Peco

## Percentages -

| | | | |
|---|---|---|---|
| 1 - 100 %. | 1/6 - 16.66 %. | 1/11 - 9.09 % | 1/16 - 6.25 % |
| 1/2 - 50 %. | 1/7 - 14.28 %. | 1/12 - 8.33 % | 1/17 - 5.85 %. |
| 1/3 - 33.33 %. | 1/8 - 12.50 %. | 1/13 - 7.69 %. | 1/18 - 5.5 %. |
| 1/4 - 25 %. | 1/9 - 11.11 %. | 1/14 - 7.14 %. | 1/19 - 5.26 %. |
| 1/5 - 20 %. | 1/10 - 10 %. | 1/15 - 6.66 %. | 1/20 - 5 %. |

- If A is 1/n more than B then B is 1/n+1 less than A.

ex.

A = 150 — A is 1/2 greater than B.

B = 100 — B is 1/3 less than A.

- IF A is m/n more than B then B is m/(m+n) less than A.

ex.

$\frac{+40}{100}$ ↑ A = 140 ↓ $\frac{-40}{140}$

B = 100

- Price of a chocolate increases by 10% due to which now I am able to purchase 4 chocolate less for Rs. 100 Find increased price of each chocolate.

→

100 — x

1 chocolate → $\frac{100}{x}$

new chocolate

100 — x-4

new price = $\frac{100}{x-4}$

$\frac{100}{x-4} = \frac{100}{x} \times \frac{110}{100}$ ( $\because$ old price × 110% = new price)

$100x = 110x - 440$

$440 = 10x$

$x = 44$

new price = $\frac{100}{44-4} = \frac{100}{40} = \frac{5}{2} = 2.5$ RS.

By traveling 20% faster than the usual speed a man reaches his office 10 min earlier then the scheduled time by how many min. he would be delayed if he reduces the speed by 25%.

→

speed × time = Distance → const.

$\uparrow s \rightarrow \frac{1}{s}$ ∴ time $\downarrow \frac{1}{s}$

$\frac{1}{6} \times$ time = 10

time = 60

$\frac{1}{4} \downarrow s$ ∴ time $\uparrow \frac{1}{3}$

$\frac{60}{3} = 20$

∴ 20 mins delay

- Price of article increases by 20%. by what %.tage consumption should change if expend. increases by 10%.

→

expenditure = P x C

| P | C | E |
|---|---|---|
| 10 | 10 | 100 |
| 12 | x | 110 |

$\therefore x = \frac{110}{12} = 9.1$

$\therefore$ 9%. less $\frac{9}{10}$

- The H and B of a triangle are such that even though B is decreased by 10% area still increases by 10%. Find %. increase in H.

→

$+10\% \rightarrow 1 + \frac{1}{10} = \frac{11}{10}$

$-10\% \rightarrow 1 - \frac{1}{10} = \frac{9}{10}$

Area original $\times \frac{11}{10}$ = new Area

$\frac{1}{2} \times B \times H \times \frac{11}{10} = \frac{1}{2} \times B \times \frac{9}{10} \times H'$

$\frac{H \times 11}{9} = H'$

$\frac{H'}{H} = \frac{11}{9}$ $\therefore$ 22.2% increase.

- when prices of milk went up by 18.18%. the consumption was decreased by 8.33%. by what % expenditure of the family changes.

→

$$P \times C = E$$

$$\frac{2}{11} \uparrow p \quad C \downarrow \frac{2}{13}$$

$$\frac{13}{11} \times \frac{11}{12} = \frac{\text{new } E}{E}$$

$$\frac{13}{12} = \frac{\text{new } E}{E}$$

$\therefore$ increase is $\frac{1}{12} \longrightarrow 8.33\% \uparrow$

- successive percentage changes.

- The population of the city increases by 25%., 18.18%., 10%. in 3 consecutive years and decreased by 9.09% in 4th year the population after 4 years was 65 lacks Find the original population.

→

initial population = $x$

$$x \times \frac{5}{4} \times \frac{13}{11} \times \frac{11}{10} \times \frac{10}{11} = 65$$

$\therefore x = 44$ lakh.

• Population of city change by +12.5 %, -12.5 %, + 6.6% in 3 years find total % change in 3 years

→

$$x \times \frac{9}{8} \times \frac{7}{8} \times \frac{16}{15} = x'$$

$$\frac{x'}{x} = \frac{9}{8} \times \frac{7}{8} \times \frac{16}{15}$$

$$= \frac{63}{60}$$

$$= \frac{21}{20} = \frac{1}{20} \uparrow$$

∴ 5% increase.

• Fresh greps contains 90% water and dry contains 85% matter. How many kg of fresh greps are to be processed in order to obtain 25 kg dry greps.

→

| | water | matter |
|---|---|---|
| Fresh | 90%. | 10%. |
| Dry | 15%. | 85%. |

matter is always constant

$$x \times 10\% = 25 \text{ kg} \times 85\%$$

$$x = \frac{25 \times 85}{10}$$

$$=$$

- a large watermelon whose weight is 20 kg with 96%. of weight is water. It is allowed to stand in sun for a while and some water evaporates. so that now only 95%. is water. Its reduced weight will be.

→

96%. 4%.

95%. 5%.

$20 \times 4 = x \times 5$

$x = 16$ kg

- M is equal to 30% of Q

Q = ~~30~~ 20%. P

N = 50%. P

Then $\frac{M}{N} = ?$

→

$M = \frac{Q \times 30}{100}$

$Q = \frac{20 \times P}{100}$

$N = \frac{50 \times P}{100}$

$\frac{Q}{N} = \frac{2}{5}$

$\frac{\frac{M}{1}}{\frac{2}{5}} = \frac{\frac{Q \times 30}{100}}{\frac{Q}{N}}$

$\frac{M \times 5}{2} = \frac{30}{100} \times N$

$\frac{M}{N} = \frac{60}{500} = \frac{6}{50} = \frac{3}{25}$

• A team won 80% of the games it played. It played 5 mode of which it won 3 and loss 2 Its loss % change to 25%. How many games did it play overall.

→

| | won | loss |
|---|---|---|
| $x$ | $\frac{4}{5}x$ | $\frac{1}{5}x$ |
| 5 | 3 | 2 |

$(x+5)$ — $2+x$

100 — loss

$$\text{loss} = \frac{100 \times \frac{10+x}{5}}{x+5}$$

$$= \frac{x+10}{x+5} \times 20$$

$$25 = \frac{x+10}{x+5} \times 20$$

$$25x + 125 = 20x + 200$$

$$5x = 75$$

$$x = 15$$

loss = $\frac{25}{100}$

. Income of A is 50% more than B. expend. of B is equal to savings of A and savings of A is 3 times of B. What % of his income does A save.

→

let B income is 100

∴ A income = 150

A saving = $x$

∴ B expend. = $x$

∴ B saving = $100 - x$

$(100-x) \times 3 = x$

∴ $x = 75$

∴ $\frac{SA}{IA} = \frac{75}{150} = \frac{1}{2}$

• Income of A is 50% more than B. expend. of B is equal to savings of A and savings of A is 3 times of B. What %. of his income does A save.

→

let B income is 100

∴ A income = 150

A saving = x

∴ B expend. = x

∴ B saving = 100 - x

$(100-x) \times 3 = x$

$\therefore x = 75$

$\therefore \frac{SA}{IA} = \frac{75}{150} = \frac{1}{2}$

• Speed distance time.

1) Distance between A and B is 60 km. It goes with speed of 30 km/hr and reach B.

2) ~~$50 = \frac{2 \times 75 \times y}{75 + y}$~~

~~$\therefore 75 + y = 3y$~~

~~$2y = 75$~~

~~$y =$~~

$50 = \frac{2 \times 30 \times y}{30 + y}$

$50 \times (30 + y) = 60y$

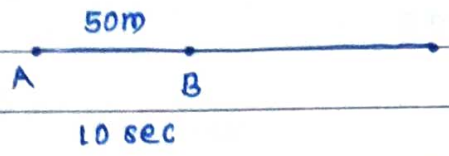
$150 + 5y = 6y$

$y = 150$ km/hr

• average speed $= \frac{2xy}{x+y}$

where $x$ and $y$ are speed of going and comming back from destination.

3)




speed of B $= \frac{50\text{ m}}{10\text{ sec}} = 5\text{ m/sec}$

time taken by B $= \frac{1000}{5} = 200$ sec.

4)

Distance is constant

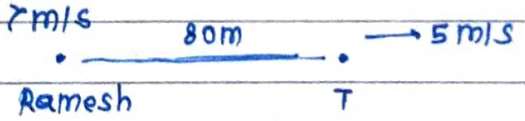
$\therefore x \times t = \frac{x \times 9}{5}(t-30)$

$\therefore 5t = 9t - 270$

$\therefore 4t = 270$

$\therefore t = \frac{270}{4} = 67.5$ mins.

5)



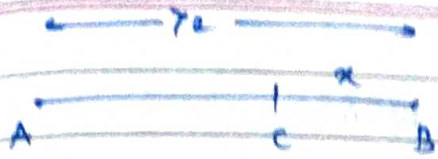

$\frac{(80+D)}{7} = \frac{D}{5}$

$400 + 5D = 7D$

$2D = 400$

$D = 200\text{ m}$

6)




time const.

$$\frac{72-x}{17} = \frac{72+x}{13}$$

$\therefore 13 \times 72 - 13x = 17 \times 72 + 17x$

$\therefore 36x = 2 \times 72$

$\therefore x = 4$ km

7) Dist. const.

$50 \times (t+30) = 60 \times (t-10)$

$5t + 150 = 6t - 60$

~~$t = 90$ mins~~. $t = 210$ mins.

~~1.5 hr~~ ~~$50 \times (2) = 100$ km~~

~~$\frac{25}{50} \times (230 \text{ mins})$~~ $\frac{50 \times 240}{60} = 200$ km

~~$\frac{25 \times 23}{3}$~~

8) $30(t+20) = 45(t+8)$

$2t + 40 = 3t + 24$

$t = 16$

$\frac{45 \times 24}{60} = 3 \times 6 = 18$ km

D =

9) $t_2 = \frac{100}{S_B} = \frac{90}{S_C}$ $\quad S_B = \frac{100 \times S_C}{80}$

$t_1 = \frac{100}{S_A} = \frac{80}{S_B} = \frac{100}{S_A} = \frac{80 \times 80}{100 \times S_C} = \frac{64}{S_C}$

$\therefore$ C will travel 64 m

$\therefore$ ans = 36 m.

- opposite direction = $x+y$
  same direction = $x-y$.

- Train -

1) $D = S \times P = 60 \text{ km/hr} \times 9 \text{ sec}$

$= 60 \times \frac{5}{18} \times 9$

$= 150 \text{ m}$

2) $D = S \times t$

$125 = (x-5) \times 10$

$\frac{125}{10} = x-5 \times \frac{5}{18}$

$\frac{125 \times 18}{10 \times 5} = x-5$

$5 \times 9 = x-5$

$x = 50 \text{ m/sec}$

3) $D = (130+d) = \frac{45 \times 5}{18_3} \times 30^{15} 5$

$130+d = 15 \times 5 \times 5 = 75 \times 5 = 375$

$d = 375 - 130$

$d = 245 \text{ m}$

4) $D = \frac{54 \times 5}{18} \times 20 = 3 \times 5 \times 20 = 300\ m$

$(300 + D) = 15 \times 36$

$300 + D = 540$

$D = 540 - 300 = 240\ m.$

5) $2x = \frac{10 \times 5}{18} \times 36$

$x = 25 \times 2 = 50\ m$

Date __/__/____

Saathi

# Time and Work

- Units of Work.
- Work equivalence:
- Pipes and systems.

1) A and B → 12 day B and C can finish in 16 days A and B started without C.
   i) A leaves after 5 days
   ii) C works for 13 days
   iii) B leaves after 7 days
   In how many days can C finish work alone?

→

A + B = 12
B + C = 16
→ consider LCM → 48 units of work

work done A and B in 12 days is 48 units
∴ work done in one day is 4 units

∴ similar for B and C one day work is 3 units.

Date __/__/____

Saathi

2) A, B and C can finish a work in 15 days. All started but A leaves after 5 days. B and C completes the remaining work in 20 days. How many days A will take to complete entire work.

→

Total work is 15 units

work done in one day by all is 1 unit

work done by all in 5 days is 5 units.

∴ Remaining work = 15-5 = 10

10 ⟶ B+C in 20 days

∴ in one day 1/2 units

∴ work done by A is one day = 1 - 1/2 = 1/2

∴ A will take 30 days.

3) A, B, C can do work in 6, 7, 14 hrs working alone all started together at 9 am. A leaves after 2hrs. B leaves 20 mins before the completion. what time the work compleated.

→

42 units of total work

by A in one hr ⟶ 7

B in one hr ⟶ 6

C in one hr ⟶ 3

∴ For 1st 2hrs ⟶ 14 + 12 + 6 = 32

∴ remaining 10 units.

$$\therefore \quad t \times 6 + t \times 3 + \frac{1}{3} \times 3 = 10$$

$$\therefore \quad 9t = 9$$

$$t = 1$$

Page No.

Date __/__/____

Saathi

∴ 9 am + 2 hr + 1 hr + 20 mins
= 12 : 20 pm.

application base question -

1) A can build a wall in 50 days. B can break it in 60 days. They work on alternate days starting with A, in how many days the wall is completely build.

→

300 units of work
∴ A 1 day work = 6 unit
∴ For B = 5 unit

∴ $(x+1) \times 6 + x \times (-5) = 300$
∴ $6x + 6 - 5x = 300$
∴ $x = 294$
∴ total days = 294 + 295 = 589 days.

⇒

- Efficiency $\propto \frac{1}{\text{time}}$

2) A does half as much work as B and C does half as A and B together. C alone finish in 40 days. Find time by all together to finish the work.

→

C → 40 day
A + B → 20 days

A : B
1 : 2

C : A + B
1.5 : 3

∴ total work = 40 × 1.5 = 60 units.
∴ For all work done in 1 day = 1 + 2 + 1.5 = 4.5
∴ Days = 60/4.5 = 13.33 days

Page No.

Date ___/___/_____

Saathi

Que. 1) A can do 50% more work than B in the same time. B alone can do in 30 hr. B started and has already worked for 12hr when A joins him. How much time they should work together to complete remaining.

→

A : B

3 : 2

∴ units = 30 × 2 = 60

work by B in 12 hr = 24 units

∴ remaining = 36

∴ For both = $\frac{36}{5}$ = 7.2 hr

Que. 2) A, B, C can type 900 pages in 20 days working for 8 hr a day. In a day B types as many pages more than A and C types as many pages more than B. Page typed by A in 4 hr = C in 1 hr. How many page C type each hr.

→

900 page → 20 day

1 day → 45 pages by A, B, C

1 : 4 → pages by A and C in 1 hr.

1 : 2.5 : 4

$x + 2.5x + 4x = 45$

$2x + 5x + 8x = 90$

$15x = 90$

$x = 6$

$\therefore 4x = 24$

~~∴ work do~~ ∴ C do 24 pages in 8 hr.

∴ 3 pages 1 hr.

Date __/__/____

Saathi

- work equivalence ⟶

Que. A and B completed the work in 5 days. Had A worked at twice the speed of B and B as half of A. The work would completed in 4 day. how much time it take for A done to complete work.

⟶

~~2 : 1 - work done by A - B~~

~~2+1 = 3 done per day~~

~~∴ total work = 12 units~~

A + B ⟶ 5 days
2B + A/2 ⟶ 4 days
] ⟶ 20 units

A and B First case ⟶ 4 units per day
for 2nd case ⟶ 5 units per day

$A+B = 4 \quad -①$

$\frac{4B+A}{2} = 5$

$4B+A = 10$

$4B = (4-A) \times 4$ ⟶ From ①

$16 - 4A + A = 10$

$3A = 6$

$A = 2$

∴ 10 days for A.

Date __/__/____

Saathi

work equivalence -

$$\frac{m_1 d_1}{w_1} = \frac{m_2 d_2}{w_2}$$

Que. 1) Certain number of men can finish the work in 36 days. If 2 more men are added it will take 16.66 % less time. How many men are required to finish work in 20 days.

→

$$\frac{m_1 \times 36}{w_1} = \frac{(m_1+2) \times \left(36 - \frac{36 \times 1}{6}\right)}{w_2}$$

$$\frac{36 \times m_1}{w_1} = \frac{(m_1+2) \times 30}{w_2}$$

$$6 m_1 = 5 m_1 + 10$$

$$m_1 = 10$$

$$\frac{10 \times 36}{w_1} = \frac{20 \times m_2}{w_1}$$

$$m_2 = 18 \text{ mens}$$

Que. 2) 20 men can finish the work in 23 days working together.

i) All started but 1 man leaves after every one day Find % of work completed when last man leaves. → 45%

→ ii) All started but 1 man joins after every day. How many days are required to finish work.

→

Date __/__/____

Saathi

Total units → 23×20 = 460 units

for 1 men → 1 unit

∴ For 1st

$20 + 19 + 18 + 17 \ldots + 1 = \frac{n(n+1)}{2} = \frac{20(21)}{2} = 210$

460 — 210

100 — x

$\therefore x = \frac{100 \times 210}{460} = 45.6\%$

∴ For 2nd

$20 + 21 + 22. + \ldots + x. = 460$

$\therefore \frac{n}{2}[2 \times a + (n-1) \times d] = 460$

$\therefore n \times 2a + n^2 - dn = 920$

$\therefore n^2 + 40n - n = 920$

$\therefore n^2 + 39n - 920 = 0$

$\therefore n \simeq 17$ days $16 + \frac{5}{9}$ days.

Que.3) In garrison of 600 soldiers the food stock is sufficient for 24 days after 15 days 200 additional men arrived and the conssumption last for only 5 days. Find the % increase in consumption.

→

$600 \times 24 \times x = (x \times 600 \times 15) + (800 \times y \times 5)$

$24 \times 6 \times x = 15 \times 6 \times x + 40y$

$9 \times 6x = 40y$

$27x = 20y$

$\frac{x}{y} = \frac{20}{27}$

20 — 7

100 — x

$\frac{100 \times 7}{20} = 35\%$ ↑ increase

Date __/__/____

Saathi

Que. 4) 6 painters can paint 18 walls in 2 weeks How many wall of twice the area can 15 painters paint in 3 weeks.

→

$$\frac{6 \times 8 \times 2}{18 \times a} = \frac{15 \times 3}{a \times 2 \times x}$$

$$2x = 72$$

$$x = 36 \text{ walls}$$

Que. 5) 15 men or 24 women or 36 boys can do a work in 12 days working for 8 hr a day. How many men must be associated with 12 w and 6 b to do another work 9/4 x times big in 30 days working for 6 hr a day.

→

$$15\,m = 24\,w = 36\,b$$

$$\therefore \frac{15 \times 12 \times 8}{1} = \frac{x \times 30 \times 6}{9/4}$$

$$3 \times 12 = 2x$$

$$x = 18 \div \quad ym + 12w + 6b$$

$$18 = ym + \frac{15}{2}m + \frac{15}{6}b$$

$$18 \times 12 = 12y + 15 + 15 \times 2$$

$$18 \times 4 = 4y + 5 + 5 \times 2$$

$$72 = 4y + 15$$

$$4y = 47$$

$$y = \frac{47}{4}$$

$$18 \times 6 = 6y + 45m + 15m$$

$$18 \times 2 = 2y + 15m + 5m$$

$$36 = 2y + 20$$

$$2y = 16$$

$$y = 8$$

∴ 8 men.

Date __/__/____

Saathi

Que.6) The daily work of 2 men = 3 women = 4 youngsters
14 m , 12 w , 12 y can finish work in 24 days.
But it is required to be in 14 days and as an additional labour only men are reliable. How many of them are required.

→

$$\frac{\text{prev} \times 24}{w} = \frac{\text{curr} \times 14}{w}$$

$$(14m + 12w + 12y) \times 12 = ((14+x)m + 12w + 12y) \times 7$$

$$(14m + 8m + 6m) \times 12 = ((14+x)m + 8m + 6m) \times 7$$

$$28m \times 12 = ((14+x)m + 14m) \times 7$$

$$48 = 14 + x + 14$$

$$x = 20$$

∴ 20 mens are required.

Que.7) The no. of men, women, children working together are 18 together they earn 4000/- per day. Sum of the wages of all men, women and child are in ratio of 18 : 10 : 12
and individual wages are in 6:5:3 How much does a women earn in a day.

→ no. of men women children →

$$\frac{18}{6} : \frac{10}{5} : \frac{12}{3}$$

3 : 2 : 4

$3x + 2x + 4x = 18$

$\therefore x = 2$

∴ 6 men
4 women
8 children

$18y + 10y + 12y = 4000$

$40y = 4000$

$y = 100$

$\therefore 10y = 1000$

$\frac{1000}{4} = 250$ Rs

Page No.

u = boat speed
v = current speed
u+v = downstream
u-v = upstream

Date __/__/____ Boats and streams

Saathi

1) B ⟶ 13 km/hr ∴ speed in downstream = 17 km/hr
W ⟶ 4 km/hr ∴ time = $\frac{68}{17}$ = 4hr

2) u+v = 15 km/hr v = 2.5 km/hr
∴ u = 12.5 km/hr
∴ u-v = 10 km/hr ⟶ upstream speed

3) u = 9 kmph v = 1.5 kmph
For downstream speed = 10.5
time = $\frac{105}{10.5}$ = 10 hr
For upstream speed = 7.5
time = $\frac{105}{7.5} = \frac{1050}{75} = \frac{42}{3}$ = 14 hr
∴ total time = 10 + 14 = 24 hr.

4) u = 15 kmph

$$4+\frac{1}{2} = \frac{30}{x} + \frac{30}{y}$$

$$\frac{9}{2} = 30\left(\frac{x+y}{xy}\right)$$

$$9 = 60\left(\frac{(u+v)+(u-v)}{(u+v)(u-v)}\right)$$

$$9 = 60\left(\frac{15+15}{(15)^2 - v^2}\right)$$

$$9 \times (225 - v^2) = 60 \times 30$$

$$-v^2 = \frac{60 \times 30}{9} - 225 = \frac{1800 - 1575}{7}$$

$$v^2 = 25$$

$$v = 5 \text{ kmph}$$

Page No.

Date ___/___/_____

Saathi

5) Down stream speed = 8 kmph

upstream speed = 4 kmph

$(u+v) + (u-v) = 8+4$

$2u = 12$

$u = 6$ kmph $\quad \therefore v = 2$ kmph

6) $u = 15$ kmph $\quad v = 3$ kmph

downstream $= 18 \times \frac{5}{18}$ m/sec $= 5$ m/sec

$\therefore$ in 12 mins it will travel $= 5$ m/sec $\times 12 \times 60$ sec

$= 300 \times 12 = 3600$ m $= 3.6$ km

7) upstream time = t $\quad u = 10$ mph

$\therefore$ downstream time = $t - 1.5$ $\quad d = 36$ miles

$u+v = 10+v = \frac{36}{t-1.5}$

$10-v = \frac{36}{t}$

$20 = \frac{36}{t} + \frac{36}{t-\frac{3}{2}}$

$5\ 10 = 9\left[\frac{t-1.5+t}{t(t-3/2)}\right]$

$5 = 9\left[\frac{4t+3}{t(2t-3)}\right]$

$\therefore 10t^2 - 15 = 36t + 27$

$\therefore 10t^2 - 36t - 42 = 0$

$\therefore 5t^2 - 18t - 21 = 0$

$1.5 = 36\left[\frac{1}{10-v} - \frac{1}{10+v}\right]$

$1 = 24\left[\frac{10+v-10+v}{100-v^2}\right]$

$100 - v^2 = 24v \times 2$

$v^2 + 48v - 100 = 0$

$\therefore v = 2$ mph

Page No.

Date ___/___/_____

8) $u+v \longrightarrow 1\text{ hr}$ $\quad v = 3\text{ kmph}$

$u-v \longrightarrow 1.5\text{ hr}$

$d = (u+v) \times 1 = (u-v) \times 1.5$

$2u+2v = 3u-3v$

$u = 5v$

$u = 15\text{ kmph.}$

9) ~~$u = \frac{48}{14}$~~ $\quad$ ~~$u = \frac{48}{7}$~~ $=$

$u+v = \frac{4}{t}$

$u-v = \frac{3}{t}$

$\frac{u+v}{u-v} = \frac{4}{3}$

$3u+3v = 4u-4v$

$7v = u$

~~$48$~~ $\quad 14 = t_1 + t_2$

$14 = \frac{48}{u+v} + \frac{48}{u-v}$

$7(u^2-v^2) = 24(2u)$

$7u^2 - 7v^2 = 48u$

$7 \times 49v - 7v^2 = 48 \times 7v$

$v^2 = v$

$v = 0 \quad$ or $\quad v = 1$

$\therefore v = 1\text{ kmph}$

10)

Date ___/___/_____

10) $d_1 + d_2 = 300$

$30 \times t + 10 \times t = 300$

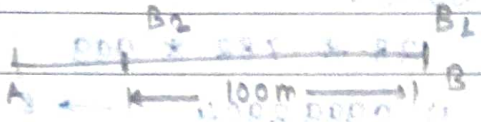

$4t = 30$

$t = \frac{15}{2} = 7.5$ hr

$d_1 = 30 \times \frac{15}{2} = 225$km

$d_1 = 300$ m

$\therefore t = \frac{200}{30} = 10$ hr




$\therefore d_2 = 10 \times 10 = 100$km



distance between them is 100 m

$\frac{d-100}{10} = \frac{d}{20}$

$2d - 200 = d$

$d = 200$km from B

$\therefore$ time = 10 hr

$\therefore$ total time = 20 hr → (10hr for $B_1$ to reach B and 10 hr for reach $B_2$)

Page No.

Date ___/___/_____ Digital Sum

Saathi

- Sum till we get single digit. ex. 1234 = 1+2+3+4 = 10 = 1+0 = 1

$9+x = x$ ex. $9+6 = 15 = 1+5 = 6$

$9 \times x = 9$ ex. $9 \times 7 = 63 = 6+3 = 9$

1) solve.

$128 * 782 * 999$

→ 1) 99992904 → 6 ×

2) 99999904 → 7 ×

3) 99994904 → 8 ×

4) 99995904 → 9 ✓

$1+2+8 = 11 = 2$

$7+2+8 = 17 = 8$

$9+9+9 = 27 = 9$

→ $16 \times 9 = 144 = 9$

2) $(88)^{\wedge}2$

→ 1) 7544 2) 7644 3) 7744 ✓ 4) 7844

88 × 88

$16 = 7 \times 7 = 49 = 4$

3) $73^2$ ⟶ $(1)^2 = 1$

1) 5129 × (8) 2) 5229 × (9) 3) 5239 1 (✓) × 4) 5329 1 (✓) ✓

73 → 3 → 09

7 → 49

13 → 169

17 → 289

23 → 529

second last digit is always even if last is 9.

Date __/__/____

Saathi

4) $(24)^3$ —— $(\quad)^3 = 216 = 9$

→ 1) 13524 (6) 2) 13624 (7) 3) 13724 (8) 4) 13824 (9 ✓)

5) $1.15 \times 1.27$ ⟶ $7 \times 1 = 7$

→ 1) 1.4615 (8) 2) 1.4705 (8) 3) 1.4625 (9) 4) 1.4605 (7 ✓)

6) 27% of 37 ⟶ $\frac{27}{100} \times 37 = 9$

→ 1) 9.69 (6) 2) 9.79 (7) 3) 9.89 (8) 4) 9.99 (9 ✓)

8) Principal = 5000 ROI = 18% no. of years = 2
amount ? (compounded Annually)

→ 1) 6762 (3) 2) 6862 (4) 3) 6962 (✓5) 4) 7062 (6)

$$A = P\left(1 + \frac{R}{100}\right)^N$$

$$= 5000\left(1 + \frac{18}{100}\right)^2$$

$$= 5000\left(\frac{118}{100}\right)^2$$

$5 \times (1)^2 = 5$

9) $\sqrt{1+20 \times 21 \times 23 \times 22}$ ⟶ $\sqrt{1+2\times3\times5\times4} = \sqrt{1+20} = \sqrt{3+1} = \sqrt{4} = 2$

1) 441 2) 451 3) 461 4) 471

→ 9 square (9) ↓ 1 ↓ 1 — 2 (✓) ↓ 4 (✓) — 3 (✗) ↓ 9

$(1+4)^{\frac{1}{2}} = (\sqrt{5})^{\frac{1}{2}} = 4$

Page No.

Date ___/___/___

10) 88 % (6242) × 12 % (225)

→ 1) 13426318 2) 13988322 3) 15622184 4) NOTA (may be)

11) $\left(\frac{2562}{3416} \times 100\right)$ % of 4016

→ 1) 3015 2) 3012 3) 4004 4) 1004 5) NOTA

12) $(21 \times 41 \times 97 + 4)^{1/4}$

→ 1) 16 2) 17 3) 18 4) 15

$(3 \times 5 \times 7) + 4$

$105 + 4$

$6 + 4 = (1)$

$(1)^4 = (RHS)^4$

$1 = (RHS)^4$

$8 \times 8 \times 8 \times 8 = 64 \times 64 = (1)$ ✓

13) 443 × 456 − 8792 + 20 % of 555

→ 1) 184321 2) 193327 3) 206357 4) 189332

$7 + 8 = 15 = 6$

$2 \times 6 - 8 + 3$

$3 - 8 + 3$

$6 - 8 \rightarrow (-2) \Rightarrow$ ans $= -2 + 9 = (7)$

$(6) \rightarrow RHS + 8$

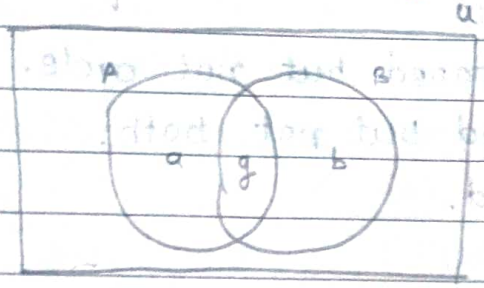
Date __/__/____ Reasoning

Saathi

- Set Theory (venn diagrams) -

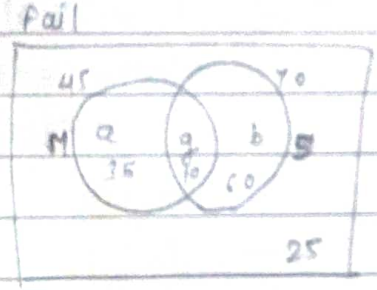
1) Two set venn diagram -

General venn diagram -




1) In a class of 130 students 85 passed in maths, 60 passed social and 10 failed both.

→ 1) How many failed in exactly one.
2) Passed in social, failed in maths.
3) Passed in only social.




passed in maths = 60 85
∴ Failed in maths = 130 - 85 = 45
Failed in social = 130 - 60 = 70
Failed in both = 10

∴ Failed in only maths = 45 - 10 = 35
Failed in only social = 70 - 10 = 60
passed in social and failed in maths = 35
passed in only social = 35

Date __/__/____

Que. 2) In a class of 100 students 45 have cycles. the no. of students who have neither moped nor cycle is 25%. of total those who have moped. 33.3% having both bycycle have moped.

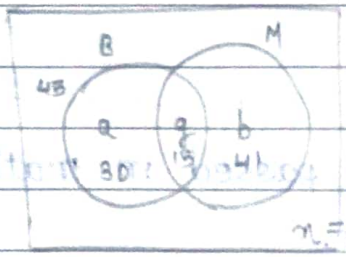
also

i) How many have a moped but not cycle. → 41

ii) Have cycle or moped but not both. → 71

iii) do not have moped. → 44

→




$a+g+b+n = 100$

$a+g = 45$

$\therefore b+n = 55$

$n = (b+g) \times \frac{25}{100}$

$\frac{45 \times 1}{3} = 15 = g$

$b+n = 55$

$b+15 = 4n$

$n+15 = 55-4n$

$5n = 70$

$n = 14$

Que.3 In a community of 160 people a survey was conducted to know the people likings for the movies of

1) every male who like B movies likes A movies also
2) Female who like movies of both is half total males.
3) 45% of total like B movies.
4) each person likes atleast one movie.

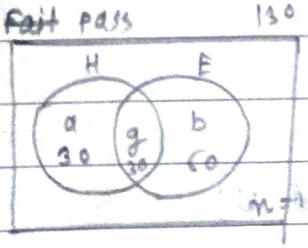
→

| | A | B | both | total |
|---|---|---|---|---|
| male | 60 | 12 | 12 | 60 |
| female | 70 | 60 | 30 | 100 ← provided |
| total | 130 | 72 | 42 | 160 |

provided

Que.4) In a class of 130 students 90 passed in exactly one subject. The number of students who failed in both is 16.66% of those who failed in only in hindi. Half of the students who passed in Hindi failed in only english.

→




$a+b+g+n = 130$

$a+b = 90$

$g = \frac{1}{6} \times a$

$\frac{b+n}{2} = b$

$n = b$

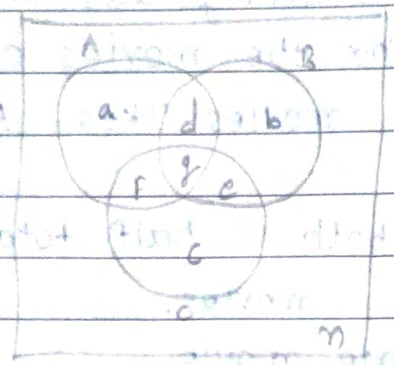
$n = \frac{1}{6} \times b$

$\frac{a+g}{2} = a \Rightarrow a = g$

Date __/__/____

Saathi

# THREE SET

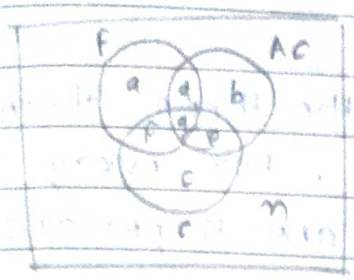



only A and B = d
only B and C = e
only C and A = f

- set no. 1 percentages -

que. 1) In the summer last year it was observed that 112- coolers.
number of houses which are equiped with none of these is 5 ty times of that with all the 3.
10 %. have coolers and fans.
42 %. have AC.
44 %. have fans
20 %. have none.
22 %. have only fans
12 %. have AC and coolers.
Find.
How many have fans only ⟶ 88
How many were survey. (Find U) ⟶ 400
How many have 2 devices. ⟶ 120
How many have almost 1 device. ⟶ 280

⟶




$c + e + f + g = 112$ —

$n = 5 \times g$ —

$f + g = \frac{u \times 10}{100}$ —

$d + b + g + e = \frac{u \times 42}{100}$ —

$n = \frac{u \times 20}{100}$ —

$a = \frac{u \times 22}{100}$ —

$g + e = \frac{12 \times u}{100}$ —

44% have fans

$\therefore \quad a + d + f + g = \frac{44 \times u}{100}$

| | |
|---|---|
| a | 22%. |
| b | 18%. |
| c | 10%. |
| d | 12%. |
| e | 8%. |
| f | 6%. |
| g | 4%. |
| n | 20%. |

$c + e + f + g = 112$

$u\left(\frac{10}{100} + \frac{8}{100} + \frac{6}{100} + \frac{4}{100}\right) = 112$

$\therefore u = 400$

Date Ratio.

Saath

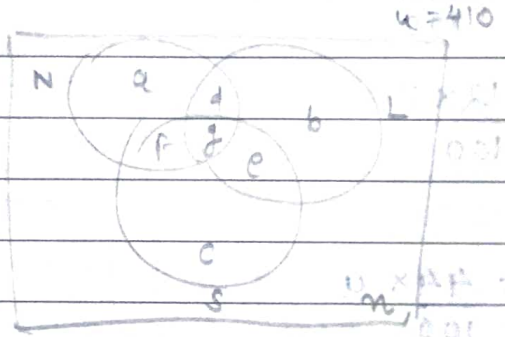
Que.1) 410 mobile users

For each person who use all the three there are 2 persons who use exactly 2. For every 2 persons who use exct. 2 there are 5 persons who use exct. 1.

For every 5 persons who use all 3 there is 1 person who does not use any.

Those who use nokia, LG, Siemens → 210, 220, 170.

→




$$\frac{g}{d+e+f} = \frac{1}{2}$$

$$\frac{d+e+f}{a+b+c} = \frac{2}{5}$$

$$\frac{g}{n} = \frac{5}{1}$$

$$a+d+f+g = 210$$

$$b+e+d+g = 220$$

$$c+e+f+g = 170$$

$$a+b+c+d+e+f+g+n = 410$$

$$5g + 2g + g + \frac{g}{5} = 410$$

$$\frac{40g+g}{5} = 410$$

$$g = 10 \times 5$$

$$g = 50$$

$$\therefore n = 10$$

Date ___/___/_____

Saathi

i) Those who use only siemens are 100 then how many use both nokia and LG.

$c = 100$

$d + g = ?$

$c + e + f + g = 170$

$f + e = 170 - 100 - 50 = 20$

$2g = d + e + f$

$100 = 20 + d$

$\boxed{d = 80}$

$\therefore d + g = 130.$

ii) Only nokia and siemens is 50 how many use only LG.

$f = 50$

$b = ?$

$b + e + d + g = 220$

$b + 50 + 50 = 220$

$b = 120$

iii) If 100 people who use LG do not use siemens, how many use only siemens.

$b + d = 100$ can not be determined.

$c = ?$

$c + f + g + e = 170$

$c + (e + f) + 50 = 170$

$c + (2g - d) + 50 = 170$

$c = 120$

Page No. ____

Date __/__/____

iv) 80 do not use either siemens or LG then how many use only siemens and LG.

$a+n = 80$

$a = 70$

$e = 8$

$a + d + g + f = 210$

$70 + d + 50 + f = 210$

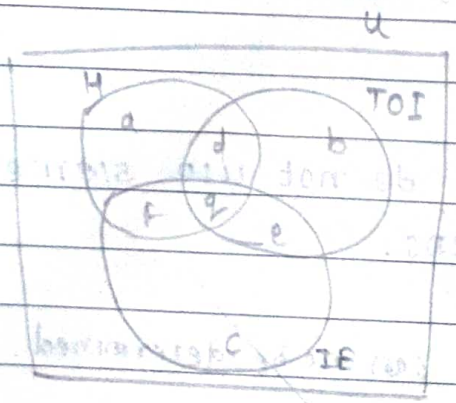
$d + f = 90$

$100 = 90 + e$

$e = 10$

que. 180 families Hindu times
120 read india expres
250 read either Hindu or times of India.
each family read atleast one newspaper and 30 read both Hindu and TOI.

→




$a+d+f+g = 180$

$c+f+g+e = 120$

$d+g = 250$

$a+d+f+b+e+g = 250$

$d+g = 30$

$a+f+b+e = 250-30$

$a+f+b+e = 220$

Page No.

Date ___/___/___

Saathi

i) If 60 read only IE, how many do not read I.E. ?

$c = 60$

$e+f+g = 60$

$\therefore a+b+d = 190$

ii) 110 families read atleast 2 newspapers then atleast how many families are residing in colony.

$d+g+e+f = 110$

$e+f = 80$

$a+b+c+d+e+f+g = 140+c+110 = 140+10+110 = 260$

$\therefore a+b = 220-(e+f)$

$a+b = 140$

$c+(f+g+e) = 120$ $\quad$ $d+(e+f+g) = 110$

~~$c+g = 120-80$~~

~~$c+g =$~~ consider c and d $\Rightarrow 0$

but condition break

$\therefore$ min is 10

c min = 10

iii) 60 families reads only IE, read exactly one more news paper then min. possible families that read exactly one news paper.

~~$e = 60$~~ $\quad$ $f+e = 60$

~~$f+g+e = 120-60$~~ c $\quad$ $(a+b+c)\min = ?$

~~$f+g+e =$~~

$a+b+30+60 = 250$

$a+b = 160$

$c+g = 60$ $\quad$ $d+g = 30$ $\quad$ $\therefore$ ans = 160+30 = 190

$g_{max} = 30$ $\quad$ $\therefore$ $c_{min} = 30$

Page No.

Date ___ / ___ / _____

Saath

# Data Interpretation Basics.

Que:

Find %. age.

1) $\frac{24}{192}$

approx $\frac{20}{200} \Rightarrow \frac{1}{10}$

$$\frac{24 + 8 \times \frac{1}{10}}{192 + 8} \times 100$$

$$\frac{24 + 0.8}{200} \times 100$$

$$\frac{24.8}{2} = 12.4\%.$$

2) $\frac{789}{9874}$

approx $\frac{7}{98} = \frac{1}{14}$

$$\frac{789 + \frac{1}{14} \times 126}{9874 + 126} \times 100 = \frac{198}{10000} \times 100$$

$$= \frac{.798}{100}$$

$$= 7.98\%.$$

3) $\frac{468}{21428}$

approx $\frac{4}{214} = \frac{1}{53}$

$$\frac{468 - \frac{1428 \times 1}{53}}{21428 - 1428} = \frac{468 - \frac{238}{9}}{20000} \times 100 = \frac{468 - 27}{20000} \times 100$$

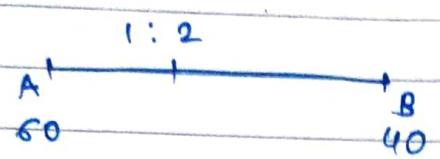
$$= \frac{440}{200} = 2.2\%.$$

Page No.

Date __/__/____

Saathi

4) Weighted average concept -




| | count | average |
|---|---|---|
| A | 60 | 60 |
| B | 120 | 40 |

$$\text{average} = \frac{60 \times 60 + 120 \times 40}{180}$$

other method

$$\frac{60 + 40 \times 2}{3} = \frac{140}{3}$$