } = \frac{100}{20} = 5 \text{ unit/day}$$

$$\text{A did work alone for 10 days } = 4 \times 10 = 40 \text{ unit}$$

$$100 - 40 = 60 \text{ remaining}$$

$$\text{B joined } = 4+5 = 9 \text{ unit/day}$$

$$60 = \frac{60}{9} = 6 \frac{6}{9} \text{ days}$$

$$6 \left( \frac{1}{3} \right) + 10 = 16 \frac{2}{3} \text{ days.}$$

14) A do a job in = 15 days

B " " = 30 days

$$\text{LCM} = 30$$

$$\text{In 1 day A do} = \frac{30}{15} = 2 \text{ unit/day}$$

$$\therefore B" = \frac{30}{30} = 1 \text{ unit/day}$$

$$\text{for 2 day they} = (2+1) = 3 \text{ unit working}$$

~~$$\frac{30}{2} = 15 \text{ days}$$~~

$$2 \text{ day} = 3 \text{ unit}$$

$$\frac{x \times 10}{26 \text{ day}} = \frac{x \times 10}{30 \text{ unit}}$$

15) A do work in = 12 days

B " " = 16 days

$$\begin{array}{r} 4 | 16, 12 \\ \quad 4, 3 \end{array}$$

$$\begin{array}{r} 12 \\ \cdot 4 \\ \hline 48 \end{array}$$

$$\text{LCM} = 48$$

$$\text{In 1 day A do} = \frac{48}{12} = 4 \text{ unit/day}$$

$$\therefore B \text{ do} = \frac{48}{16} = 3 \text{ unit/day.}$$

Alternate day A & B work so = 4+3 = 7 unit/2 days

$$2 \text{ day} = 7 \text{ unit}$$

$$x = 48 \text{ unit}$$

$$x = \frac{48 \times 2}{7}$$

$$13 \frac{2}{7} \text{ days}$$

$$\begin{array}{r} 13.7 \\ \times 7 \\ \hline 91 \\ - 7 \\ \hline 21 \\ - 21 \\ \hline 50 \\ - 49 \\ \hline 1 \end{array}$$

$$\begin{aligned}
 (6) \quad A \text{ do a work in} &= 20 \text{ days} \\
 B \text{ " } &= 30 \text{ days} \\
 C \text{ " } &= 60 \text{ days} \\
 \text{LCM} &= 60
 \end{aligned}$$

$$\begin{aligned}
 \text{In 1 day } A \text{ do} &= \frac{60}{20} = 3 \text{ unit / day} \\
 \text{u } B \text{ do} &= \frac{60}{30} = 2 \text{ unit / day} \\
 \text{C " } &= \frac{60}{60} = 1 \text{ unit / day.}
 \end{aligned}$$

$$\begin{aligned}
 \text{for 3 days } & (3 \times 3) + 2 + 1 \\
 & = 9 + 2 + 1 = 12 \text{ unit / 3 days}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{12}{3} = 4 \text{ days} \times 3 \\
 & \frac{60}{12} = 5 \text{ days} \times 3 \\
 & \text{so } 5 \times 3 = 15 \text{ days}
 \end{aligned}$$

$$\begin{aligned}
 (7) \quad \frac{M_1 D_1 H_1}{W} &= \frac{M_2 D_2 H_2}{W} \\
 &= \frac{24 \times 15 \times 8}{W} = \frac{x \times 10 \times 6}{W} \\
 &\text{same work}
 \end{aligned}$$

$$\begin{aligned}
 & 4 \times 15 \times 8 = x \times 10 \\
 & \frac{480}{10} = x \\
 & x = 48 \text{ men}
 \end{aligned}$$

$$\begin{aligned}
 (8) \quad \frac{M_1 D_1 H_1}{W} &= \frac{M_2 D_2 H_2}{W} \\
 &= \frac{18 \times 15 \times 5}{15} = \frac{45 \times 30 \times 5}{W}
 \end{aligned}$$

$$\begin{aligned}
 & W = 15 \times 5 \\
 & \boxed{W = 75 \text{ men}}
 \end{aligned}$$

25)

A : B

2 : 1  $\rightarrow$  Efficiency.∴ 2  $\rightarrow$  twice efficiency

together A + B do a work in = 14 days

$$1+2=3 \text{ part} = 14 \text{ days}$$

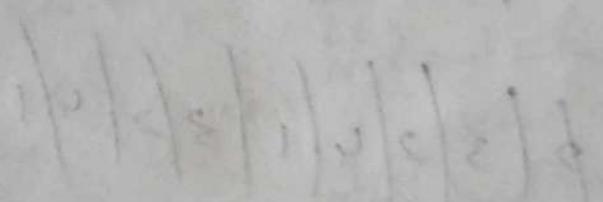
$$\boxed{1 \text{ part} = \frac{14}{3} \text{ unit/day}}$$

$$1 P = 4.6$$

A take  $\frac{14}{3}$  day in 14 days

=  
20)

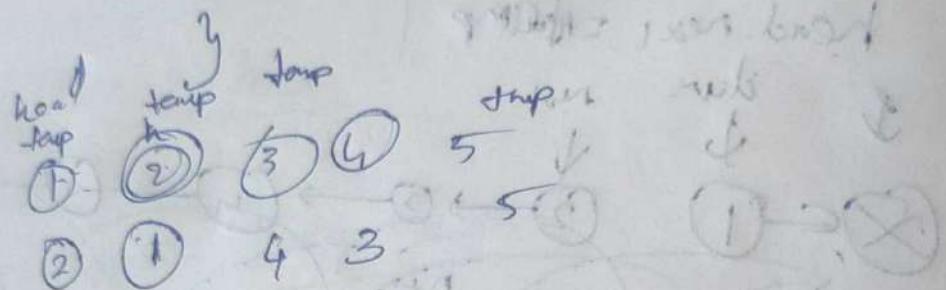
Chances are 20%  
not to have



2 chance

Node temp = head  
 while (temp · next != null)  
 {  
 node h = temp · next  
 temp · next = tempt  
 tempt = h  
 temp = temp · next  
 }

Node h = temp  
 temp = temp · next  
 temp · next = h  
 temp = temp · next



Time & distance Prg: 11

$$22) 10M \times 20d = 20W \times 15$$

$$2M = 3W$$

~~$$5M + 10W \times 2d = 2M (10M \times 20d)$$~~

$$(5M + 10W) \times 2d = 10M \times 20d$$

$$(5(3) + 10(2)) \times 2d = 10(3) \times 20 \times d$$

$$35 \times 2 = 600$$

$$x = 17 \frac{1}{2}$$

10M fresh work in ~~100~~ = 20 days

10 workers in ~~\*\*~~ = 15 d

60 km

In 1 day Men do =  $\frac{60}{20} = 3$  u/d

In " woman do =  $\frac{60}{5} = 4$  u/d

Men + Women do work in 1 da =  $3+4$

$\Rightarrow 7$  u/d

So =  $\frac{60}{7}$  = ~~8 days~~  $\boxed{8 \frac{4}{7} \text{ days}}$

Qn 1a na na keender padi hadden 10M & 20W ko

but we need for 5M 20W  $\Rightarrow$  no. of

People reduced to half na day increase 2 times

$$= \frac{60}{7} \times 2 = \frac{120}{7} = \boxed{17 \frac{1}{7}}$$

23) Given

A : B  
2 : 1  $\rightarrow$  efficiency

1 : ?  $\rightarrow$  time

$\rightarrow$  B complete work in 12 days

for total  $1+2 = \cancel{3}$

$$\# \rightarrow 12 + 12 = 30 \times ?$$

? = 4 days

24)

A : B  
3 : 1  $\rightarrow$  efficient

1 : ?  $\rightarrow$  time

$$\text{diff} = \sqrt{P} = 10 \text{ days}$$

$$\downarrow P = 5 \text{ days}$$

time required by B is  $3P = 3 \times 5 = 15 \text{ days}$

26) A fill tank in  $= 12$  min  
 B " " "  $= 24$  min  
 LCM = 24  $\Rightarrow$  total capacity of tank  
 In 1 min A fill  $= \frac{24}{12} = 2$  unit/min  
 " B "  $= \frac{24}{24} = 1$  unit/min  
 A + B in 1 min  $= 2+1 = 3$  unit/min  
 so  $\frac{8}{3} = 1.8$  min

27) Pies A fill a tank in  $= 5$  hrs  
 B " " "  $= 6$  hours  
 C empty a tank  $= 12$  hrs  
 LCM = 60

In 1 hrs A fill  $= \frac{60}{5} = 12$  unit/hr  
 1 hr B fill  $= \frac{60}{6} = 10$  unit/hr  
 " C empty a tank in  $= \frac{60}{12} = 5$  unit/hr  
 for 1 hr  $= 12 + 10 - 5$   $\Rightarrow$  empty the tank  
 $= 17$  unit/hr.

$\therefore \frac{60}{17} = 3.52$  hrs

work = 9  $\rightarrow$  9 hrs  
 work = 9  $\rightarrow$  9 hrs

$3 \times 8 = 9 \times 2 \Rightarrow$  2 workers will

28) Tap A fill tank in = 4 hrs  
 Tap B fill tank in = 6 hrs LCM = 24

In 1 hr A fill =  $\frac{24}{4} = 6 \text{ units}$   
 In 1 hr B fill =  $\frac{24}{6} = 4 \text{ units}$

(A+B) in 1 hr =  $\frac{6+4}{1} = 10 \text{ units/hr}$

for 2 hrs A+B work together  
 $= 10 \times 2 = 20$

So  $24 - 20 = 4$ .

A \* pipe is close  $\Rightarrow 50$ ,  $\frac{4}{4} = 1 \text{ hr}$

totally  $2+1 = 3 \text{ hrs}$

29) A fill tank in = 12 hrs  
 B fill tank in = 15 hrs LCM = 60  
 C fill tank in = 20 hrs

In 1 hr A fill =  $\frac{60}{12} = 5 \text{ units}$

In 1 hr B fill =  $\frac{60}{15} = 4 \text{ units}$

In 1 hr C fill =  $\frac{60}{20} = 3 \text{ units}$

for 2 hrs

~~$5+4+3 = 12 \text{ units}$~~

1<sup>st</sup> hr = A+B =  $5+4 = 9 \text{ units}$

2<sup>nd</sup> hr = A+C =  $5+3 = 8 \text{ units}$

So  $\frac{60}{17} = 3.52$

$3.52 \times 2 = 7 \text{ hrs}$

because normally  
 tank full takes 7 hrs

$$30) \quad E = 3 \text{ hr} \Rightarrow 3 \times 60 = 180$$

Plump fill tank = 3 hr  
With leak if fill in = 3 hr 30 min  
 $E + \text{leak} = 3.5 = 3\frac{1}{2}$   
 $= 180 + x$

Leak is 30 mins

$$\text{So } \begin{aligned} 1 \text{ min fill} &= \frac{180}{30} = 6 \text{ ml/min} \\ \text{leak} &= \frac{30}{30} = 1 \text{ ml/min} \\ \text{leak} &= 21 \end{aligned}$$

$$\begin{array}{r} (30, 35) \\ 6, 7 \\ \hline 21.0 \end{array}$$

$$\begin{aligned} \text{In 1 hrs E fill} &= \frac{21}{3} = 7 \text{ ul/hr} \\ T1 E + L &= \frac{21}{35} = 6 \text{ ul/hr} \end{aligned}$$

$$E + L = 6$$

$$7 + L = 6$$

$$L = 1 \text{ ul/hr}$$

$$\text{So } \frac{21}{1} = 21 \text{ hrs} \rightarrow \text{take to take adult age}$$

### Additional

Police chase thief who has 100 metres ahead

Police speed - 1 km / 8 min

use before method  
both lost

thief " = 1 / 10 min

What is distance covered by thief before he over police.

$$\text{Speed of police} = \frac{1000}{8} \text{ m/min}$$

$$\text{thief} = \frac{1000}{10} \text{ m/min}$$

$$\frac{100+x}{1000} = \frac{x}{1000}$$

$$8(100+x) = 10x$$

$$x = 400 \text{ m}$$

what will Rs 40000 be in 2 years at rate of

20% p.a. if interest compound half-yearly

Sol

$$r = 20\% \text{ per annum}$$

$$\text{sum} = 40000$$

(therefore)

$$\text{Amt} = P \times \left[1 + \left(\frac{r}{2}\right)\right]^T$$

let compound amt be  $x$

$$\text{Effective time} = 2 \times 2 = 4 \text{ years}$$

$$\text{Effective rate of interest} = \frac{20}{2} = 10\% \text{ half year}$$

$$\begin{aligned} \text{Compound Amt} &\Rightarrow 40000x \left(1 + \frac{10}{100}\right)^4 \\ &= 40000x \left(\frac{11}{10}\right)^4 = \boxed{58564} \end{aligned}$$

Paul finishes  $\frac{3}{10}$  of work in 6 days & fresh

remaining work with assistance of Peter in 6 days,

In what time can Peter alone finish work.

Sol

work is given by rate  $\times$  time

let Peter alone work in  $m$  days & rate will be  $1/m$

Now 6 day paul's rate for  $\frac{3}{10}$

$$\frac{3/10}{6} = \frac{1}{20} \quad \text{Leave}$$

Find 0's at end of 1090!

Sol

$$\frac{1090}{5} + \frac{218}{5} + \frac{43}{5} + \frac{8}{5} = 218 + 43 + 8 + 1$$

$$= \boxed{270} \text{ zeros}$$

AP

How many term in 20, 25, 30, ..., 140?

$$\text{num of term} = \frac{140 - 20}{5} + 1$$

(S) common diff

$$= \frac{120}{5} + 1 \Rightarrow 24 + 1 = 25 \text{ terms}$$

Find first term of AP whose 8<sup>th</sup> & 12<sup>th</sup> term are 39 & 59

$$8^{\text{th}} \text{ term} = a + 7d = 39 \quad (1) \quad \text{eqn 1}$$

$$12^{\text{th}} \text{ term} = a + 11d = 59 \quad (2) \quad \text{eqn 2}$$

$$(1) - (2) \Rightarrow a + 7d - a - 11d = 39 - 59$$

$$4d = 20 \\ d = 5$$

$$a = 39 - 35 = 4$$

Find 15<sup>th</sup> term in sequence 20, 15, 10, ...

$$15^{\text{th}} \text{ term} = a + 14d$$

$$= 20 + 14(-5)$$

$$= 20 - 70 = -50$$

GP is called when the ratio of consecutive terms are same

$$2 \ 4 \ 8 \ 16$$

$$\frac{4}{2} = \frac{8}{4} = \frac{16}{8} = 2 \text{ So GP}$$

GP of less than 10 is not

$$1+5+25+125$$

$$\frac{1}{2} + \frac{5}{2} + \frac{25}{2} + \frac{125}{2} = \frac{141}{2}$$

## Model-2

2) heads total = 400

total legs = 850

M. Muthuram

Parrot  
deers

2 legs

4 "

8000

imagined 1<sup>st</sup> 400 are Parrot

& then 400 are deer

1600

850

750

15

$$25 \times 15$$

$$= 375$$

25

1

$$16x = 400$$

$$\boxed{x = 25}$$

deers

$\boxed{25}$  b

3) heads = 80

legs = 260

M. Muthuram  
O. Senthil

160

320

260

60

100

$$8x = 80$$

$$\boxed{x = 10}$$

6 : 10

$\boxed{3 : 5}$

$5 \times 10 = 50$  horse

4)

200 400

290

110 290

$\boxed{11 : 9}$

$$80x = 100$$

$$x = \frac{100}{80} = \frac{5}{4}$$

$$\boxed{x = \frac{100}{20} = 5}$$

$$10 \times 5 = 45$$

rabbits (d)

$$\boxed{\frac{10 \times 10}{3} = \frac{100}{3}}$$

### Model - 3

3)  $3\phi \times \frac{8\phi}{10\phi} \times \frac{8\phi}{10\phi} \times \frac{8\phi}{10\phi} = \frac{3 \times 8 \times 8 \times 8}{100}$

15.36 Ltrs

4)  $8\phi \times \frac{9\phi}{10\phi} \times \frac{9\phi}{10\phi} \times \frac{9\phi}{10\phi} = \frac{8 \times 9 \times 9 \times 9}{100} = \boxed{58.32}$  Ltrs (c)

5) 20kg  $\rightarrow$  10% is water  $\rightarrow$  so 2 kg water  
to change this to 25% we need 5kg of water

(b)

6) 45 ltrs  $\rightarrow$  contains 20%

$$\begin{aligned} & \frac{45 \times 20}{100} \\ &= 11.25 \\ &= 11.25 - 9 \\ &= \boxed{2.25} \end{aligned}$$

(d) 2.25 liters

001 00

01 0

- 0.81

001 001

001

001 011

011 111

## Soliton training

$$(n+1)! = 6[(n-1)!], \text{ find } n$$

$$(n+1)(n+1-1)(n+1-2)! = 6(n-1)!$$

$$(n+1)(n)(n-1)! = 6(n-1)!,$$

$$n^2 + n - 6 = 0 \rightarrow 0$$

$$\boxed{n=2}$$

$$(n+5)(n-2) = 0$$

-6

1

3

-2

$\underline{\underline{=}}$  2, 4, 5, 7, 8, how many 3 digit even no. can be formed without repetition.

$$\begin{array}{c} 2, 4, 8 \\ 4 \quad 3 \quad 3 \end{array} \rightarrow 3 \text{ ways} \quad 4 \times 3 \times 3 = 36 \text{ ways}$$

$\underline{\underline{=}}$  If the letters of the word "NOZHI" are arranged taken all at time, final how many do not start with "OZ".

$$MOZHI = 5! = 120$$

Starts with OZ

$$O \cancel{Z} H I \rightarrow \frac{4!}{3!} = 4$$

$$\text{so does not start with OZ} = 120 - 4 = 116 \text{ ways}$$

- U have 5 post boxes & 10 letters in how many way
- U can post letters in post box where in each post box
- U can post more than 10 letters.

PTU

So here

5 box 10 letters

so  $5^{10}$  ways.

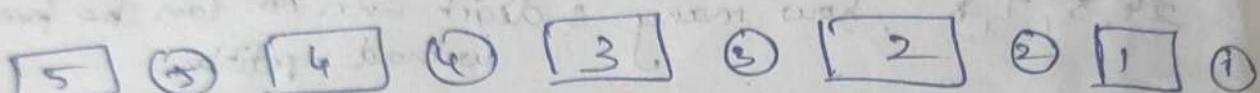
Q) Consider

2 post box & 3 letters.

Box 1	Box 2
1/a	bc
2/b	ac
3/c	ab
4/ab	c
5/ac	b
6/bc	a
7/abc	-
8/-	abc

$$2^3 = 8 \text{ ways}$$

In how many ways 5 boys &  
5 girls can be placed alternatively  
for a photoshoot in a line?



boys girls      boy ah um enukalan  
 $5! \times 5! \times 2!$       girl ah um enukalan

$$= 120 \times 120 \times 2$$

$$= 28800$$

If RUBAN are arranged in all possible ways &

These words are written out in dictionary,

then word EUBAN appears at serial number?

Dictionary order = A B N R U

$$A - - - - = 4! = 24$$

$$B - - - - = 4! = 24$$

$$N - - - - = 4! = 24$$

$$R A - - - = 3! = 6$$

$$R B - - - = 3! = 6$$

$$R \cancel{U} A - - = 3! = 6$$

$$R U B A - - = 2! = 2$$

$$R U B A N = 7! = 5040$$

q3

rank of word

MOHAN they like other

A H M N O → Dictionary

$$\begin{aligned}A &= 4! = 24 \\H &= 4! = 24 \\M A &= 3! = 6 \\M H &= 3! = 6 \\M N &= 3! = 6 \\N O A O L &= 2! = 2 \\N O H A N &= 1! = 1\end{aligned}$$

69 rank

word  
Mohan in  
Dictionary.

Combination : → selection

$${}^n C_r = \frac{n!}{(n-r)! r!}$$

eg.  ${}^3 C_2 \Rightarrow$  instead of applying formula easy  
method reduce it to the

no. of times base 2

$$= \frac{3 \times 2}{6}$$

$$= \frac{3 \times 2}{2 \times 1} = 3$$

so eg. 314 participant, 5 can be selected

$${}^{314} C_5 = \frac{314 \times 313 \times 312 \times 311 \times 310}{5 \times 4 \times 3 \times 2 \times 1}$$

$${}^7 C_3 = \frac{7 \times 6 \times 5}{3 \times 2 \times 1} = 7 \times 5 = 35$$

$$1 \quad {}^7 C_3 = {}^7 C_4 \quad \text{v.s.}$$

$$314 \quad C_{313} \quad \text{then it's equal to } 314C_3 = 314 \boxed{314}$$

diff = 1

In combination And vandha (x)  
OR vandha (+)

= and  
4 boys + 3 girls select 3 stu. no condition

$$7C_3 = \frac{7 \times 6 \times 5}{3 \times 2 \times 1} = \boxed{35}$$

If 3 stu contain 2 boys & 1 girl

$$4C_2 \times 3C_1 = \frac{4 \times 3}{2 \times 1} \times \frac{3}{1}$$

$$= 2 \times 3 \times 3 = \boxed{18}$$

(check first 2 boys & last 1 girl)

= In how many way 3 stu can be selected from  
4 boys + 3 girls with atleast a boy in it?

$$\begin{aligned} & 4C_1 * 3C_2 + 4C_2 * 3C_1 + 4C_3 * 3C_0 \\ & \text{And OR} \\ & = \left( 4 \times \frac{3 \times 2}{2} \right) + \left( \frac{4 \times 3}{2} \times 3 \right) + \left( \frac{4 \times 3 \times 2 \times 1}{3 \times 2} \right) \\ & = 12 + 18 + 4 = \boxed{34} \end{aligned}$$

$$\begin{array}{r} 12 \\ 18 \\ \hline 34 \end{array}$$

how many integers greater than 999 & not greater than 4000, can be formed with the digits 0, 1, 2, 3, 4 if repetition of the digits allowed.

$$3 \times 5 \times 5 \times 5$$

$$\begin{array}{cccc} 3 & 5 & 5 & 5 \\ \hline + 1 & & & \\ \hline 375 & & & \\ \hline 376 & & & \end{array} \rightarrow 14000$$

add one more 1

In a meeting ~~7~~ managers are to be seated in 7 chairs around a round table. How many seating arrangement are possible?

Sol

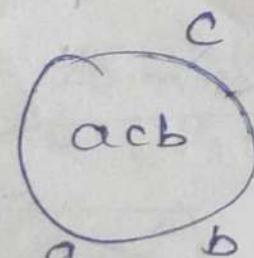
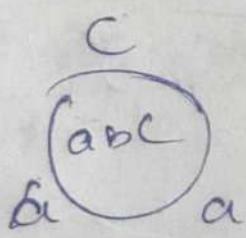
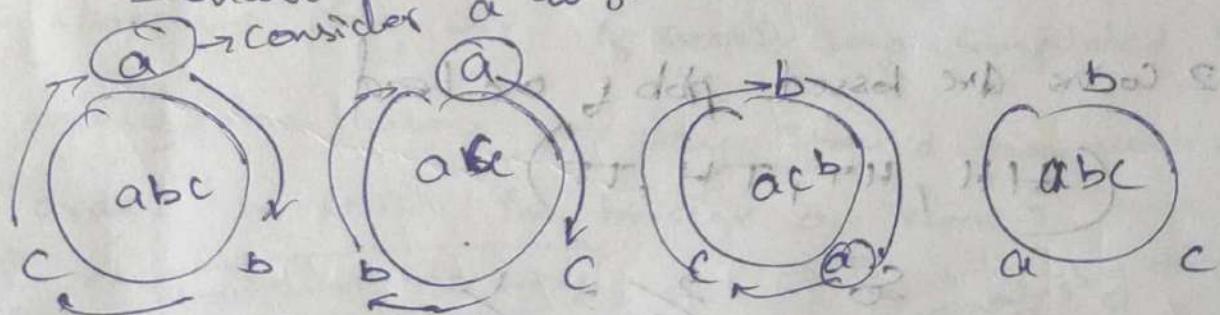
round table means  $(n-1)!$

$$(7-1)! = 6! = 720$$

Consider

3 manager  $\rightarrow A, B, C$

3 chair consider a as fixed



$$\begin{array}{l} abc \\ acb \end{array} \left\{ \begin{array}{l} (3-1) = 2! \end{array} \right.$$

# Computer Science & Engineering

- Good Afternoon!! My name is Nethusam & I'm from CSE currently pursuing my BE CSE at Sri Ram - Engg. I did my schooling at SRI RAM COLLEGE OF ENGINEERING & TECHNOLOGY. I come from CBE.
- \* My technical skills are I am good at C, C++ and littlebit of Java, Python.
  - \* And I'm very much interested in web designing
  - \* My strengths are I can easily get along with people and I am good at working in teams.
  - \* I would like to keep my weakness to my self but I am working on it.
  - \* My goal is to
  - \* As of now my short term goal is to get placed in a company.
  - \* & my long term goal is to become a successful trader in crypto & stocks.

$10101111$   $\underline{2}$   $\rightarrow$   
 $10101111$  ~~2~~ profit.

3 1 0 1  
0 1 1 1 0 0 1 0 0

34

101010  
(232 2)

for( int i=1; i<=5; i++ )

C for(i=1; i<=5; i++)

print( " " );

$$\frac{17 \times 18 \times 19}{16}$$

$$\begin{array}{r} 8 \\ 19 \\ \hline 17 \\ 17 \\ \hline 17 \\ 17 \\ \hline 10907 \end{array}$$

remainder

$$\frac{17 \times 18 \times 19}{16}$$

$$(17 \div 16) \times (18 \div 16) \times (19 \div 16) \\ = 1 \times 2 \times 3 = \boxed{6} \text{ remainder}$$

$$3) \quad \begin{array}{c} 24 \\ \circledcirc \\ 38 \end{array} \times \begin{array}{c} 24 \\ \circledcirc \\ 39 \end{array} \times \begin{array}{c} 24 \\ \circledcirc \\ 37 \end{array} \\ \hline 12$$

2 is same so leave

$$= \underbrace{38 \times 39 \times 37}_{12}$$

$$= (38 \div 12) \times (39 \div 12) \times (37 \div 12) \\ = 2 \times 3 \times 1 = 6$$

$$3) \quad \begin{array}{c} 15 \\ \circledcirc \\ \times 14 \times 13 \\ \hline 16 \end{array}$$

$$\Rightarrow \cancel{(15-15)}$$

$$(15-16) \times (14-16) \times (13-16)$$

$$= -1 \times -2 \times -3 = -6$$

if '-' then add with denominator

$$= 16 - 6 = \boxed{10}$$

if  $\boxed{2}$  we need remainders

$$7 = 5 + \boxed{2} \text{ if } '+' \text{ then } \boxed{2} \text{ remainder}$$

$$7 = 10 - 3 \text{ if } '-' \text{ then } 5 - 3 = \boxed{2}$$

remainders

$$1) \frac{\underline{231 \times 232 \times 235}}{6}$$



$$= \frac{31 \times 32 \times 33}{6}$$

$$= 1 \times 2 \times 3 = \boxed{6} \text{ if } \boxed{6} \text{ if divisible by } 6 \text{ remainder}$$

$$\frac{6}{6} = \boxed{10} \text{ previous } \neq 0$$

$$2) \frac{\underline{4388 \times 4389 \times 4388}}{6}$$

43

$$= \frac{88 \times 89 \times 88}{6}$$

43

$$= 2 \times 3 \times 2 = \boxed{12}$$

$$3) \frac{\underline{9^1 + 9^2 + 9^3 + 9^4 + 9^5 + 9^6}}{6}$$

$$= 9^6 = 3, 81^6 = 3, \dots$$

$$= \frac{6(3)}{6} = \boxed{3} \text{ rem}$$

$$4) \frac{1! + 2! + 3! + [4! + \dots + 80!]}{24}$$

$\Rightarrow 4!$  la onward  $\div 24$  so ans rem is 0

$$\text{so } 1! + 2! + 3!$$

$$= 1 + 2 + 6 = \boxed{9} \text{ rem}$$

$$5) \frac{1! \times 2! \times 3! \times 4! \times \dots \times 50!}{16}$$

$$\begin{array}{r} 24 \\ \times 5 \\ \hline 120 \\ \hline 0 \end{array}$$

= any one of the factorial is  
divisible by 16 so ans '0'

$$= 0 \times \text{anything} = \boxed{0} \text{ rem}$$

$$6) \frac{8^{235}}{7}$$

$$\frac{8 \times 8 \times 8 \times \dots}{7} \quad \text{rem} = 1 \times 1 \times 1 \dots$$

$$\text{so ans} = \text{rem is } \boxed{1}$$

$$7) \frac{3^{426}}{4} = (-1)^{426} = \boxed{1} \text{ even}$$

$$\begin{array}{l} 3^0 = 1 \\ 3^1 = 3 \\ 3^2 = 9 \\ 3^3 = 27 \\ 3^4 = \\ 3^5 = \\ 3^6 = \end{array}$$

$$8) \frac{2^{427}}{3} = (-1)^{427} = -1$$

$$= \text{if } -\text{ve} = 3-1 = \boxed{2} \text{ rem}$$

$$\begin{array}{r} 1 \\ 4 \overline{) 13} \\ 4 \\ \hline -1 \end{array}$$

$$9) \sqrt[3]{-\frac{2^{971}}{5}}$$

$$\begin{array}{l} 2^2 = 4 \\ 2^3 = 8 \end{array}$$

$$12) \frac{9^{423}}{80} \quad 2 \overline{) \begin{array}{r} 211 \\ 423 \\ \hline 1 \end{array}}$$

$$= \frac{(9^2)^{211} \times 9}{80}$$

$$= \frac{(81)^{211} \times 9}{80}$$

$81 \neq 80$  diff  $\boxed{1}$

$$= 1^{211} \times 9$$

$$= 1 \times 9 = \boxed{9}$$

$$9) \frac{2^{976}}{5} = \frac{(2^2)^{488}}{5}$$

$$= \frac{(4)^{488}}{5}$$

$$= (-1)^{488}$$

$$= \boxed{1}$$

$$2 \overline{) \begin{array}{r} 488 \\ 976 \\ \hline 176 \\ 16 \\ \hline 1.6 \end{array}}$$

~~$\frac{244}{188}$~~  = even

$$2 \overline{) \begin{array}{r} 21 \\ 43 \\ 42 \\ \hline 1 \end{array}}$$

$$10) \frac{4^{48}}{15} = \frac{(4^2)^{21} \times 4^1}{15}$$

$$= \frac{(16)^{21} \times 4}{15}$$

$$= 1^{21} \times 4 = 1 \times 4 = \boxed{4}$$

$16 \times 1000 \approx 10^4$

$(10^4) \times 0.62 = 6.2$

## Java

Object is a default class that is extended by all other classes. (root class)

Myclass mc = new Myclass(); Myclass() → calls a constructor

Default constructor is super(); if you don't write

super() means extend class or parent class  
that's default constructor will be used

Class Raja extends Object { Object → default

    Public Raja() {

        Super();

    System.out.println("Raja Construct");

Class Myclass extends Raja { Raja

    Public Myclass() {

        Super();

→ extend flow  
only for default  
non-parametrised  
constructor

    Public static void main (String args[]) {

        Myclass mc = new Myclass();

g

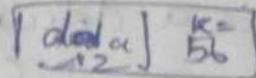
Java {

    Myclass

    Myclass

## Class Node

```
public class Node {  
    int data;  
    Node next;  
}
```



33

## Public class MyClass

```
public static void main (String args) {
```

{

```
    Node n = new Node (12);
```

Insertion of node in linked list

}

Class Node { take default val = 0

int data; //global variable

Node next; //object creation takes default value null

```
public Node (int x) {
```

data = x;

next = null;

## Public class MyClass

```
public static void main (String args) {
```

```
    Node head = new Node (10);
```

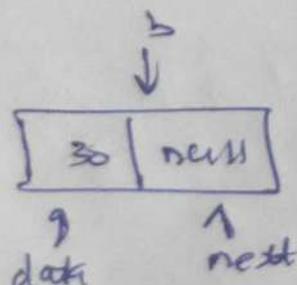
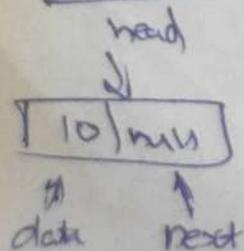
```
    a = new Node (20);
```

```
    b = new Node (30);
```

```
    head.next = a;
    a.next = b;
    System.out.println (head.data);
    System.out.println (a.data);
    System.out.println (b.data);
```

33

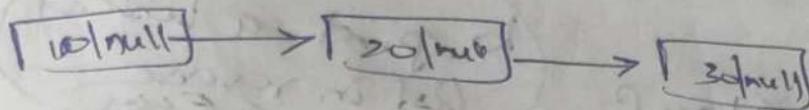
### Explanation



To connect

head.next = a; to connect whole box

a.next = b;



has to find a odd add head odd next la esukun?

System.out.println(a + " " + head.next);

example: 11 (" " Esukun) prints the hash code of a  
so sene equal ah esuka nu pakaneem

Data structure

linked list can hold diff. data type

Static to static no need obj

Tracing tree or recursion tree

```
void fn(int n)
{ if (n > 0) {
```

```
    fn(n-1);
```

```
    S.O. print(n + " ") ;
```

3  
3

main()

```
fn(3);
```

3 2 1 0  
v v v v

apo bending esukuna  
2<sup>nd</sup> line la esukuna  
execute agam

1  
2  
3

To print reverse linked

if(g == null)

{ forward traversal (g.next) };

System.out.print(g.data + " ") ;

}

Public class MyClassC

To print a linked list in reverse easy

static void forwardTraversal(Node g) { }

if(g == null) { }

forwardTraversal(g.next);

System.out.print(g.data + " "); } // end of forward traversal

reverse the print again

Public static void main (String args[]) { }

Node head = new Node(10);

" a = " + (a)

" b = " + (b),

" c = " + (c),

" d = " + (d);

head.next = a; // pointer to 10 (top pointer)

a.next = b;

b.next = c;

c.next = d;

(a to) it know

forwardTraversal(head); } // (0 to) if j

10 → 20 → 30 → 40 → 50.

forward to print again for all nodes print param

10 → 20 → 30 → 40 → 50.

reverse

50 → 40 → 30 → 20 → 10

Static enga use panalam na one class one parent  
class oda sub class ah erukken.

A → [ 10 | 20 | 30 | 40 | 50 ]  
Node head=null;  
static Node createLinkedList (int A[]){  
{ for (int i=0; i<A.length; i++)

{ if (head==null)

{ head = new Node(A[i]);  
tail = head; }  
else {

Node h = new Node(A[i]);

tail.next = h;

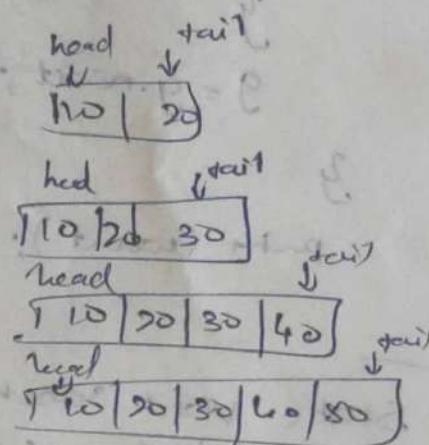
tail = h;

}

} return head

}

Class My Class {  
Class Node {  
int data;  
Node next;  
Node (int data){  
this.data = data;  
next = null; }  
head tail  
} head null



static void display (Node g) {

if (g==null) {

System.out.print(g.data + " ");

display (g.next);

}

public static void main (String args[]) {

Scanner s = new Scanner (System.in);

int n = s.nextInt();

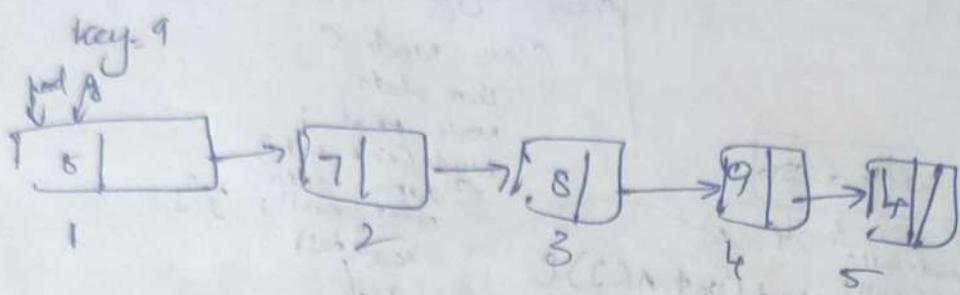
int A[] = new int [n];

for (int i=0; i<n; i++) {

A[i] = s.nextInt(); }

## Java 6 documentation

Search linked list



Node g = head;

int count = 0;

while (g != null) {

count++;

if (g.data == key) {

break;

g = g.next;

}

print(count);

Static void search (Node g, int key) {

int count = 0;

int flag = 0;

while (g != null)

{ count++;

if (g.data == key)

{ flag++;

break;

}

g = g.next;

}

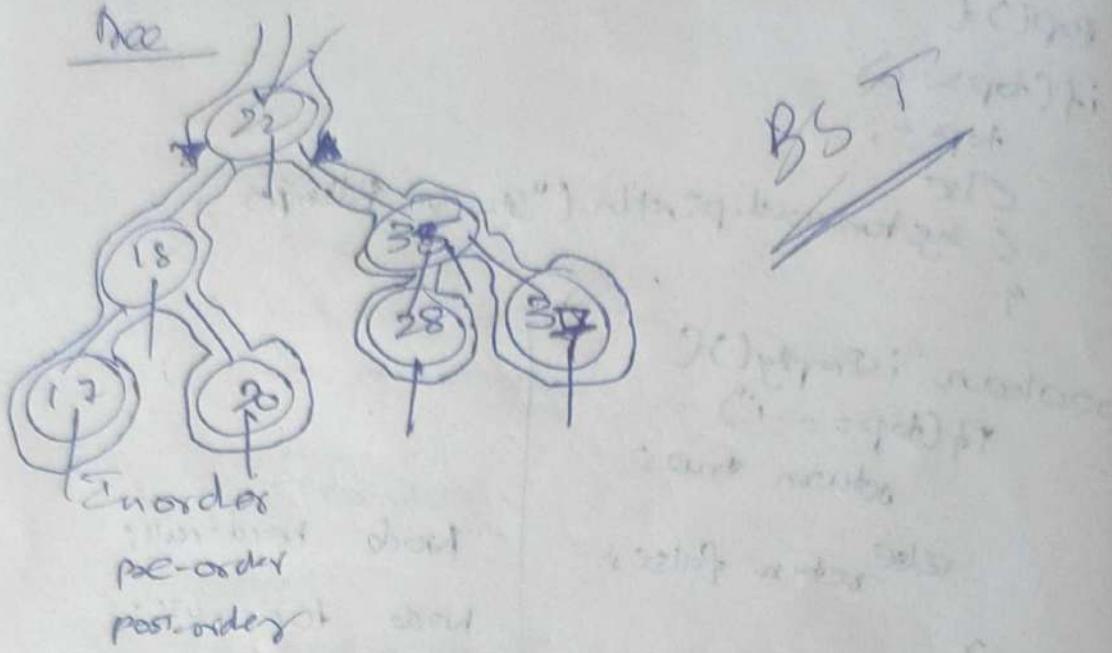
if (flag == 0)

{ S.O..out("element not found"); }

else {

S.O.out(count);

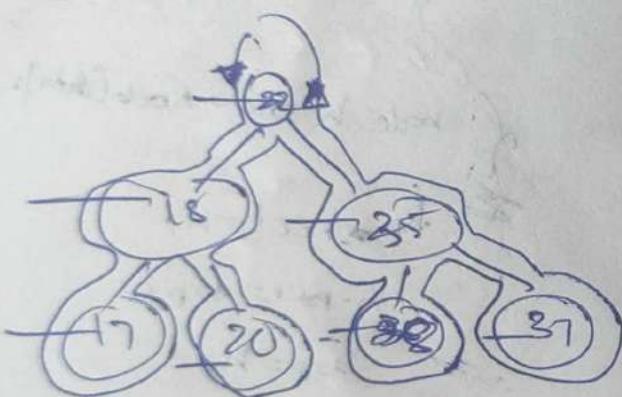
}



Inorder (met een andere Andere | touch)

17 18 20 22 28 35 37

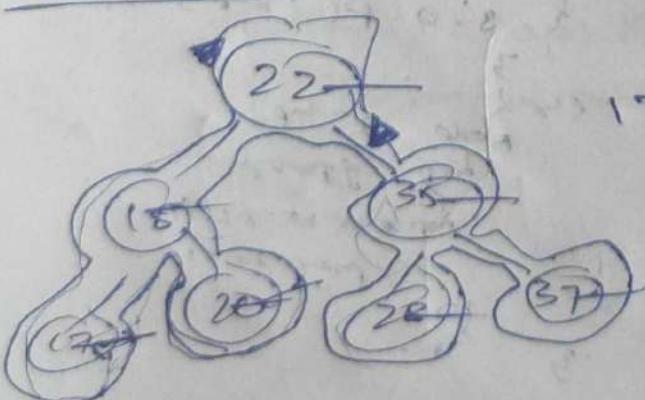
Pre-order



very early

22 18 17 20 35 28 37

Post-order



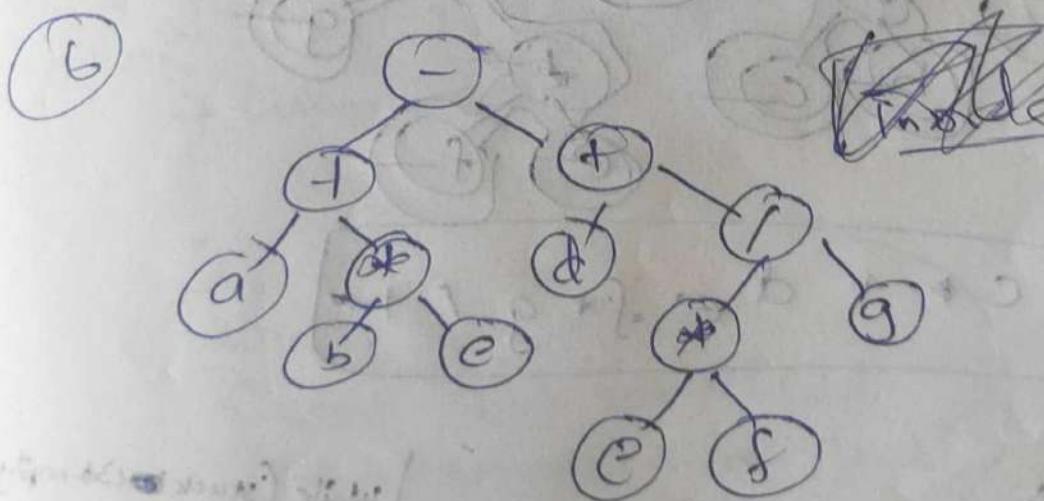
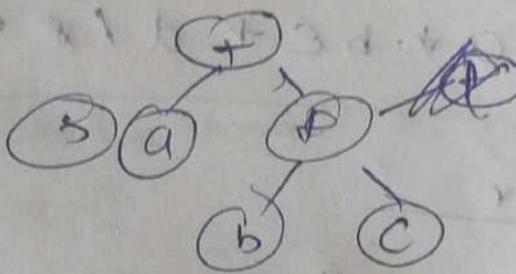
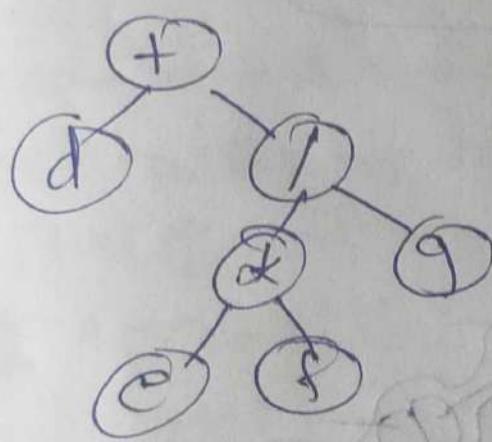
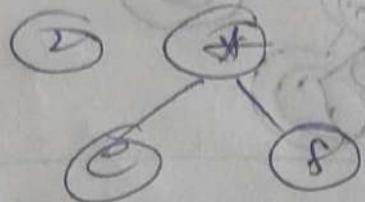
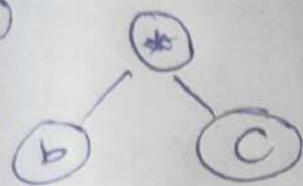
17 20 18 28 37 35 22

$a+b*c - d + e*f/g$  prefix

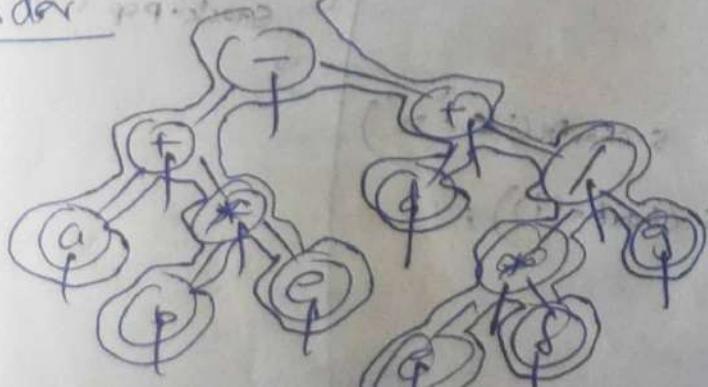
inorder = ?

draw tree

$(a + (b * c)) - (d + (e * f) / g))$

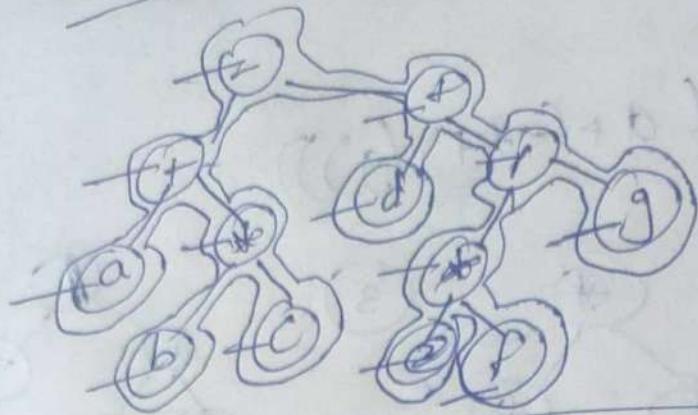


inorder



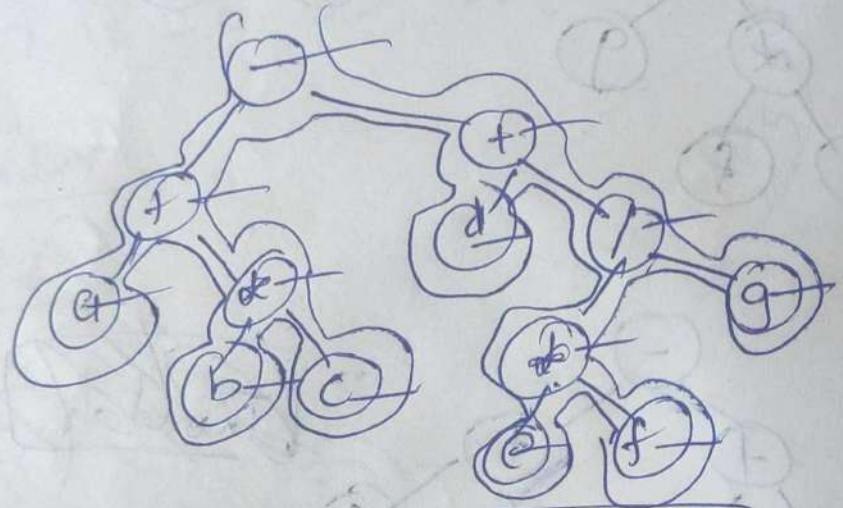
$\boxed{a + b * c - d + e * f / g}$

Pre-order



$- + a * b c + d / * e f g$

Post order



$a b c * + d e f g / + -$

s → "/ulllove1i"\

```

stack stack = new Stack();
int n = s.length();
int i = 0;
while(i < n)
{
    if (s.charAt(i) >= 'a' && s.charAt(i) <= 'z')
        stack.push(s.charAt(i));
    else
        t++;
    i++;
}
y
3

```

while (stack != Empty == false)

C stack.pop();

y

## Syllogism

(Universe - ve)

— L NO, none, " 3

(Particular + ve )

{ Some, few, 0.01% to 99.99%

(Particular - ve )

{ Some - not, few, not }

Statement 1 : All A are B

2 : All B are C

3 : All C are D

4 : All D are E

5 : Some D are F

Possiblenu togather  
dhanke kuduktha ast  
et Ma no unnes

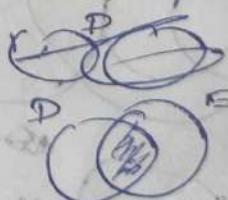
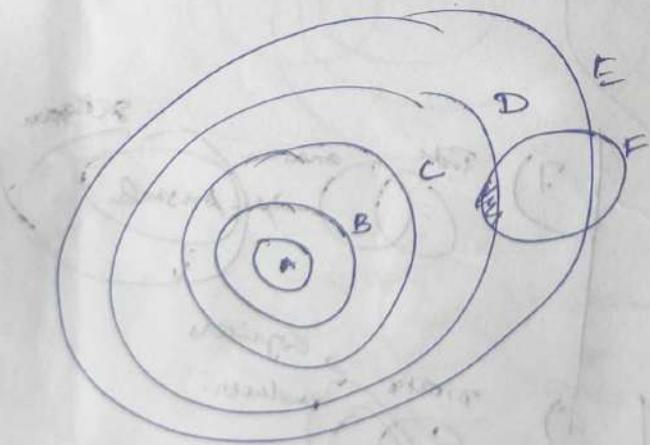
Cans 1 : Some A are D

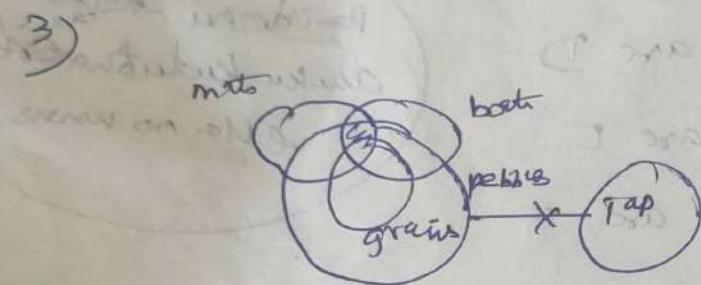
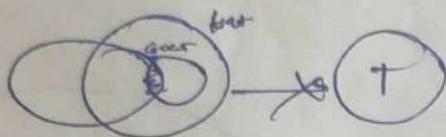
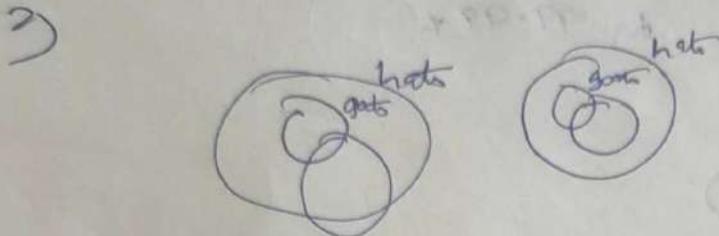
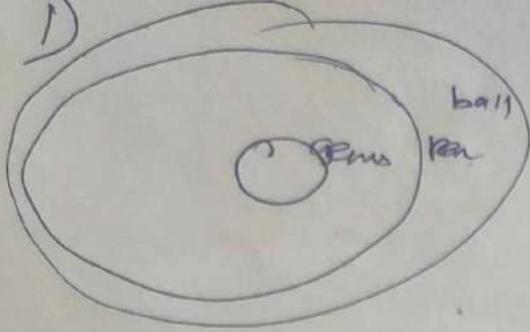
2 : some C are not A

possible den  
not sure

3 : Some E are F

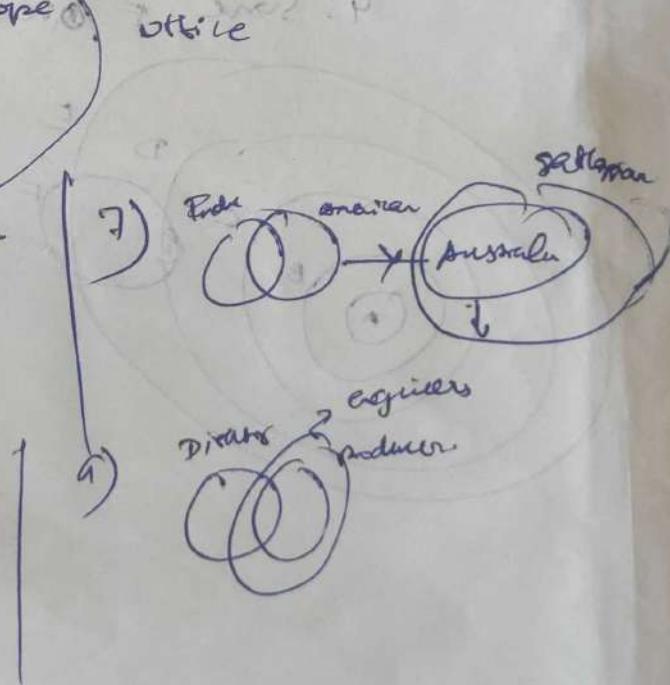
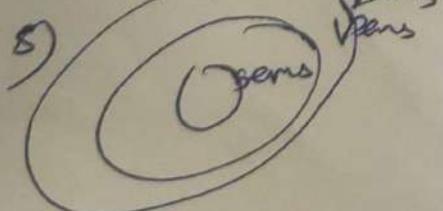
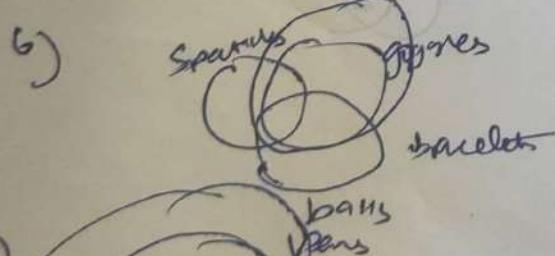
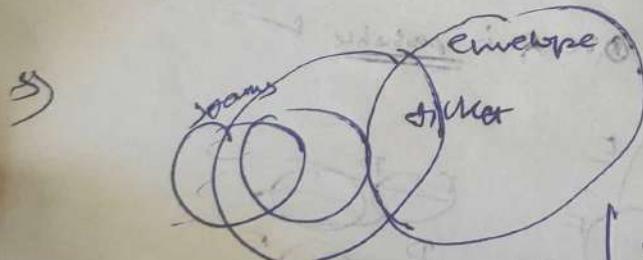
4 : Some F over A is possible

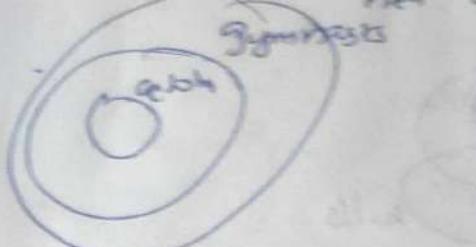
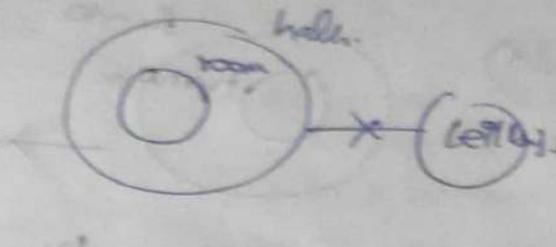
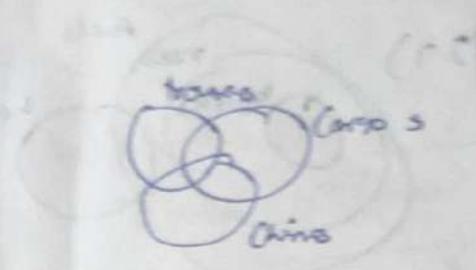
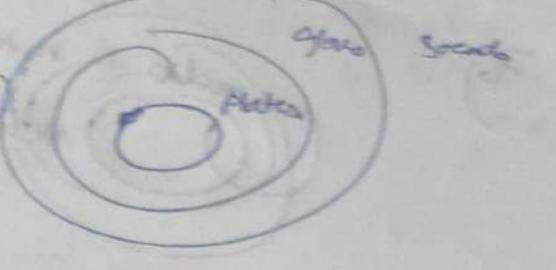
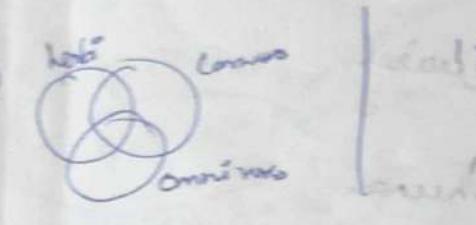
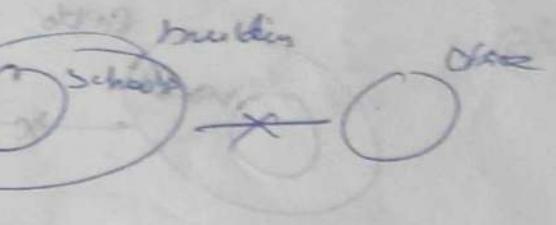
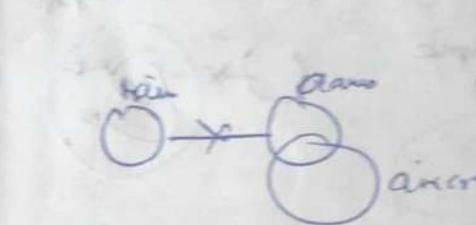
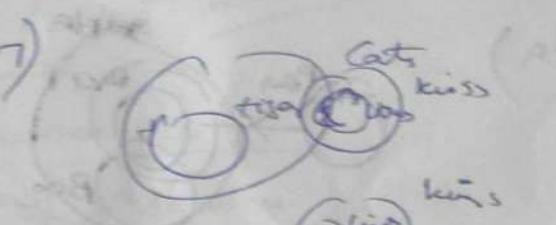
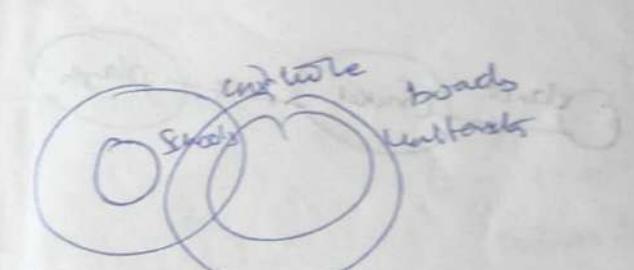
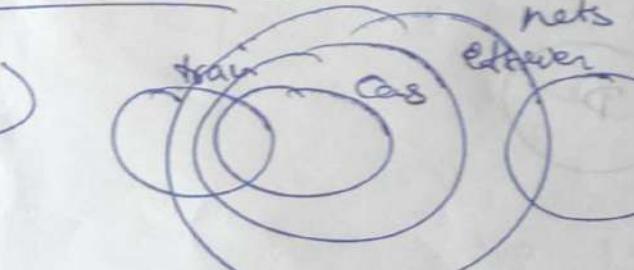
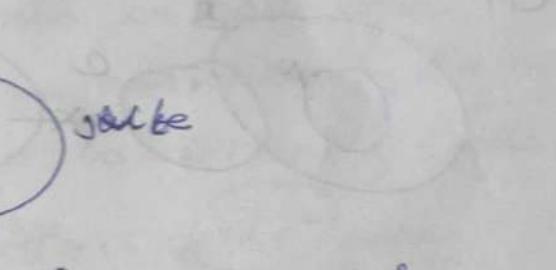
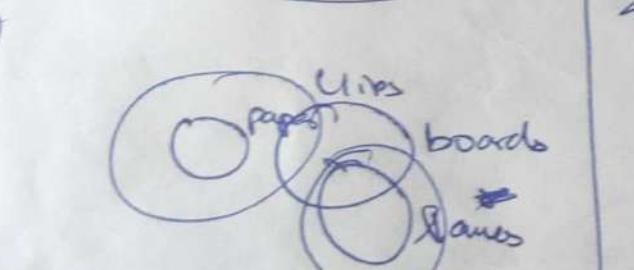
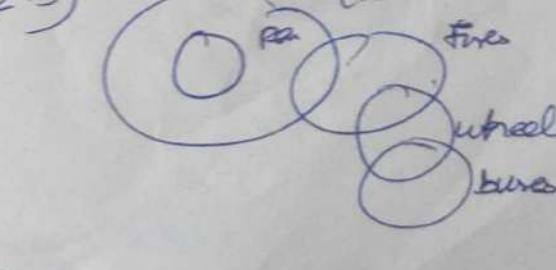
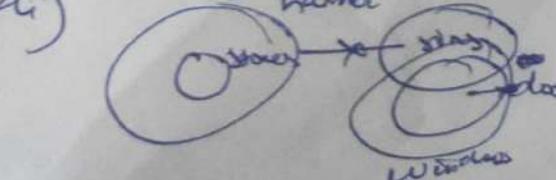




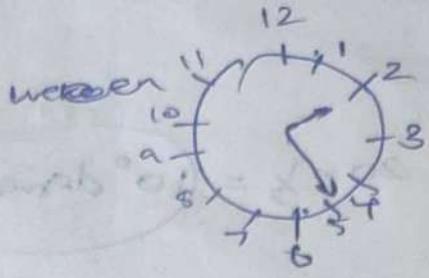
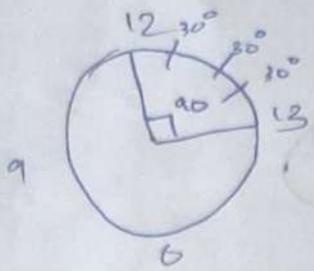
Conclusion = stone Mats are broken  
 Conform al risultato sulla medesima <sup>1</sup><sub>b</sub> false

No pebbles & Tap = nle



- 10)  cabin  
pigments  
11)  rope  
leather
- 12)  towels  
cargo's  
china
- 13)  glass  
plaster  
books
- 14)  lenses  
dominoes  
hob
- 15)  school  
books  
bunkers
- 16)  aircraft  
plane  
train
- 17)  cats  
kiss  
claws
- 18)  boards  
shoals  
culture
- 19)  nets  
etiquette  
jacket
- 20)  gas  
train  
ever
- 21)  boards  
flames  
paper
- 22)  boards  
flames  
paper
- 23)  bars  
bars  
bars
- 24)  bars  
bars  
bars

1)



perfect ah 2:25  
(a exactly 90°  
but 2:25 genera

ap 2 kuya 3 kita  
poga amabikherukan

$$so \approx (85 \cdot 5) \text{ done}$$

$$60 \text{ min} \Rightarrow 360^\circ$$

$$1 \text{ min} = 6^\circ / \text{min}$$

min hand

$$12 P \Rightarrow 360^\circ$$

$$1 P \Rightarrow 30^\circ$$

$$60 \text{ min} \Rightarrow 30^\circ$$

$$1 \text{ min} \Rightarrow 0.5^\circ$$

$$\begin{cases} 6^\circ/\text{min} \\ 0.5^\circ/\text{min} \end{cases}$$

$$\begin{cases} 6^\circ/\text{min} \\ 0.5^\circ/\text{min} \end{cases}$$

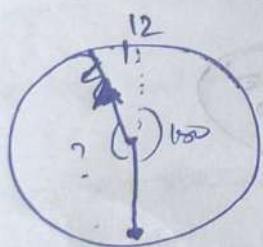
$$\frac{1}{2} \text{ degree} / \text{min} \rightarrow \text{hour hand}$$

$$\begin{cases} \frac{1}{2} \text{ degree} / \text{min} \\ \frac{1}{2} \text{ degree} / \text{min} \end{cases} \rightarrow \text{min needle}$$

$$\begin{cases} \frac{1}{2} \text{ degree} / \text{min} \\ \frac{1}{2} \text{ degree} / \text{min} \end{cases} \rightarrow \text{min needle}$$

2)

11:30 AM



$$6 - 11 \Rightarrow 150^\circ \Rightarrow 11$$

after 30 min

30 min ku evallo done

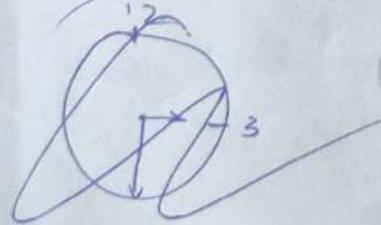
1 min ku hour needle =  $\frac{1}{2}^\circ$  d moves

$$so 30 \text{ min} = 30 \times \frac{1}{2}^\circ \text{ distance}$$

$$so 150^\circ + 15 = 165^\circ \text{ angle between } 11-30$$

3)

3:25 AM



$$30 \text{ min} = 30 \times \frac{1}{2}^\circ = 15^\circ$$

3) 3:20

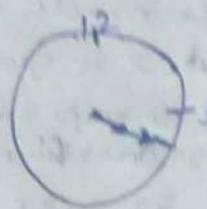


$$\begin{cases} 12 P \Rightarrow 360^\circ \\ 1 P = 30^\circ \end{cases}$$

$$1 \text{ min} = \frac{1}{2}^\circ \rightarrow \text{min hand moves so}$$

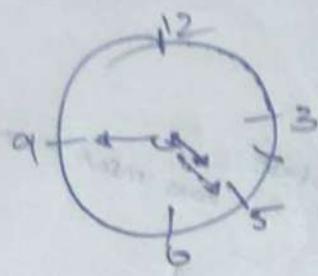
$$3(20) \Rightarrow 20 \text{ min} = 20 \times \frac{1}{2}^\circ = 10^\circ \text{ d so } 30^\circ - 10^\circ = 20^\circ \text{ done}$$

4:20



$$20 \times \frac{1}{2} = 10^\circ \text{ dacea}$$

5:45



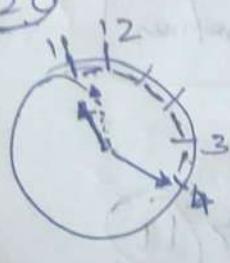
$$120^\circ \text{ but}$$

$$45 \text{ min} \times \frac{1}{2} = 22.5^\circ$$

$$\text{So } 120^\circ - 22.5^\circ$$

$= 97.5^\circ$  maar het minuut moet nu in 5:45

11:20



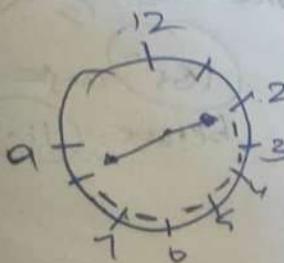
$$150^\circ$$

$$20 \times \frac{1}{2} = 10^\circ$$

$$150^\circ - 10^\circ = 140^\circ$$

word altijd met min 05

2:40



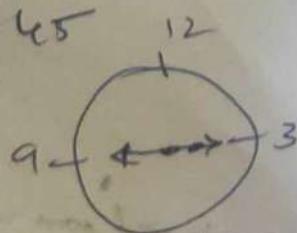
$$6 \times 30 = 180^\circ$$

$$40 \times \frac{1}{2} = 20^\circ$$

$$\text{So } 180^\circ - 20^\circ$$

$$= 160^\circ$$

3:45



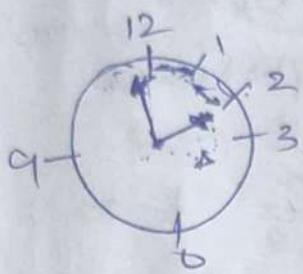
$$180^\circ$$

$$45 \times \frac{1}{2} = 22.5^\circ$$

180 - 22.5 = 157.5° dacea  
maar kloktje moet omhoog worden

$$= 157.5^\circ \text{ dacea}$$

2. 5. 7



60°

$$60 + 18 = 78$$

$$28.5 \times \frac{1}{2} = 28.5$$

$$78 + 28.5 = 106.5$$

$$5 \text{ min} = 30^\circ$$

$$3 \text{ min} = x$$

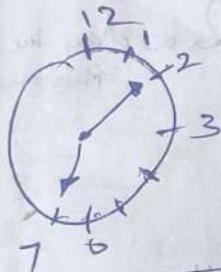
$$x \Rightarrow \frac{3}{5} \times 30 \times 2$$

$$x = 18^\circ$$

$$\begin{array}{r} 72 \\ 28.5 \\ \hline 100.5 \\ -106.5 \\ \hline \end{array}$$



7:10



150

$$10 \times \frac{1}{2} = 5$$

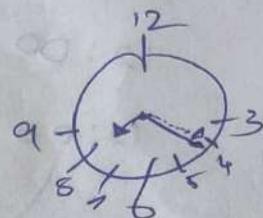
$$155^\circ$$

$$\theta = \left( \frac{11}{2} \times \text{Min hand} - 30^\circ \times \text{hour hand} \right)$$

formula but not necessary

If any  $180^\circ$  ak veda adhigama vandha  
 $360^\circ$  la subtract panise

8:23



120

$$5 \text{ min} = 30^\circ$$

$$3 \text{ min} = x$$

$$x = \frac{30 \times 3}{5}$$

$$x = 18^\circ$$

$$120^\circ - 18^\circ$$

$$= 102^\circ$$

$$= 23 \times \frac{1}{2} = 11.5$$

$$= 102 + 11.5$$

$$= 113.5^\circ \text{ done}$$

When both the hand coincide

$$\Rightarrow \frac{360}{\frac{11}{2} \text{ min}} \rightarrow \frac{720}{11} = 65 \frac{5}{11}$$

$$= 1:5 \frac{5}{11} \rightarrow \text{meet}$$

$$= 11.5 \frac{5}{11}$$

$$= 2:10 \frac{1}{11}$$

$$\frac{1}{11} \frac{1}{4} \rightarrow 1 \frac{1}{4}$$

$$3:16 \frac{4}{11}$$

23)

Sunday

next Sunday

7 day weeks

Current: 10 AM

12 PM = 7 hrs

$$7 \times 24 + 2 = 170$$

$$168 + 2 = 170$$

01:58 AM  
2 min less

$$\begin{array}{r} 0:58 \\ - 0:48 \\ \hline 0:10 \end{array}$$

12:04:48 pm

4:48 minutes

$$\begin{array}{r} 6:58 \\ - 6:48 \\ \hline 10 \\ \times 60 \\ \hline 600 \end{array}$$

= 30 min

Tuesday 12 PM

$$\frac{x = 340 \times 5}{3}$$

$$\frac{340}{3} = 170$$

$$2 = x$$

$$\begin{array}{r} 240 \\ - 210 \\ \hline 30 \\ \times 60 \\ \hline 1800 \end{array}$$

Sunday

50 hrs

$$10\text{ AM} + 50\text{ hrs} = 12\text{ PM}$$

$$\begin{array}{r} 170 \\ \times 2 \\ \hline 340 \\ \times 5 \\ \hline 1700 \end{array}$$

$$x = 50\text{ hrs}$$

24)

Cast Work

Slow W

Fast - W

Sunday

12:00

12:00

12:00

Monday

12:00

11:59

12:01

1 day 1 hr 1 min  
kali chalare day less 1 min  
difference

$$1 \text{ day } k = -1 + 1 = 0$$

apo 12 hrs vandha ell gow shane

$$= 12 \times 60 \Rightarrow 720 \text{ min}$$

720 min equal age adhu 720 days  
agen

(11:20)

what have what work

(11:20)

(11:21)

80 Calander

033-614 - 625 - 035      last no D      century code

Century code(CC)

		Day	
1600-99	6	S-O	
1700-99	4	M-S	
1800-99	2	TU-W	
1900-99	0	W-3	Century Code $\Rightarrow 0$
2000-99	6	THU-4	Mon code $\Rightarrow 02$
2100-99	4	FRI-5	Date = 15
	2	SAT-6	28P1
	0	SUN-7	75

5 = Friday

10  
7/15  
4 days  
 $\frac{70}{5}$

16/6/2003

$$\begin{array}{r} 0 \\ 4 \overline{) 03} \\ 0 \quad 3 \\ \hline 0 \end{array}$$

last 2 digit = 03  
Quotient = 0  
Century code = 06  
Mon code = 4  
Date =  $\frac{11}{24}$

7/24

21  
3  
Wednesday

16/3/2002

$$\begin{array}{r} 0 \\ 4 \overline{) 02} \\ 0 \quad 0 \\ \hline 2 \end{array}$$

last 2 digit = 02  
Quotient = 0  
Century code = 06  
Mon code = 3  
Date =  $\frac{16}{27}$

7/27

6  
3  
Saturday

leap year la Jan / feb kedua ban  
 kedikura ans la -1  
 (terset na while Friday)

BPO + na sat 1.

BPO 1 Mon the  $7+1 \rightarrow 8^{\text{th}}$  Monday  
 the  $\rightarrow 8+7+1 \rightarrow 16^{\text{th}}$  Monday.

pm: 9

1) 31/10/1984

$$\begin{array}{r} 21 \\ \hline 84 \\ 84 \\ \hline 0 \end{array}$$

last 2 digit = 84

Quarter = 21

Year code = 00

Month code = 00

Date = 31

$$\begin{array}{r} 13 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 29 \\ \hline 7 \\ 7 \\ \hline 66 \\ 63 \\ \hline 3 \end{array}$$

(3)  $\rightarrow$  wednesday

2) 27/12/1985

last 2 digit = 85

Quarter = 21

Year code = 00

Month code = 05

$$\begin{array}{r} 27 \\ \hline 13 \\ 4 \end{array}$$

$$\begin{array}{r} 21 \\ \hline 8 \\ 4 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 19 \\ \hline 7 \\ 7 \\ \hline 68 \\ 63 \\ \hline 5 \end{array}$$

Holiday

3) 23/4/1990

last 2 digit = 90

Quarter = 22

Year code = 00

Month code = 06

Date = 23

$$\begin{array}{r} 14 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 22 \\ \hline 4 \\ 9 \\ 8 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 8 \\ \hline 2 \\ 0 \end{array}$$

$$\begin{array}{r} 20 \\ \hline 7 \\ 14 \\ 1 \\ 14 \\ \hline 1 \end{array}$$

Monday

4) 26/8/1990

last 2 digit = 90

Quarter = 2

Year code = 00

Month code = 02

Date = 26

$$\begin{array}{r} 40 \\ \hline 40 \end{array}$$

10

Friday

5) 15/8/1947

out 2 dist = 67

Cleaved = 211

Year code = 00  
Month code = 02  
Date = 15

$$\begin{array}{r} 7 \\ 775 \\ -70 \\ \hline 75 \end{array}$$

25  $\Rightarrow$  Friday

31/12/1987

out 2 dist = 87

Quotient = 121

Year code = 00  
Month code = 05  
Date = 31

$$\begin{array}{r} 20 \\ 79144 \\ -26 \\ \hline 4 \end{array}$$

(4)  $\Rightarrow$  Thursday

20) Jan 1 2004  $\Rightarrow$  Tuesday

1st ~~not~~ leap year last day is Tuesday  
so Jan 1 2005  $\Rightarrow$  Saturday

Leap year at amudha (2024)

But is odd reason  
apo leap year, varalana

1872

2x  
1900

not leap year

for 1872

40  
1912

In this year  
1872 calendar is  
we used

28  
2052  $\Rightarrow$  leap year eppadi vachu  
same 2024 calendar  
ah 2052 la cue parikam

5. 15/8/1947

last 2 digit = 47

Century = 11

Year code = 00

Month code = 02

Date =  $\frac{15}{95}$

$$\begin{array}{r} 11 \\ 4747 \\ \hline 47 \end{array}$$

$$\begin{array}{r} 7 \\ 775 \\ \hline 70 \end{array}$$

(3)

15 → Friday

31/12/1987

last 2 digit = 87

Century = 1921

Year code = 00

Month code = 05

Date =  $\frac{31}{144}$

$$\begin{array}{r} 21 \\ 4787 \\ \hline 8 \end{array}$$

(3)

$$\begin{array}{r} 20 \\ 79144 \\ \hline 26 \\ 4 \end{array}$$

15 → Thursday

29 Jan 1 2004 → Tuesday

12 is not leap year last day is Friday  
so Jan 1 2005 → Saturday

Leap year at amulha

2024

28

2052 → leap year eppadivachu  
same 2024 calendar  
ah 2052 la cua panikku

But is odd number  
apo leap year, variana

1872

2 → not leap year

1900

so 1872

40

1912

In this year  
1872 calendar  
be used

if not leap year na

2007 leap + 3  
2004 + 3  
11 → add

2016 → 2007 calendar  
can be used in  
2018

leap year + 3  
 $(1944+3)$   
so add 13  
11  
~~1958~~ → 1947 Calendar  
at 1958 na  
were printed

3-Friday  
 $\frac{7+1}{11}$  Friday  
 $+7+1$   
 $19 \rightarrow$  Friday

7-Nov  
 $\frac{7+1}{15} \rightarrow$  Mon  
16-Tue  
17-Wed  
18-Thu  
19-Fri

Thurs → 1-Thurs = beginning

$\frac{7+1}{9} \rightarrow$  18 = day

## Cubes

a cube of side 4 cm has been painted

black, red, & green on opposite faces.

then cut into small cubes of size 1cm.

i) how many small cubes will be there

ii) how many small cubes will have 3  
faces painted?

iii) how many small cubes will have 2 faces "

iv) " " " " " " " " " " 1 face "

v) how many " " " " " " " " only 2 faces  
painted green & red.

vi) " " " " " " " " only green painted.