

Basic — Foundation Course.

Numerical

Percentage

Area and Permutation

Profit and loss

Ratio and proportion

Time and work.

Number systems

Linear and quadratic equation

Time, Speed and distance

Permutation and combination

Probability

Geometry

Trigonometry.

Reasoning

Critical Reasoning

Data arrangement

Coding and decoding

Data Sufficiency

Blood Relation

Direction sense

Selection Criteria

Approximation

Change / Interchanging
of operation or
digits

Verbal

Tenses

Grammar

Vocabulary

Sentence construction

Concept of Percentages

Percentages



$$a + b$$

$$\frac{a + b}{100} \Rightarrow \frac{ab}{100}$$

(CANCEL ZEROS AND MULTIPLY THE VALUE)

LONG METHOD $20/20 \Rightarrow \frac{2\cancel{0}}{1\cancel{0}} \times 3\cancel{0} \Rightarrow 6$

QUICK METHOD $2\cancel{0}/3\cancel{0} \Rightarrow 2 \times 3 \Rightarrow 6$

LONG METHOD $40/70 \Rightarrow \frac{4\cancel{0}}{1\cancel{0}} \times 7\cancel{0} \Rightarrow 28$

QUICK METHOD $4\cancel{0}/7\cancel{0} \Rightarrow 4 \times 7 \Rightarrow 28$

LONG METHOD $90/80 \Rightarrow \frac{9\cancel{0}}{1\cancel{0}} \times 8\cancel{0} \Rightarrow 72$

QUICK METHOD $9\cancel{0}/8\cancel{0} \Rightarrow 9 \times 8 \Rightarrow 72$

LONG METHOD

$$30 \cancel{+} 1.42 \Rightarrow \frac{3 \cancel{+} 1}{\cancel{10}} \times \cancel{42}^2 \Rightarrow \frac{63}{5} \Rightarrow 12.6$$

QUICK METHOD

$$\cancel{3+1.42} \Rightarrow \frac{3 \times \cancel{42}}{10} \Rightarrow \frac{(40+2)3}{10} = \frac{120+6}{10} = \frac{126}{10} \Rightarrow 12.6$$

LONG METHOD

$$70 \cancel{+} 1.82 \Rightarrow \frac{7 \cancel{+} 1}{\cancel{10}} \times \cancel{82}^{8.2} \Rightarrow 57.4$$

QUICK METHOD

$$\cancel{7+1.82} \Rightarrow \frac{7 \times \cancel{82}}{10} \Rightarrow \frac{(80+2)7}{10} \Rightarrow \frac{560+14}{10} = \frac{574}{10} \Rightarrow 57.4$$

QUICK METHOD

$$\cancel{9+1.63} \Rightarrow \frac{9 \times \cancel{63}}{10} \Rightarrow \frac{(60+3)9}{10} = \frac{540+27}{10} = \frac{567}{10}$$

QUICK METHOD

$$\cancel{7+1.63} \Rightarrow \frac{7 \times \cancel{63}}{10} \Rightarrow \frac{(60+3)7}{10} \Rightarrow \frac{420+21}{10} = \frac{441}{10} \Rightarrow 44.1$$

$$\textcircled{1} \quad 424 \cdot 83 \Rightarrow 42 \cancel{18} \times 83 \Rightarrow 34 \cdot 86$$

QUICK
METHOD

$$424 \cdot 83 \Rightarrow \frac{42 \times 83}{100} \Rightarrow \frac{3486}{100} \Rightarrow 34 \cdot 86$$

$$\begin{array}{r} \textcircled{12} + \textcircled{16} = 28 \\ \text{carry} \rightarrow \textcircled{2} \quad \begin{array}{r} 14 \\ \times 83 \\ \hline \end{array} \\ \hline \begin{array}{r} 3486 \\ \hline \end{array} \end{array}$$

QUICK
METHOD

$$76 \cdot 89 \Rightarrow \frac{76 \times 89}{100} \Rightarrow 67 \cdot 64$$

$$\begin{array}{r} \textcircled{63} + \textcircled{48} = 111 \\ \text{carry} \rightarrow \textcircled{11} \quad \begin{array}{r} 76 \\ \times 89 \\ \hline \end{array} \quad \textcircled{54} \\ \hline \begin{array}{r} 6764 \\ \hline \end{array} \end{array}$$

$$111 + 5 = 116$$

$$\text{Simple Multiplication} \quad 56 \times 65 = 3682$$

$$\begin{array}{r} \textcircled{25} + \textcircled{36} = 61 \\ \text{carry} \rightarrow \textcircled{6} \quad \begin{array}{r} 75 \\ \times 65 \\ \hline \end{array} \quad \begin{array}{r} 36 \\ \times 65 \\ \hline \end{array} \quad 61 + \textcircled{3} = 64 \\ \hline \begin{array}{r} 3640 \\ \hline \end{array} \end{array}$$

Simple multiplication : $64 \times 61 = 3904$

$$\begin{array}{r} 6 + 24 = 30 \\ \text{carry } \rightarrow 3 \\ \hline \end{array}$$

$\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$

$$\begin{array}{r} 3 \quad 9 \quad 0 \quad 4 \\ \hline \end{array}$$

Simple multiplication : $54 \times 60 = 3240$

$$\begin{array}{r} 6 + 24 = 24 \\ \text{carry } \rightarrow 2 \\ \hline \end{array}$$

$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$

$$\begin{array}{r} 3 \quad 2 \quad 4 \quad 0 \\ \hline \end{array}$$

① $33 \cdot 33 \div 93$

$$\begin{array}{|c|} \hline 50\% = 1/2 \\ \hline 33 \cdot 33\% = 1/3 \\ \hline 12.5\% = 1/8 \\ \hline \end{array}$$
$$1/3 \times 93 = 31$$

② $62.5 \div 64$

$$(100\% + 12.5\%) 64$$
$$1/8 = 8$$

$$\Rightarrow 32 + 8 = 40$$

$$\textcircled{1} \quad 84 \cdot 1.150 \Rightarrow 84/150 \boxed{= 126}$$

$\stackrel{\textcircled{1} + \textcircled{2} = 44}{\cancel{84}) \quad 20 = 46}$

carry $\rightarrow \textcircled{4}$ $\underline{\underline{126 \cancel{8}}}$

$$84 \cdot 1.150 = 150 \cdot 84$$

$$\textcircled{1} \quad 150 \cdot 84 \Rightarrow \stackrel{\textcircled{1}}{150}/84 = 126 \textcircled{1} \boxed{\Rightarrow 126}$$

$\stackrel{\textcircled{1} + \textcircled{2} = 44}{(\cancel{15}) \quad 20 \textcircled{46}}$

carry $\rightarrow \textcircled{9}$ $\underline{\underline{126 \cancel{8}}}$

$$a \cdot 1 \cdot b = b \cdot 1 \cdot a$$

LEFT HAND SIDE is EASIER TO SOLVE THAN RIGHT HAND SIDE

Problem Solving

① If 12% of x is equal to 6% of y , Then 18% of x will be equal to how much % of y ?

(a) 6%.

(b) 8%.

(c) 9%.

(d) 2%.

$$12\% \cdot x = 6\% \cdot y \rightarrow ①$$

$$\cancel{18\% \cdot x} = ? \% \cdot y \rightarrow ②$$

$$(12\% \cdot x)(?) = (6\% \cdot y)(18\% \cdot x)$$

$$\cancel{12\%} \cdot ? = \cancel{6\%} \cdot 18\%$$

$$\boxed{? = 9\%}$$

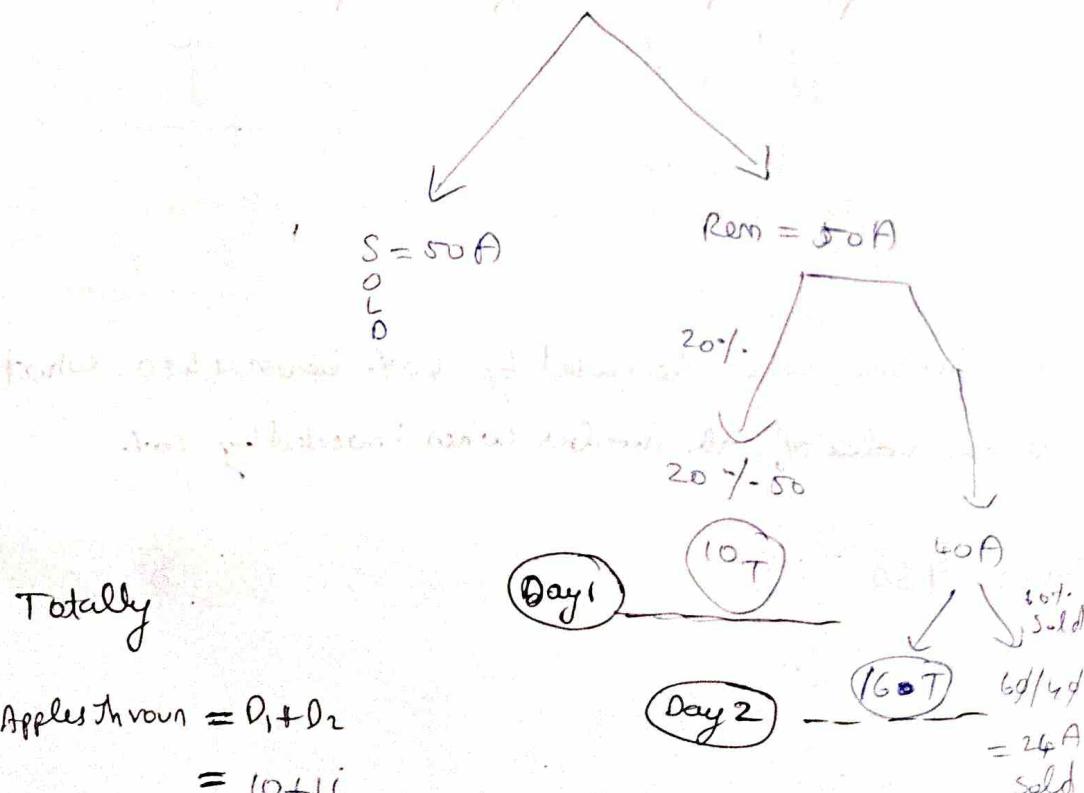
② A Number when decreased by 40% becomes 480. what is the value of the number when increased by 20%.

Answer: 960

(3) A vendor sells 50 percent of the apples he had and throws away 20 percent of the remainder. Next day he sells 60 percent of the remainder and throws away the rest. What percent of his apples does the vendor throw?

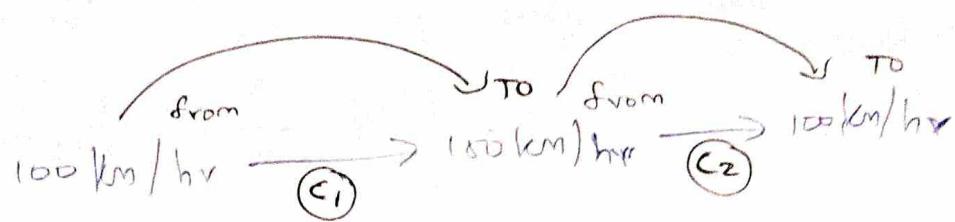
- (A) 20%
- (B) 22%
- (C) 24%
- (D) 26%

Let him have = 100 apples



Percentage increase / decrease

Dinesh



$$c_1 \rightarrow \text{① Speed } (\uparrow) = +50 \text{ km/hr}$$

$$c_2 \rightarrow \text{② Speed } (\downarrow) = -50 \text{ km/hr}$$

$$c_1 \rightarrow \text{③ Speed } (\uparrow) = 50\% \uparrow$$

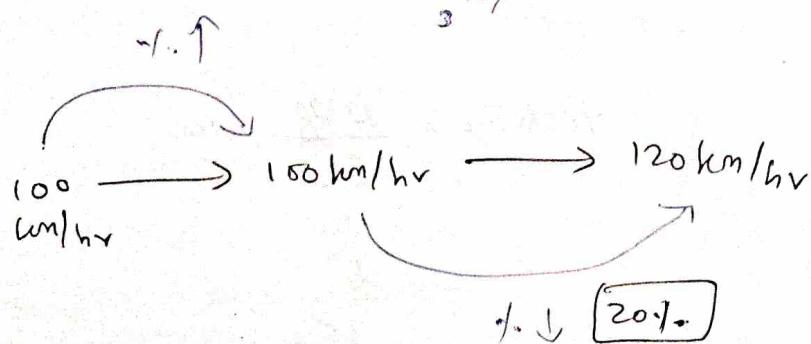
$$c_2 \Rightarrow \text{④ Speed } (\downarrow) = 33.33\% \downarrow$$

$\gamma \cdot \text{change } (\uparrow/\downarrow) =$	$\frac{\text{Difference}}{\text{Initial value} / \text{Compared value}} \times 100$
---	---

$$\textcircled{3} \quad c_1 = \gamma \cdot \uparrow = \frac{50}{150} \times 100\% = 33.33\%$$

$$\textcircled{4} \quad c_2 = \gamma \cdot \downarrow = \frac{50}{100} \times 100\% = 50\%$$

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



If Initial value = final value

$$\text{If } \frac{\textcircled{1}}{x} \uparrow = \frac{1}{x+n} \downarrow \left(\begin{array}{l} \frac{3}{4} \uparrow = \frac{3}{72} \\ \frac{4}{9} \uparrow = \frac{4}{12} \end{array} \right)$$

$$\text{If } \frac{\textcircled{1}}{x} \uparrow = \frac{1}{x+1} \downarrow \left(\begin{array}{l} \frac{1}{2} \uparrow = \frac{1}{3} \\ \frac{1}{4} \uparrow = \frac{1}{5} \end{array} \right)$$

$$\text{If } \frac{\textcircled{2}}{3} \uparrow = \frac{2}{3+2} = \frac{2}{5} \downarrow$$

If not Initial \neq final value \Rightarrow

$$\% \text{ change} = \frac{\text{Diff Inv/Cv}}{\text{Inv/Cv}} \times 100$$

Problem Solving

① At a supermarket a certain item had increased

from $\textcircled{75}$ cents per pound to $\textcircled{81}$ cents per pound

what is the percent increase in the cost of this item?

A) 6%

B) 7%

C) 8%

D) 10%

$$\% \text{ change} = \frac{\text{Diff Inv/Cv}}{\text{Inv/Cv}} \times 100$$

$$= \frac{6}{75} \times 100$$

$$= 8\% \uparrow$$

② A Teacher by mistake entered a student's mark as 320 instead of 400. find the percentage error?

A) 20%.

B) 25%.

C) 40%.

D) 80%.

$$\% \text{ Change} = \frac{\text{Diff}}{\text{G.V}} \times 100$$

$$= \frac{20}{400} \times 100$$

$$\text{Error} = 5\%$$

$$= 20\%$$

③ The price of a book is 20% more than a pen. By what percentage is the price of the pen less than the book?

A) 20%.

$$\text{Pen} = 100\%$$

$$\text{book} = 120\%$$

Pen less than book

B) 25%.

$$\% \text{ Change} = \frac{\text{Diff}}{\text{Value}} \times 100$$

C) 16.66%.

D) 40%.

$$= \frac{20}{120} \times 100$$

$$= 16.66\%$$

Successive Percentage Change [Continuous/ One after the other]

Today = 100 people

1st Day people increase by 10%.

2nd Day people increase by 20%

How many people after 2 Days = ?

$$\begin{aligned} & 100 + 20\% \\ & 10\% + 20\% = 30\% \\ & 100 \times \frac{30}{100} = 130 \end{aligned}$$

Initial people = 100

Wrong Calculation,

inc of D1. $10\% \cdot 100 = 110$ by End of Day(1)

inc of D2. $20\% \cdot 110 = 110 + 22 = 132$ by End of Day(2)

$$\boxed{\frac{20}{100} \times 110 = 22}$$

Successive Percentage Change

Total = 100

on D1 \Rightarrow 10% ↑

on D2 \Rightarrow 20% ↑

$$\boxed{100 + 32 = 132}$$

$$\boxed{\text{Overall } \% \uparrow / \downarrow = a + b + \frac{ab}{100}}$$

$$\Rightarrow a + b + \frac{ab}{100}$$

$$\Rightarrow 10 + 20 + \frac{200}{100}$$

$$\Rightarrow 30 + 2$$

$$\Rightarrow 32\%$$

$$\text{Overall } \% \uparrow/\downarrow = a + b + \frac{ab}{100}$$

$$\left. \begin{array}{l} \text{1st yr/day} = a; \text{ if } \uparrow = +a \\ \text{if } \downarrow = -a \end{array} \right\}$$

$$\left. \begin{array}{l} \text{2nd yr/day} = b; \text{ if } \uparrow = +b \\ \downarrow = -b \end{array} \right\}$$

Q1: The population of a village decreases at the rate of 20% per annum. If its population 2 years ago was 10000, what is its present population.

$$10,000 \xrightarrow{20\%} 8000 \xrightarrow{20\%} 6400$$

each year = 20%

$$\frac{20 \times 100}{100} = 2000$$

$$10000 - 2000 = 8000$$

$$8000 - 2000 = 6000$$

$$a + b + \frac{ab}{100}$$

$$-20 + -20 + \frac{400}{100}$$

$$-40 + 4 = -36\%.$$

by
decreas



wrong method

$$10,000 \times -36/100 = 10,000 - 3600$$

$$= 6400$$

$$\begin{array}{r} 100 \\ 36 \\ \hline 600 \\ 3600 \\ \hline 64 \end{array}$$

Q The population of a village is 10,000. In the first year it increases by 20%. in the second year it decreases by 40%. in the third year it again increases by 30%. Find the population of the village after third year?

Answer:

$$\text{Present population} = 10,000$$

first year $10,000 \times \frac{20\uparrow}{100} = 2000 \Rightarrow 10,000 + 2000 = 12,000$

Second year $12,000 \times \frac{40\downarrow}{100} = 4800 \Rightarrow 12,000 - 4800 = 7200$

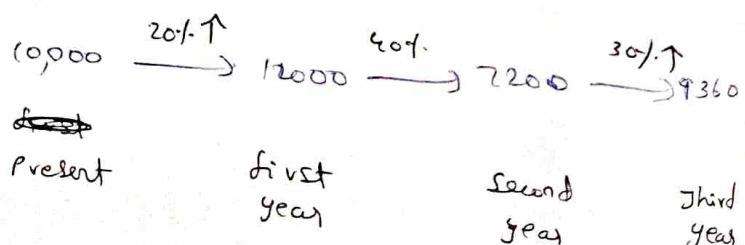
Third year $7200 \times \frac{30\uparrow}{100} = 2160 \Rightarrow 7200 + 2160 = 9360$

(a) 10500

(b) 10400

(c) 10300

~~9360~~



Election Voting Problems

- (a) In an election between two candidates, a person who gets 35% of the votes lost the election by a margin of 15,000 votes. Find the total number of votes casted?
- (A) 35200 A B
 (B) 45000 35% votes 65% Votes
~~(C) 50000~~ B - A = 15,000
 (D) None of these

$$35\% \text{ votes} = 15,000 \quad \textcircled{1}$$

$$10\% \text{ votes} = 5000$$

$$\begin{aligned} \text{Total votes} &= 50000 \\ \text{Total votes} &= 50,000 \end{aligned}$$

$$\text{Total Votes} = 50,000$$

$$A = 35\% \text{ of } 50,000 = 17,500$$

$$B = 65\% \text{ of } 50,000 = \frac{32,500}{50,000}$$

(2) 10% of the voters did not cast their vote in an election between two candidates 10% of votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1620 votes. The total number of voters enrolled for election were:

(A)

(A) 25,000

54% 11800 43200

48%

(B) 33,000

36% 9000

(C) 35,000

1620

(D) 40,000

(3) In an election between two candidates, one got 55% of the total valid votes 20% of the votes were invalid. If the total number of votes was 7000, the number of valid votes that the other candidate got was:

(A) 2700

4125
1875

(B) 2400

[Easy to solve]

(C) 6000

(D) 5700

1825

Valid

6000

3300

2700

6000

Income - Expenditure Problem.

- Q) 5% of A's Income is equal to 15% of B's Income and
 10% of B's Income is equal to 20% of C's Income,

If income of C is Rs 2000, then the total income of A, B and C is

A) 6000 ₹

$$\cancel{5\%} \cdot A = \cancel{15\%} \cdot B$$

B) 18000 ₹

$$\frac{A}{B} = \frac{3}{1}$$

C) 14,000 ₹

d) 20,000 ₹

$$\cancel{10\%} \cdot B = \cancel{20\%} \cdot C$$

$$\frac{B}{C} = \frac{2}{1}$$

$$\begin{array}{c} A : B \\ \diagdown \quad \diagup \\ B : C \\ \hline \end{array} = \frac{3}{1} \quad \frac{1}{2} : 1$$

$$\hline \quad \hline$$

$$A : B : C = 6 : 2 : 1$$

Income

$$A = 6x$$

$$A = 6x = 12,000$$

$$B = 2x$$

$$B = 2x = 4000$$

$$C = x$$

$$C = x = 2000$$

$$A + B + C = 18,000$$

$$C = x = 2000$$

(2) Radha's salary is 80% more than Leetha's salary. Radha got a raise of 40% on her salary while Leetha got a raise of 30% on her salary. By what percent is Radha's salary more than Leetha?

A) 61.53%

Example:

- b) 71.64%
- c) 86.47%
- d) 56.92%

$$\text{Leetha's Salary} = 100 \quad \text{Radha's Salary} = 150$$

$$\left. \begin{array}{l} \text{New Salary Leetha} = 130 + 10\% \\ \qquad\qquad\qquad = 130 \end{array} \right| \quad \left. \begin{array}{l} \text{New Salary Radha} = \\ 150 + 40\% \\ \qquad\qquad\qquad = 210 \end{array} \right|$$

$$\begin{aligned} \therefore \% \text{ increase} &= \frac{80}{130} \times 100 = \frac{80}{130} \times 100 \\ &= \frac{800}{130} = 61.53\% \end{aligned}$$

Radha Leetha

100 80

$$100 + \frac{40}{100} = 140$$

140 115

$\frac{100}{140} \times 100 = 71.43\%$

$$\frac{80}{115} \times 100 = 69.57\%$$

Percentage Ratio Equivalence Problem.

① The angles of a triangle are in the ratio 1:2:3.

Find the measure of each angle. What will be the percentage of second angle?

a) 16.66%

$$\text{Ratio} = 1:2:3$$

b) 33.33%

c) 50%

d) 66.66%

$$\begin{aligned} \text{1st Angle} &= 1x \\ \text{2nd Angle} &= 2x \\ \text{3rd Angle} &= 3x \end{aligned} \quad \left. \begin{array}{l} 30^\circ \\ 60^\circ \\ 90^\circ \end{array} \right\} \quad \left. \begin{array}{l} 1^\circ \\ 2^\circ \\ 3^\circ \end{array} \right\} \quad \left. \begin{array}{l} 1x \\ 2x \\ 3x \end{array} \right\} \quad \left. \begin{array}{l} 30^\circ \\ 60^\circ \\ 90^\circ \end{array} \right\}$$

$$6x = 180^\circ$$

$$x = 30^\circ$$



$$\text{2nd angle} = \frac{x}{3} \times 100$$

2 → angle
6 → parts

① $\frac{1}{6}$ ② $\frac{2}{6}$ ③ $\frac{3}{6}$ $\Rightarrow 33.33\%$
⑥ Parts

2) The price of two articles are in the ratio 3:4. If the price of the first article be increased by 10% and that of the second by Rs 4, the original ratio remains the same. The original price of second article is.

Ans:

Articles

$$A:B = 3:4$$

$$\begin{aligned} A &= 3x \rightarrow 3x + 10\% \cdot 3x = 3x + 0.3x \\ B &= 4x \rightarrow 4x + 4 = 4x + 4 = \frac{3 - 3x}{4x + 4} = \frac{3}{4} \end{aligned}$$

$$3 \cdot 2x = 12x + 12$$

$$12x = 12$$

$$x = \frac{12}{3} \Rightarrow x = 4$$

Original price of 2nd article = $4x$

$$\begin{aligned} &= 4 \cdot 4 \\ &= 16 \\ &= 40/- \end{aligned}$$

Interesting Question (easy)

- 1) Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third the sum of 6% of A and 2% of B. Find the ratio of A : B?

A. $3:4$

$$\Rightarrow 5\%A + 4\%B = \frac{2}{3} [6\%A + 2\%B]$$

B. $4:5$

C. $4:3$

$$5\%A + 4\%B = \frac{2}{3} [6\%A + 2\%B]$$

D. $5:4$

$$15A + 12B = 12A + 16B$$

$$3A = 4B$$

~~$$3A = 4B$$~~

$$\Rightarrow \frac{A}{B} = \frac{4}{3}$$

~~$$A:B = 4:3$$~~

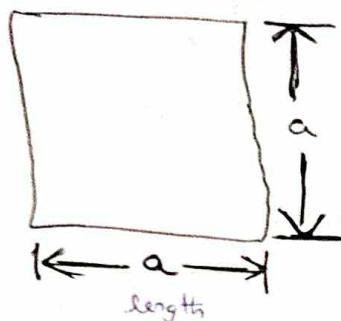
$$A:B = 4:3$$

NQT Cognitive Test $\Rightarrow 7.0/15$

Concept of 2D & 3D figures

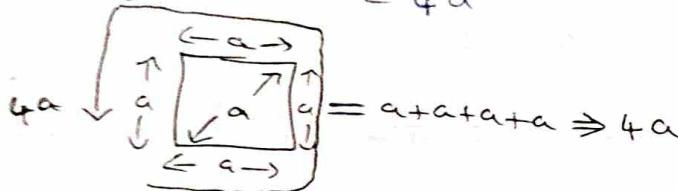
ONLY HEIGHT IS ADDED

Square (2D)

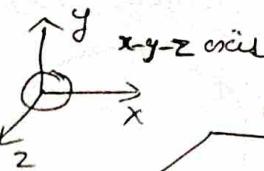
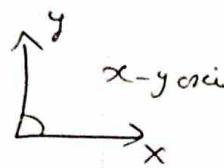


$$1) \text{Area} = l \times b = a \times a = a^2$$

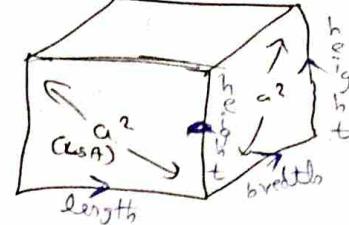
$$2) \text{Perimeter} = 4a$$



2D Square \rightarrow Area / Perimeter

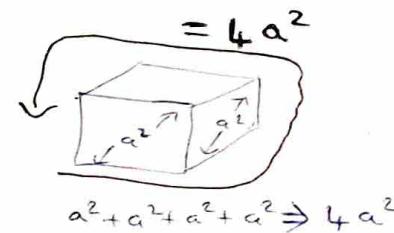


CUBE (3D)



$$\begin{aligned} 1) \text{Volume} &= l \times b \times h \\ (\text{cm}^3/\text{m}^3) &= a \times a \times a \\ &= a^3 \end{aligned}$$

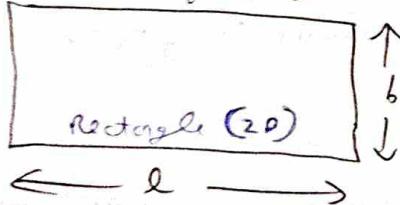
2) Lateral Surface Area [LSA]



$$a^2 + a^2 + a^2 + a^2 = 4a^2$$

3D Square \rightarrow Volume / Surface Area

Rectangle (2D)



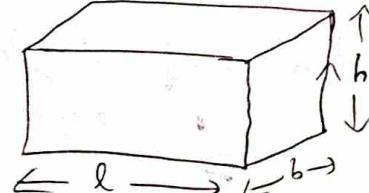
$$1) \text{Area} = l \times b$$

$$2) \text{Perimeter} = 2l + 2b$$

$$= 2(l+b)$$

ONLY HEIGHT IS ADDED

Cuboid (3D)



$$1) \text{Volume} = l \times b \times h$$

$$2) \text{LSA} = 4 \text{ faces}$$

$$= 2lb + 2bh = 2(lb + bh) \quad (\text{Front+back}) \quad (\text{Front+back})$$

$$3) \text{TSA} = 6 \text{ sides}$$

$$= 2[lb + bh + lh]$$

ONLY HEIGHT IS ADDED

CIRCLE (2D)



三

- 1) Area = πr^2
 - 2) Perimeter = $2\pi r$

CYLINDER (30)



Try 2

- 1) Volume = $\pi r^2 h$
 - 2) Curved Surface Area (CSA)
 $= 2\pi r h$
 - 3) TSA = CSA + other sides (T)
 $= 2\pi r (h+r)$

Triangle (20)



- 1) Area of Triangle = $\frac{1}{2} \times b \times h$

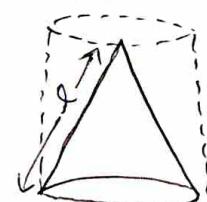
2) Perimeter $a+b+c$

Equilateral

$$\text{Area} = \frac{\sqrt{3}}{4} a^2$$

$$\text{Perimeter} = 3a$$

Cone [3D]



$$\text{Volume} = \frac{1}{3}\pi r^2 h$$

$$zCSA = \pi r l$$

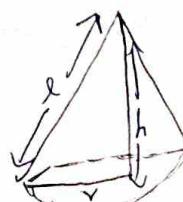
$$3 \text{ TSA} = \text{CSA} + \text{bottom area}$$

$$= \pi \sqrt{d} + \pi \sqrt{r^2}$$

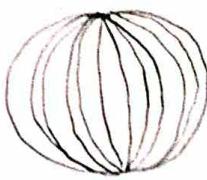
$$= \pi r(l+r)$$

$$l^2 = b^2 + v^2$$

$$l = \sqrt{z_1^2 + z_2^2}$$



Sphere (3D)



$$CSA = 4\pi r^2$$

$$TSA = 4\pi r^2$$

$$\text{Volume} = \frac{4}{3}\pi r^3$$

Hemisphere (3D)



$$1) \text{ Volume} = \frac{2}{3}\pi r^3$$

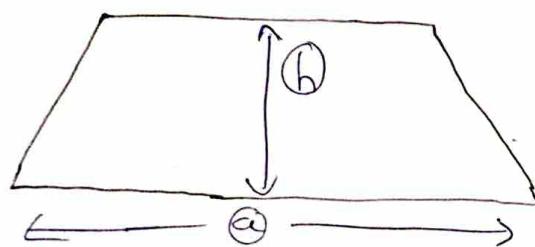
$$2) CSA = 2\pi r^2$$

$$3) TSA = CSA + \frac{\text{TOP}}{\text{bottom}}$$
$$= 2\pi r^2 + \pi r^2$$

$$= 3\pi r^2$$

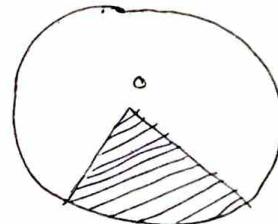
(X)

Trapezium (2D)



$$1) \text{ Area} = \frac{1}{2}(a+b)h$$

Sector



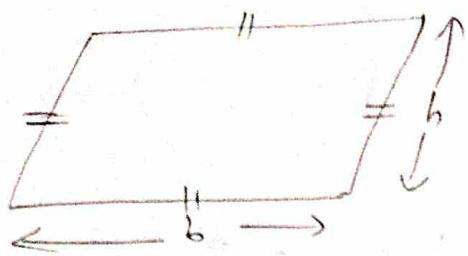
$$1) \text{ Area} = \frac{\theta}{360} \pi r^2$$

θ = degree

$$\text{Area} = \frac{\theta}{180} \pi r^2$$

θ = radius

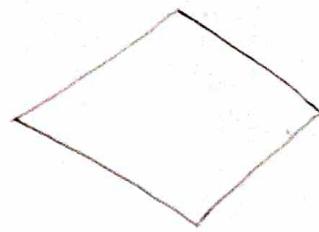
Parallelogram



$$\text{Area} = b \cdot c$$

$$\text{Perimeter} = 2(b+c)$$

Rhombus



$$1) \text{ Area} = \frac{1}{2} d_1 d_2$$

$$2) \text{ Perimeter} = 2\sqrt{d_1^2 + d_2^2}$$

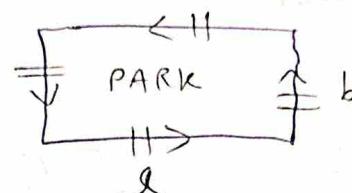
(X)

Practice Questions

(20 figures - Area and Perimeter)

The ratio between the length and the breadth of a rectangular park is 3:2. If a man cycling along the boundary of the park at the speed of 12 km/hr completes one round in 8 minutes, then the area of the park (in sqm) is

- A) 15360
- B) 153600
- C) 30720
- D) 307200



$$\text{Area} = l \times b \\ = (3x) \cdot (2x)$$

$$= 480 \cdot 320$$

$$= 153600 \text{ sqm}^2$$

$$l:b = 3:2$$

$$l = 3x$$

$$b = 2x$$

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

$$1 \text{ round; Time} = 8 \text{ min}$$

$$D = S \times T$$

$$T = 12 \frac{\text{km}}{\text{hr}} \cdot 8 \text{ min}$$

$$= \cancel{12} \cdot \cancel{8} \frac{\text{min}}{60}$$

$$= \frac{1}{5} \text{ km}$$

$$D = 1.6 \text{ km}$$

$$D = \text{perimeter}$$

$$2(l+b) = 1.6 \text{ km}$$

$$2(5x) = 1.6 \text{ km}$$

$$10x = 1.6 \text{ km}$$

$$10x = 1.6 \times 1000 \text{ m}$$

$$2x = 160 \text{ m}$$

② The length of a rectangle is halved. While its breadth is tripled. what is the percentage change in the area?

- A) 25% increase
- B) 50% increase
- C) 50% decrease
- D) 75% decrease.

$$\% \text{ change} = \frac{\text{Diff}}{\text{Initial Value}} \times 100$$

$$l_0 = x \quad b_0 = y \quad l_N = \frac{2x}{2} : B_N = 3y$$

$$A_0 = xy$$

$$A_N = \frac{3xy}{2}$$

↓ from →

$$\% \text{ change} = \frac{\frac{3xy}{2} - xy}{xy} \times 100$$

$$= \left(\frac{3}{2} - 1 \right) = \frac{1}{2} \times 100 = (50\%) \quad \% \uparrow$$

② If radius of the circle is decreased by 10% Then There is _____ decrease in its area.

a) 10%

~~b)~~ 19%

c) 20%

d) 36%

$$\therefore \downarrow \text{Area} = \frac{\text{Diff}}{\text{I.V}} \times 100$$

Let us assume $r = 10$

$$A_0 = \pi (10)^2$$

$$A_0 = 100\pi$$

$$R = 10 - 10/10$$

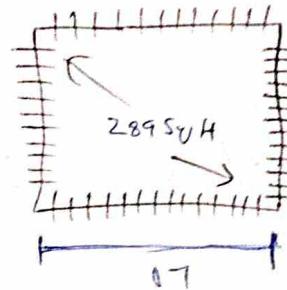
$$R = 9$$

$$A_N = 81\pi$$

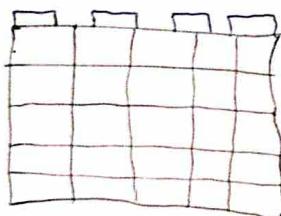
$$\therefore \downarrow \text{Area} = \frac{100\pi - 81\pi}{100\pi} \times 100 = 19\%$$

④ What will be the cost of building a fence around a square plot with area equal to 289 sq m if the price per foot of building the fence is Rs 58?

- A) Rs 3743
B) Rs 3847
~~C)~~ Rs 3944
D) Rs 3866



$$A_S = 289 \quad a^2 = 289$$



fence (wall)

$$S \Rightarrow a\sqrt{z_{89}}$$

$$a = \sqrt{17^2}$$

$$a = 17$$

$$\text{Fence} = \text{Perimeter} = 4a = 4(17) = 68 \text{ feet}$$

$$\boxed{\begin{array}{l} \text{68 feet cost} = 68 + 58 \\ \hline \text{Vedhie Maths / Shortcut} \\ 48 + 50 \end{array}}$$

$$\begin{array}{r} \underline{\quad}^{68} \\ 88 \\ \hline 3944/- \end{array}$$

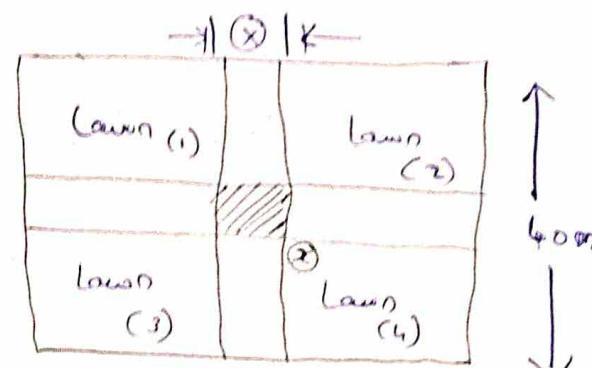
⑥ A rectangle park 60m long and 40m wide has two concrete crossroads running in the middle of the park and rest of the park has been used as a lawn. If the area of the lawn is 2109 m^2 . Then what is the width of the road?

A) 1

B) 3

C) 2

D) 4



$$\text{Area of Rectangle} = 2400 \text{ m}^2 (60 \times 40)$$

$$2400 \quad 60m \rightarrow$$

$$\text{Area of lawn} = 2109 \text{ m}^2$$

$$\begin{array}{r} 0+0=0 \\ (6 \times 0) \\ \hline 2400 \end{array}$$

$$\text{Area of cross roads} = 271 \text{ m}^2$$

$$(60x + 40x) - x^2 = 271 \text{ m}^2$$

$$x^2 - 100x + 271 = 0$$

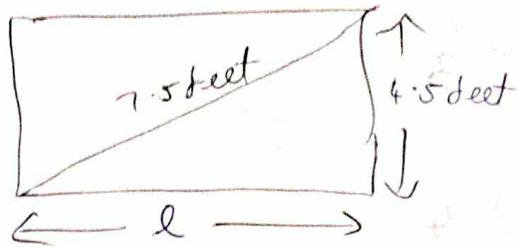
$$x^2 - 97x - 3x + 271 = 0$$

$$x = 97/3$$

$$\boxed{x = 3}$$

⑦ The diagonal of the floor of a rectangle closet is 7.5 feet. The shorter side of the closet is 4.5 feet. What is the area of the closet in square feet?

- (a) 5
- (b) 13
- (c) 27
- (d) 37



$$\text{Area} = l \cdot b$$

$$b = 4.5 \text{ feet}$$

$$l = ?$$

$$D^2 = l^2 + b^2$$

$$(7.5)^2 = l^2 + 20.25$$

$$l^2 = 36 - 20.25$$

$$l^2 = 36 \quad l = 6 \text{ feet}$$

$$\text{Area} = l \times b$$

$$= 6 \times 4.5$$

$$= 27 \text{ square feet}$$

Sub the length
in area

Problems on 3D Figures - Volume and Surface Area.

② The slant height of a right circular cone is 10 m and its height is 8 m, then the area of its curved surface is

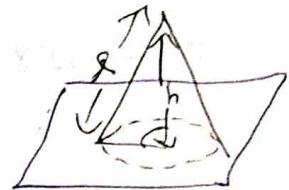
A) $80\pi m^2$

B) $60\pi m^2$

C) $65\pi m^2$

D) $70\pi m^2$

$$\therefore l^2 = h^2 + r^2$$



$$CSA = \pi r l$$

$$l = \sqrt{r^2 + h^2}$$

$$10 = \sqrt{r^2 + 64}$$

$$100 = r^2 + 64$$

$$r^2 = 36$$

$$r = 6 \text{ m}$$

$$\begin{aligned} CSA &= \pi \cdot r \cdot l \\ &= \pi \cdot (6) \cdot (10) \end{aligned}$$

$$= 6\pi m^2$$

②



hemisphere

formula



cone

formula

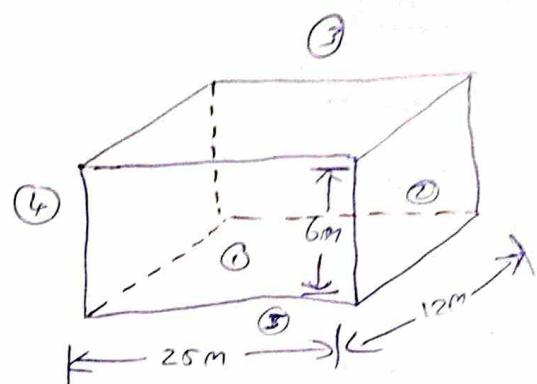
Ratio

Q) A tank is 25 m long 12 m wide and 6 m deep. The cost of plastering its walls and bottom at 75 paise per sq.m.

- A) Rs 258
- B) Rs 358
- C) Rs 458
- D) Rs 558**

$$TSA = 2(lb + bh + lh)$$

$$\text{Paint} = \text{CSA}_{\text{4 walls}} + \text{bottom}$$



$$\text{Paint} = \text{TSA} - \text{ceiling}$$

$$= 2(lb + bh + lh) - lb$$

$$= 2(300 + 72 + 180) - 300 = 300 + 144 + 300$$

$$\text{Paint} = 744 \text{ m}^2$$

$$= 744 - \frac{3}{4} \text{ Rs/-}$$

$$= 558/-$$

Concept of Profit and Loss.

$$SP > CP = \text{Profit}$$

$$CP > SP = \text{Loss}$$

$$P\% = \frac{SP - CP}{CP} \times 100$$

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

① $CP = 500/-$
 $SP = 700/-$

$$P\% = ?$$

$SP > CP = \text{Profit}$

$$P\% = \frac{SP - CP}{CP} \times 100$$

$$= \frac{200}{500} \times 100$$

$$P = 40\%$$

② $CP = 500/-$
 $SP = 200/-$

$$L\% = ?$$

$CP > SP = \text{Loss}$

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

$$= \frac{300}{500} \times 100$$

$$L = 60\%$$

③ $CP = 400$

$$P\% = 20\%$$

$$= \frac{400 \times 20}{100}$$

$$= 80$$

④ $CP = 400$
 $L\% = 20\%$

$$L = 320$$

$$\text{Profit} = 80$$

$$= 400 + 80$$

$$P = 480$$

Successive Discount Problem.

Q) A successive discount series of 10% , 20% and 30% is equal to a single discount of?

A) 50%

B) 56.8%

C) 60%

D) $70 - 28\%$

$$\text{Successive discount} = a + b + \frac{ab}{100}$$

$$a = 10, b = 20$$

$$= 10 + 20 + \frac{(-10)(-20)}{100}$$

$$= 30 + 2$$

$$= -28$$

$$a = -28, b = -40$$

$$= -28 - 40 + \frac{(-28)(-40)}{100}$$

$$= -68 + 11.2$$

$$\Rightarrow -56.8\%$$

discount.

$$\text{Per dozen} = 12 \text{ eggs}$$

Concept of Ratio

Ratio → Comparison

$$100 \text{ } \& \text{ } 150$$

My to Your

$$\frac{2}{100} : \frac{3}{150}$$

$$2 : 3$$

Total amount: 33,000

[Simple/Easy] ✓

$$A : B$$

$$5 : 6$$

Amount received by A: $5x$

Amount received by B: $6x$

$$5x + 6x = 33,000$$

$$11x = 33,000$$

$$x = \frac{33,000}{11}$$

$$x = 3,000$$

$$x = 3,000$$

$$A : B \\ 10,000 & 18,000$$

Amount received by A = 10,000
Amount received by B = 18,000

Proportion

$$a:b = b:c$$

(continuous proportion)

$a \& c \rightarrow$ Extremes

$b \rightarrow$ Mean

$$a:b = c:d$$

(discontinuous proportion)

$a \& d \rightarrow$ Extremes

$b \& c \rightarrow$ Mean

Product of Extremes = Product of Means

$$a:b = 1:2$$

$$b:c = 2:3$$

$$\underline{a:b:c = 1:2:3}$$

$$a:b = 1:2$$

$$b:c = 3:4$$

$$a:b = (1:2) \times 3$$

$$b:c = (3:4) \times 2$$

another Method:

$$a:b:c$$

$$\begin{array}{r} 1:2 \\ \times 3 \\ \hline 3:6 \end{array}$$

$$\boxed{3:6:8}$$

$$a:b = 2:5$$

$$b:c = 4:3$$

$$a:b:c$$

$$\begin{array}{r} 2:5 \\ \times 4 \\ \hline 8:20 \end{array}$$

$$\begin{array}{r} 5:3 \\ \hline 15 \end{array}$$

Concept of direct and Indirect Variation

A \propto B

→ A varies directly with B

Value of A ↑

Value of B ↑

$$\boxed{A \propto B}$$

Value of A ↓

Value of B ↓

$$\boxed{A \propto B}$$

→ A varies indirectly with B

Value of A ↑

Value of B ↓

$$\boxed{A = \frac{k}{B}}$$



Concept of time & work

5 holidays = 5 assignments

1 holiday = 1 assignment

Best Case of Work

Ambani \rightarrow 10 days

Ratnata \rightarrow 40 days

$D_{R + A} \rightarrow 8$ days

$$\frac{1}{10} + \frac{1}{40} = \frac{4+1}{40} = \frac{5}{40} = \frac{1}{8}$$

(= 8 days)

Practice Question

① A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

- a) 12 days
- b) 15 days
- c) 16 days
- d) 18 days

$$\begin{aligned}A &\rightarrow 20d \rightarrow \frac{1}{20} \\B &\rightarrow 30d \rightarrow \frac{1}{30} \\C &\rightarrow 60d \rightarrow \frac{1}{60}\end{aligned}$$

$3d = 12c$
 ~~$4d = 60c$~~
 $12c = 10 \text{ days}$

LCM

Timeline

A	A	A+B+C
1 st day ↓ 3c	2 nd day ↓ 3c	3 rd day ↓ 6c
		12c

Q) A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertake to do it for Rs 3200 with the help of C. They completed the work in 3 days. How much is to be paid to C?

A) 400

B) 600

C) 700

D) 800

$$A = 6 \text{ d} \rightarrow \frac{4}{24} \text{ (work)}$$

$$B = 8 \text{ d} \rightarrow \frac{3}{24} \text{ (work)}$$

$$A + B + C = 3 \text{ d} \rightarrow \frac{8}{24} \text{ (work)} \rightarrow \text{③}$$

$$\frac{1}{6} + \frac{1}{8} + \frac{1}{3}$$

$$\frac{4 + 3 + 8}{24}$$

$$8 \text{ Parts} = 3200$$

$$1 \text{ Part} = 400$$

$$\text{LCM}(3, 6, 8) = 24$$

$$C's \text{ share} = 400$$

$$B's \text{ share} = 1200$$

$$A's \text{ share} = \underline{\underline{1600}}$$

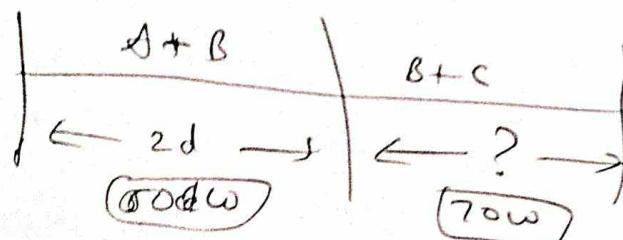
3200

Joining & leaving

Timeline

Joins
leaves
Replace

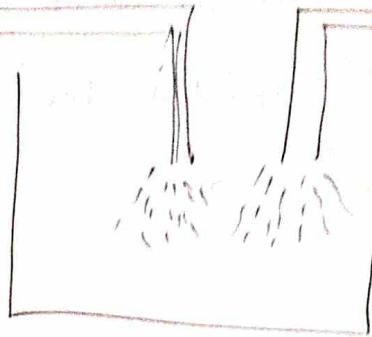
A \rightarrow 25
B \rightarrow 25
C \rightarrow 45



Concept of Pipes and Cisterns

(A)

10 hours



(B)

20 hours

$$\left. \begin{array}{l} T_{A+B} = ? \text{ (hours)} \\ (\text{to fill the tank}) \end{array} \right\}$$

Capacity = (l/cm) : (15, 30) \rightarrow 30

$$\frac{1}{15 \times 30} = \frac{1}{20} = 1 \text{ hour}$$

$$\text{Eff} : E_A = \frac{30^2 l}{15 h} = 2 l/h$$

$$E_B = \frac{30 l}{30 h} = 1 l/h$$

$$E_{A+B} = 3 l/h$$

Escape of time and work

$$\begin{aligned}
 A &\rightarrow 10 \text{ days} \rightarrow 2 \text{ work/day} \\
 B &\rightarrow 30 \text{ days} \rightarrow 1 \text{ work/day} \\
 A+B &\rightarrow \underline{10 \text{ days}}
 \end{aligned}
 \quad \left. \begin{array}{l} \text{work} \\ \text{days} \end{array} \right\} \quad \boxed{30 \text{ workers}}$$

A and B works separately : 45 days

A and B ~~works~~ together : 10 days

$$A \rightarrow 2 \text{ work/day}$$

$$B \rightarrow 1 \text{ work/day}$$

$$\frac{1 \times ①}{10 \times 2} + \frac{1 \times ①}{30 \times 1}$$

$$\frac{②+①}{30} = \frac{3}{30} \text{ days}$$

$$E_A = \frac{30}{2} = ①$$

$$E_B = \frac{30}{1} = ②$$

②

Two pipes M and N can fill a tank in 22 hours and 33 hours respectively. In how many time will the tank be full if both the pipes are opened simultaneously.

A) 13 hours

B) 13.2 hours

C) 13.5 hours

D) 13.8 hours



$$M_f = 22 \text{ hours}$$

$$N_f = 33 \text{ hours}$$

$$\frac{1 \times ③}{22 \times 3} + \frac{1 \times ②}{33 \times 2} = \frac{5}{66} \text{ litres/hr} \rightarrow \text{capacity of tank}$$

$$E_A = \frac{66}{22} \rightarrow E_A = 3 \text{ litres/hr}$$

$$E_B = \frac{66}{33} \rightarrow E_B = 2 \text{ litres/hr}$$

$$\frac{8}{66} \times 13.2 \Rightarrow 13.2 \text{ hours}$$

Dear Example

① A → 15 days → 2/day

 B → 30 days → 1/day

E_{A+B} → 10 days → 3/day

30 days work

② A Tank → 22 hours → 3 l/hr

 B Tank → 33 hours → 2 l/hr

$E_{A+B} \text{ tank}$ → 13.2 hours → 5 l/hr

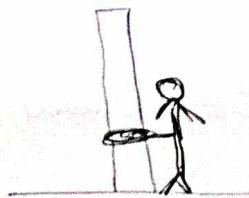
66 litres



This is how we should represent for calculating
Time & Work, Pipes & Cisterns

Concept of Man Days overwork

Chain Rule

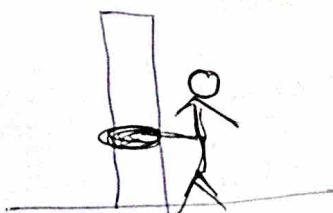


Result

$$10 \text{ people} = 24 \text{ days}$$

$$M \uparrow = d \uparrow$$

GUM



GUM

$$5 \text{ people} = 12 \text{ days}$$

$$M \downarrow = d \downarrow \rightarrow \times$$

Is not possible

Inversely Proportional ($M \propto O$)

$$\boxed{\begin{array}{l} \uparrow M = \downarrow O \\ \downarrow M = \uparrow O \end{array}}$$

$$\boxed{\begin{array}{l} \uparrow M_1 = \downarrow \text{Hours} \\ \downarrow M_1 = \uparrow \text{hours} \end{array}}$$

Formula \Rightarrow

$$\frac{M_1 O_1 H_1}{w_1} = \frac{M_2 O_2 H_2}{w_2}$$

(work = constant)

$$\boxed{\text{Formula} \Rightarrow M_1 O_1 = M_2 O_2}$$

Practice Question:- (Important)

Hours = \times Not given
work = \times Not given

② 30 workers can make 24 tables in 21 days

working 8 hours a day, 35 workers want to make 18 such tables in 12 days, how many hours should they work per every day?

Answer:

C₁

$$M_1 = 30$$

$$w_1 = 24$$

$$O_1 = 21$$

$$H_1 = 8$$

C₂

$$M_2 = 35$$

$$w_2 = 18$$

$$P_2 = 12$$

$$H_2 = ? = x$$

\downarrow
9 days

$$\frac{M_1 P_1 H_1}{w_1} = \frac{M_2 O_2 H_2}{w_2}$$

$$\frac{30 \times 24 \times 8}{20 \times 12 \times 8} = \frac{35 \times x}{30 \times 12 \times x}$$

$$\boxed{x = 9 \text{ days}}$$

Concept of divisibility

Divisible by 2 \rightarrow Last number should be Even
(or) 0, 2, 4, 6, 8.

Divisible by 3 \rightarrow 2478 \rightarrow $2+4+7+8=21$

Sum of the number is divisible
by 3 it is divisible

\rightarrow 12345 \rightarrow $1+2+3+4+5=15$

Yes it is divisible by 3.

Divisible by 4 \rightarrow 72 $\boxed{16}$ \rightarrow Last Two

digit should be divisible by
4.

\rightarrow 475 $\boxed{24}$ \rightarrow Yes it is
divisible

\rightarrow 84 $\boxed{00}$ \rightarrow Yes it is divisible
by 4.

Divisible by 5 \rightarrow The number should contain 0 or 5

Divisible by 6 \rightarrow The number should be divisible by 2 & 3

$$3 \times 2 = 6$$

16482 \rightarrow Yes it is divisible by 2

$1+6+4+8+2 \rightarrow$ Yes it is divisible by 3

\therefore So it is divisible by 6

Divisible by 7 \rightarrow 343

$$\begin{array}{r} 343 \\ \times 2 = 6 \\ \hline 21 \end{array}$$

P
Div by 7

Divisible by 8 \rightarrow Last 3 digit should be divisible by 8 (or) Three zero's

Eg: $68\boxed{728}$ Yes it is divisible by 8.

Div by 9 \rightarrow Sum of digits should be divisible by 9

$$72981 \rightarrow 7+2+9+8+1 = 27$$

Yes it is divisible by 9.

Divisible by 10 \rightarrow Number that ends with 0. Then it is divisible by 10.

Divisible by 11 \rightarrow 750327

$$\text{Sum of odd position numbers} \rightarrow 7+6+2=15$$

$$\text{Sum of even position number} \rightarrow 5+3+7=15$$

diff should be 0 or 11

$$15-15 = 0$$

\therefore It is divisible by 11

Divisible by 12 \rightarrow The number should be divisible by both 4 & 3

$$4 \times 3 = 12$$

1782 $\boxed{48} \rightarrow$ It is divisible by 4

$1+7+8+2+4+8 \rightarrow 30$, It is divisible by 3

Practice Question

① In the IT department of Lockvul, the administrator password is changed every month. The team of administrators spread across the globe receive an 8 digit number via email. The number is to be prefixed with a single digit number and suffixed with a single digit number to get the actual password. The password is divisible by 11 only. If the team received 54218340 this month. Then which of the following pairs give valid prefix and suffix respectively?

A) 3, 7

B) 1, 6

C) 2, 4

D) 4, 2

Concept of LCM & HCF

LCM → Least Common Multiple

HCF → Highest Common Factor.

Eg: LCM and HCF of 4 & 6

LCM 4 → 4, 8, 12, 16, 20, 24, 28, 32

 6 → 6, 12, 18, 24, 30, 36, 42, 48

$$\boxed{LCM = 12}$$

HCF 4 → 1, 2, 4

 6 → 1, 2, 3, 6

$$\boxed{HCF = 2}$$

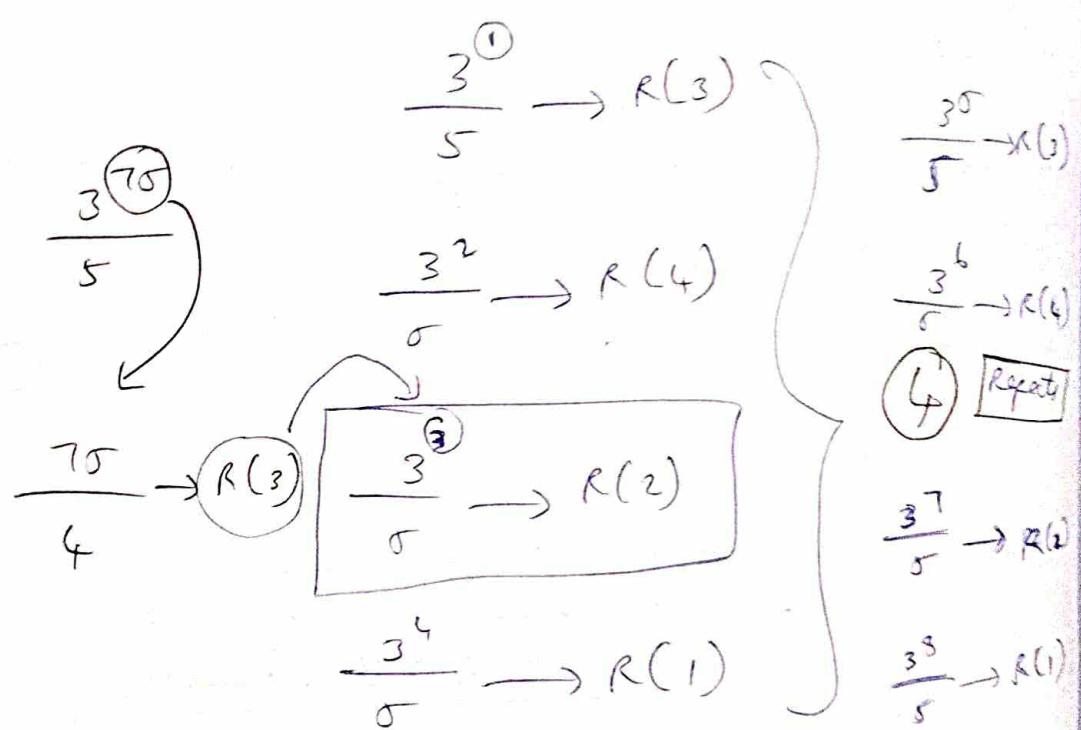
(Q) Find the remainder when 3^{175} is divided by 5?

A) 3

B) 4

C) 2

D) 1



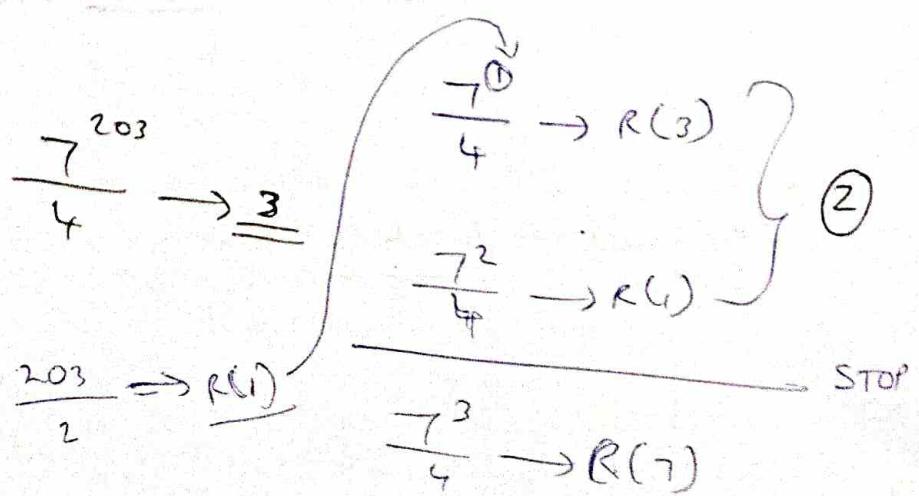
(Q) Find the remainder when 7^{203} is divisible by 4?

A) 3

B) 1

C) 2

D) 0



Q) Find the remainder when 13^{41} is divided by 7?

A) 6

- a) 1
- c) 0
- d) 3

$$\begin{array}{r} 13^{41} \\ \hline 7 \\ 41 \\ \hline 2 \end{array} \rightarrow R(1)$$

$$\begin{array}{r} 13^1 \\ \hline 7 \\ 1 \end{array} \rightarrow R(6)$$

$$\begin{array}{r} 13^2 \\ \hline 7 \\ 1 \end{array} \rightarrow R(1)$$

$$\begin{array}{r} 13^3 \\ \hline 7 \\ 1 \end{array} \rightarrow R(1)$$

STOP

BODMAS

(B) → Brackets

First - ()

Second - { }

Third - []

- O → of
- D → Division
- M → Multiplication
- A → Addition
- S → Subtraction

$$4 - 3.6 \div 4 + 0.2 \times 0.5 = ?$$

$$4 - (9 + 0.1) = ?$$

$$= \boxed{-8.1} \quad \boxed{3.2}$$

$$\begin{array}{r} 0.2 \\ 0.5 \\ \hline 1.0 \\ 0.0 + \\ \hline 0.10 \end{array}$$

$$\begin{array}{r} 0.10 \\ 9 \\ \hline 9 \\ 1 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 3.0 \\ 1 \\ \hline 0 \end{array}$$

Exponents and Sums

Q) The value of $(11111)^2$ is

(a) 12344321

(b) 121212121

(c) 123454321

(d) 11344311

$$\begin{aligned}
 1^2 &= 1 && \rightarrow 01 \\
 11^2 &= [12] \downarrow \text{Repeat} && \rightarrow 111 \\
 111^2 &= [12321] \downarrow \text{Repeat} && \rightarrow 1111 \\
 1111^2 &= [1234321] \downarrow \text{Repeat} && \rightarrow 11111 \\
 11111^2 &= [123454321] \downarrow \text{Repeat} && \rightarrow 111111
 \end{aligned}$$

Simplifications using Algebraic Identities

2D $(a+b)^2 = a^2 + 2ab + b^2$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a^2 - b^2) = (a-b)(a+b)$$

3D

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca.$$

$$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$$

$$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$$

$$(a^2+b^2) = (a+b)(a^2-ab+b^2)$$

$$(a^2-b^2) = (a-b)(a^2+ab+b^2)$$

Decimal Simplification

0.5 → decimal

$$(0.7 \times 0.7 \times 0.7 + 0.1 \times 0.1 \times 0.1) \text{ prox} = 0.73$$

$$0.729 + 0.001 = 0.73$$

$$= 0.7$$

A) 0.7

B) 0.8

C) 0.9

D) 1.0



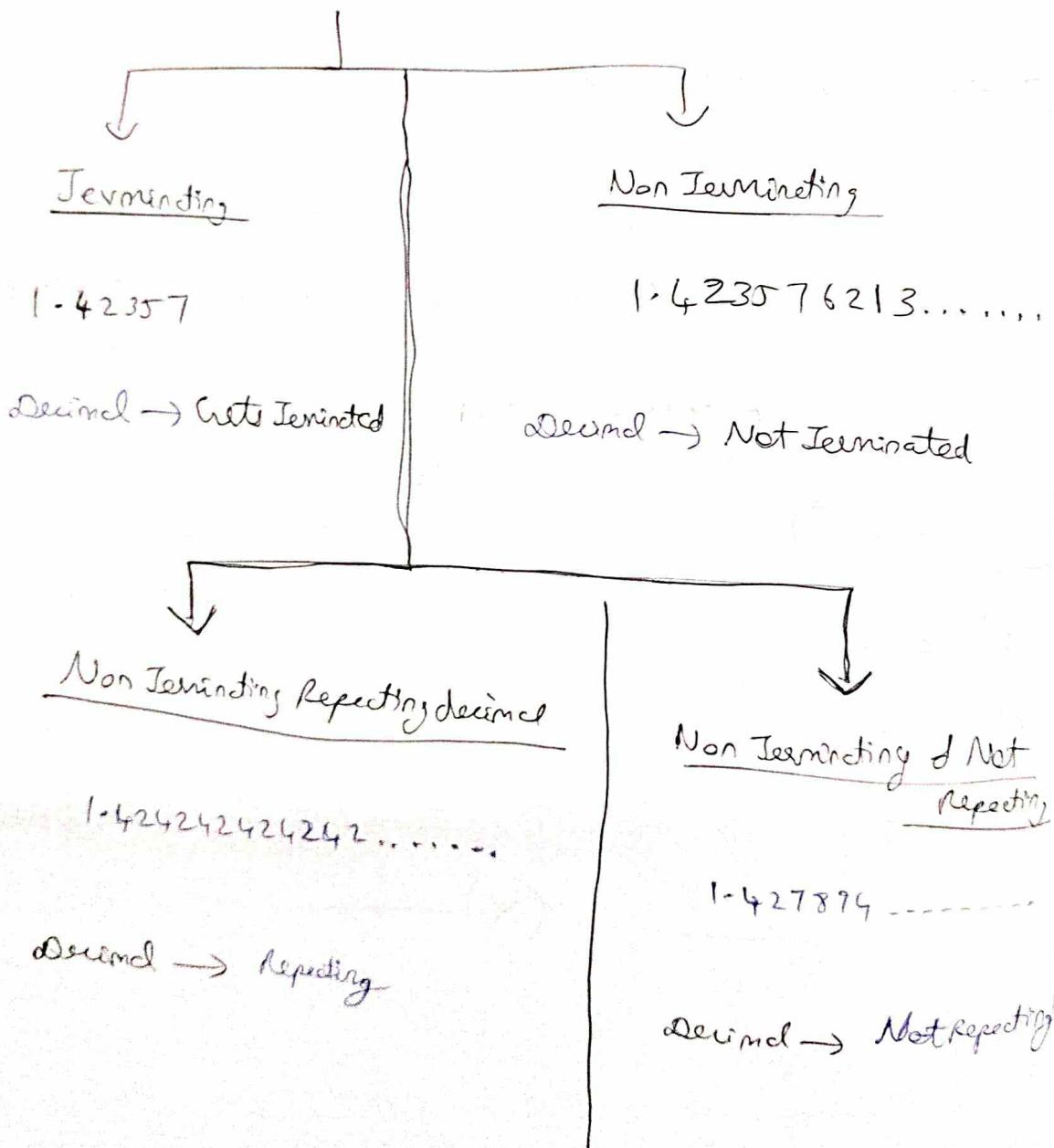
Vulgar Fraction

$$\textcircled{1} \quad 1.25 \rightarrow \frac{125}{100}$$

$$\textcircled{3} \quad 1.42367 \rightarrow \frac{142367}{100000}$$

$$\textcircled{2} \quad 1.4 \rightarrow \frac{14}{10}$$

Decimals (float, double, long)



Convert the following into vulgar fractions

A) $0.25 \rightarrow \frac{025}{100} \rightarrow \frac{25}{100} = \frac{1}{4}$

B) $4.004 \rightarrow \frac{4004}{1000} \rightarrow \frac{1001}{250} = \frac{1001}{250}$

C) $0.0056 \rightarrow \frac{0056}{10000} = \frac{56}{1250}$

Lined equation

49
5

$$ax + by + c = 0$$

~~a~~ \downarrow constant constant
Coefficient

x y \rightarrow Constant

a b \rightarrow Coefficient

$$\begin{aligned}\sigma^0 &= 1 \\ \sigma^1 &= 5 \\ \sigma^2 &= 25 \\ \sigma^3 &= 125 \\ \sigma^4 &= 625\end{aligned}$$

Solve for x

$$\begin{array}{r} 125 \\ \times 4 \\ \hline 625 \end{array}$$

A) $6x - 27 + 3x = 4 + 9 - x$

$\frac{6x}{x}$

* Take all the variables one side and constants on the other

$$6x + 3x + x = 4 + 9 + 27$$

$$10x = 40$$

$$\boxed{x = 4}$$

$$\textcircled{1} \quad x + x/2 + x/3 + 5 = 27$$

$$\frac{x}{1} + \frac{x}{2} + \frac{x}{3} = 27 - 5 = 22$$

\therefore Whenever we have some denominations we should take LCM and then we should solve.

$$\frac{6x + 3x + 2x}{6} = 22$$

$$11x = 22 \times 6$$

$$x = 12$$

$$\textcircled{2} \quad 4x - y = 13 ; 2x + 3y = 31$$

$$4x - y = 13 \quad \text{--- } \textcircled{1}$$

$$\textcircled{2} \quad \leftarrow 2x + 3y = 31 \quad \text{--- } \textcircled{2}$$

$$4x + 6y = 62$$

$$\begin{array}{r} 4x + 6y = 62 \\ \underline{-} 4x - y = 13 \\ 7y = 49 \end{array}$$

$$y = 7$$

Factorization Method (multiply and add)



②

$$x^2 + 10x + 24 = 0$$

$$x^2 + 4x + 6x + 24 = 0$$

$$x(x+4) + 6(x+4) = 0$$

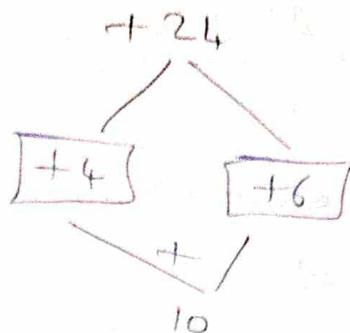
$$(x+4)(x+6) = 0$$

$$x+4 = 0$$

$$x+6 = 0$$

$$\boxed{x = -4}$$

$$\boxed{x = -6}$$



③

$$x^2 + 5x + 6 = 0$$

$$x^2 + 2x + 3x + 6 = 0$$

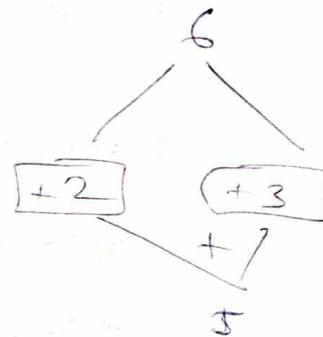
$$x(x+2) + 3(x+2) = 0$$

$$(x+2)(x+3) = 0$$

$$x+2 = 0 \quad x+3 = 0$$

$$\boxed{x = -2}$$

$$\boxed{x = -3}$$



④

$$\textcircled{2} x^2 + 3x - 9$$

$$2x^2 + 6x - 3x - 9 = 0$$

$$2x(x+3) - 3(x+3) = 0$$

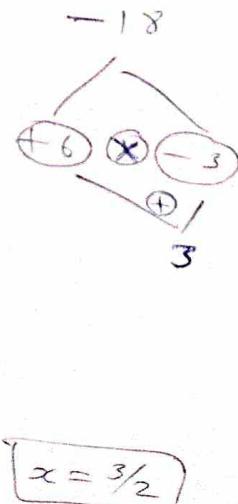
$$(x+3)(2x-3) = 0$$

$$x+3 = 0$$

$$\boxed{x = -3}$$

$$2x-3 = 0$$

$$2x = 3$$

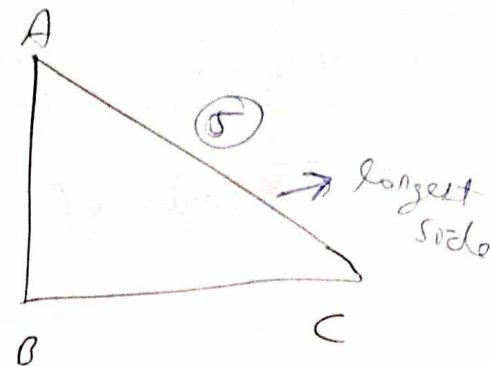


$$\boxed{x = 3/2}$$

Q) The three sides of a right-angled triangle are x , $x+1$ and 5 , if the longest side is 5 .

A) 3

- b) 4
- c) 2
- d) 1



$$AC^2 = AB^2 + BC^2$$

$$5^2 = x^2 + (x+1)^2$$

$$25 = x^2 + x^2 + 2x + 1 + 2x$$

$$2x^2 + 4x - 24 = 0$$

$$x^2 + 2x - 12 = 0$$

$$x^2 + 4x - 2x - 12 = 0$$

$$x(x+4) - 3(x+4) = 0$$

$$\begin{array}{c} -12 \\ \swarrow \quad \searrow \\ 4 \quad -3 \end{array}$$

$$\boxed{x-3=0} \quad \boxed{x=3}$$

$$\boxed{x=-4}$$

$$\boxed{x=3} \cancel{-4}$$

Basics of roots

$$\textcircled{1} \quad \sqrt{64}$$

$$= \sqrt{8^2} \quad [= 8]$$

$$\textcircled{2} \quad \sqrt{81} =$$

$$\sqrt{9^2} \quad [= 9]$$

$$\textcircled{3} \quad \sqrt{49} =$$

$$\sqrt{7^2} \quad [= 7]$$

$$\textcircled{4} \quad \sqrt{4} =$$

$$\sqrt{2^2} \quad [= 2]$$



Concept of Time Speed and Distance

$$S = D/T$$

D → km

$$D = S \times T$$

T → hr

$$T = D/S$$

S → km/hr

$$1 \text{ hr} \rightarrow 60 \text{ min}$$

$$\text{min} \rightarrow \frac{1}{60} \text{ hr}$$

$$1 \frac{\text{min}}{\text{hr}} \rightarrow 60 \text{ sec}$$

$$\text{sec} \rightarrow \frac{1}{3600} \text{ hr}$$

$$\boxed{\frac{m}{\text{sec}} = \cancel{\times} \frac{18}{5} \frac{\text{km}}{\text{hr}}}$$

$$\boxed{\frac{\text{km}}{\text{hr}} = \cancel{\times} \frac{5}{18} \frac{m}{\text{sec}}}$$

$$\text{Late} = '+'$$

$$\text{Early} = '-'$$

② Walking at $(5/7) t$ of your usual speed, you will reach the market 16 minutes late. What is the usual time taken by you to reach the market?

- a) 27 minutes
- b) 32 minutes
- c) 38 minutes
- d) 40 minutes

$$\frac{7}{5}t = t + 16$$

$$7t = 5t + 80$$

$$2t = 80$$

$$t = 40$$

② Excluding stoppages the speed of a bus is 54 km/hr and including stoppages it is 45 km/hr. For how many minutes does the bus stop per hour?

- a) 9
- b) 10
- c) 12
- d) 20

$$54 \text{ km/hr} \rightarrow 1 \text{ hr} \rightarrow 54 \text{ km } \left[\text{(Stoppage)} \right]$$

$$45 \text{ km/hr} \rightarrow 1 \text{ hr} \rightarrow 45 \text{ km } \left[\text{(No stoppage)} \right]$$

Distance covered by Auto stoppage = 9 km

$$T = \frac{D}{S} = \frac{45}{54} = \frac{5}{6} \text{ hr}$$

$$= \frac{5}{6} \times 60^{\circ} \text{ min/hr}$$

$$= 10 \text{ min/hr}$$

Concept of Average Speed

$$\text{Avg Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$S = 40 \text{ km/hr}$	$S = 20 \text{ km/hr}$	\Rightarrow
$t = 3 \text{ hrs}$	$t = 2 \text{ hrs}$	
$D = 40 \times 3$	$D = 20 \times 2$	
$= 120 \text{ km}$	$= 40 \text{ km}$	

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

- ∴ We don't know distance.
- ∴ First calculate distance

$$\text{Avg Speed} = \frac{120 + 40}{3 + 2}$$

$$= \frac{160}{5} = 32$$

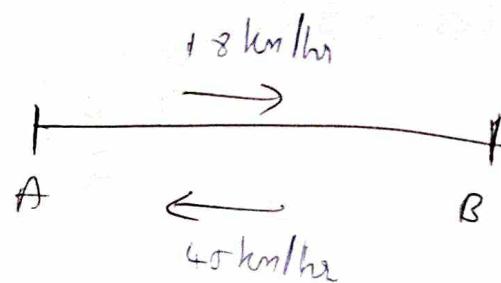
(Q2) Arjun covers a distance by cycle at 18 km/hr. He returns to the starting point by bus at a speed of 45 km/hr. Find the average speed for the entire journey.

A) 27.39 km/hr

B) 25.71 km/hr

C) 27 km/hr

D) 31.5 km/hr



$$= \frac{2 \times 18 \times 45}{18 + 45}$$

$$= \frac{2 \times 18 \times 45}{63} \rightarrow \frac{180}{3}$$

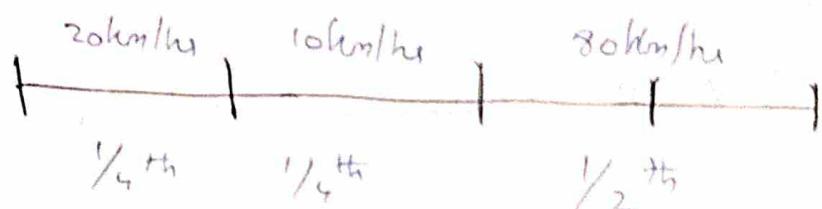
$$= 25.71$$

$$\text{Avg Speed} = \frac{2 \times s_1 \times s_2}{s_1 + s_2}$$

$$\boxed{\text{Avg Speed} = \frac{s_1 + s_2}{2}}$$

② Kishore covers one-fourth of the total distance at 20 km/hr, one-fourth at 10 km/hr and rest of his journey at 80 km/hr. Find Kishore's average speed for the whole distance?

- a) 22.85 km/hr
- b) 25.10 km/hr
- c) 50 km/hr
- d) 40 km/hr



$$\text{Avg Speed} = \frac{2 \times S_1 \times S_2}{S_1 + S_2}$$

$$= \frac{2 \times 20 \times 10}{20 + 10}$$

$$= \frac{2 \times 20 \times 10}{30}$$

$$= \frac{40}{3}$$

$$\text{Avg} = \frac{2 \times \frac{40}{3} \times 80}{\frac{40}{3} \times 80}$$

$$= \frac{2 \times \frac{40}{3} \times 80}{280/3}$$

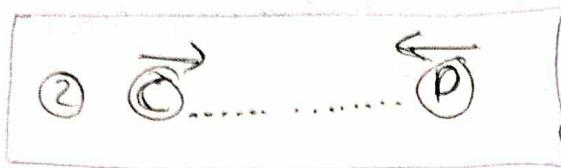
$$\frac{\frac{40}{3} \text{ km/hr}}{\frac{1}{2} \text{ th}} \quad \frac{80 \text{ km/hr}}{\frac{1}{2} \text{ th}}$$

$$= \frac{2 \times \frac{40}{3} \times 80 \times \frac{7}{280}}{\frac{160}{7}} \rightarrow \frac{160}{7} = 22.85 \text{ km/hr}$$

Concept of Relative Speed



$$\text{Relative Speed} = S_1 - S_2$$



$$\text{Relative Speed} = S_1 + S_2$$

$$P = S \times T$$

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

i) A & B \rightarrow 30km/h & 20km/h

Time to meet each.

① Opposite direction

$$\frac{D}{S} = 1 \text{ hour}$$

$$T = \frac{D}{R+S} \quad R.S = S_1 + S_2$$

$$= 30 + 20 = 50 \text{ km/h}$$

② Same direction

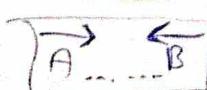
$$T = \frac{D}{R-S}$$

$$R.S = S_1 - S_2$$

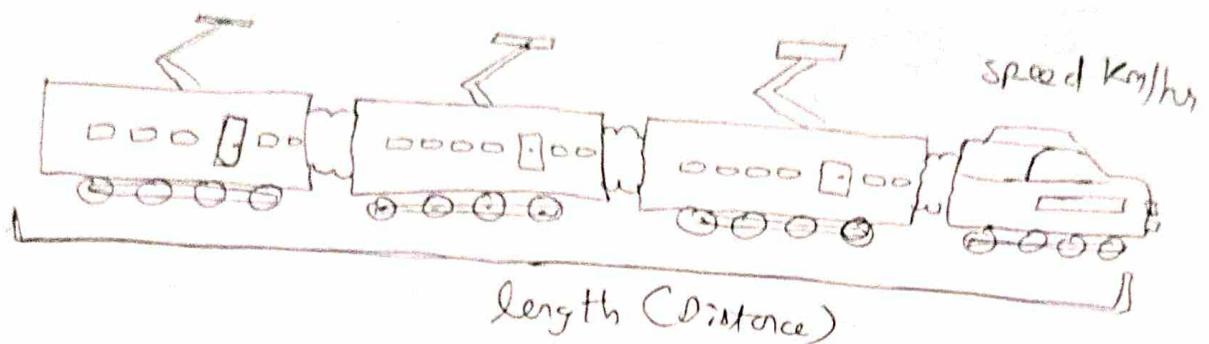
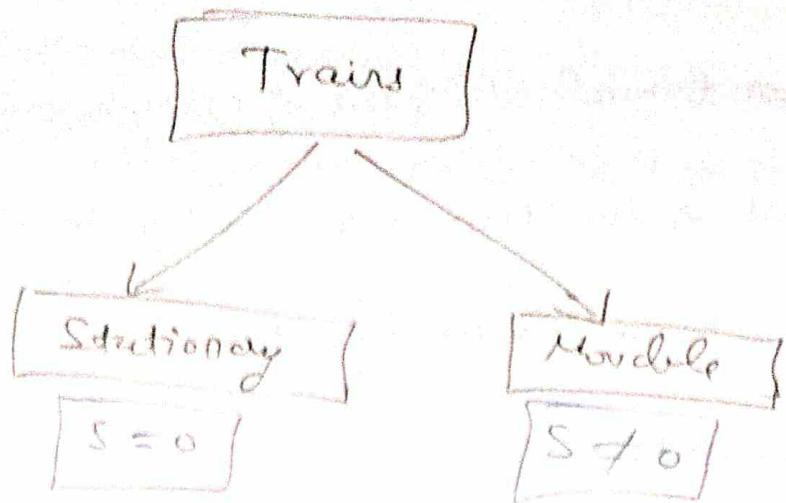
$$\frac{D}{S} = ? \text{ hours} \quad = 30 - 20 = 10 \text{ km/h}$$



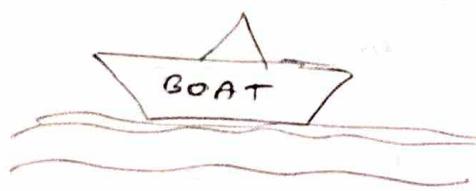
\rightarrow 1 hour to meet each other



\rightarrow 5 hours to meet each other



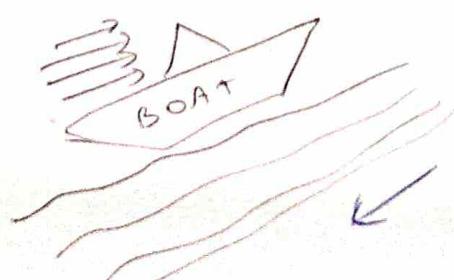
Effective Speed:



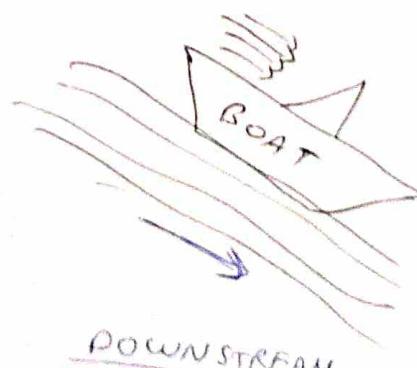
$$\therefore D = S \times T$$

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

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



UPSTREAM



DOWNSTREAM

$$S_U = S_B - S_S$$

$$S_D = S_B + S_S$$

FORMULA :

② A boat can travel at a speed of 13 kmph in still water.
 If the speed of the stream is 4 kmph find the time taken by
 the boat to travel 68 km downstream.

- A) 2 hours
- B) 2.5 hours
- C) 4 hours
- D) 5 hours

$$\boxed{S_B = 13 \text{ km/hr}}$$

$$\boxed{S_S = 4 \text{ km/hr}}$$

$$\boxed{S_D = S_B + S_S}$$

$$S_D = 13 + 4 (= 17 \text{ km/hr})$$

$$\boxed{D = 68 \text{ km}} \rightarrow D/S$$

$$T = \frac{D}{S_D} = \frac{68}{17} (= 4 \text{ hours})$$

Q) A motorboat travels 40km downstream in 5 hours and 30km upstream in 6 hours. Find the speed of the stream.

A) 1.5

- B) 2.5
- C) 3.5
- D) 4.5

$$D = 40 \text{ km}$$

$$t = 5 \text{ hrs}$$

$$S_o = 8 \text{ km/hr}$$

$$D = 30 \text{ km}$$

$$t = 6 \text{ hrs}$$

$$S_o = 5 \text{ km/hr}$$

$$S_B + S_s = 8$$

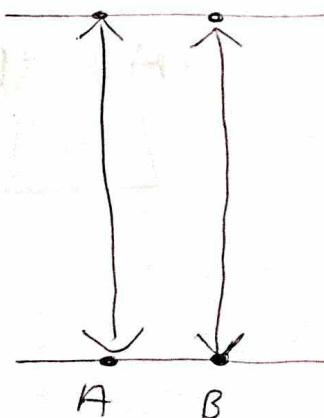
$$S_B - S_s = 5$$

$$\begin{array}{r} S_B + S_s = 8 \\ S_B - S_s = 5 \\ \hline \end{array}$$

$$2 S_s = 3$$

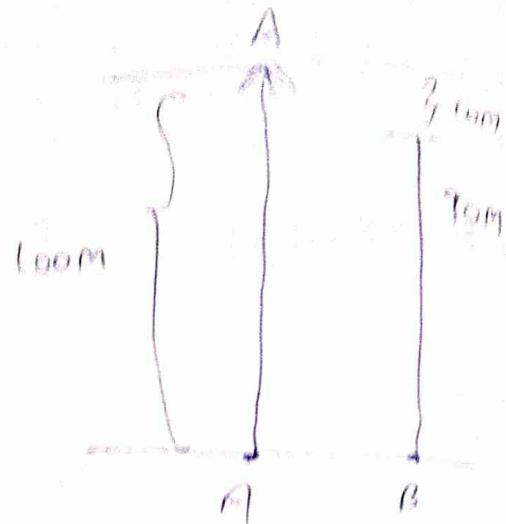
$$S_s = 1.5 \text{ km/hr}$$

Concept of Linear Race



(A) Books (B) by 10 Meter

↓
[Winner]

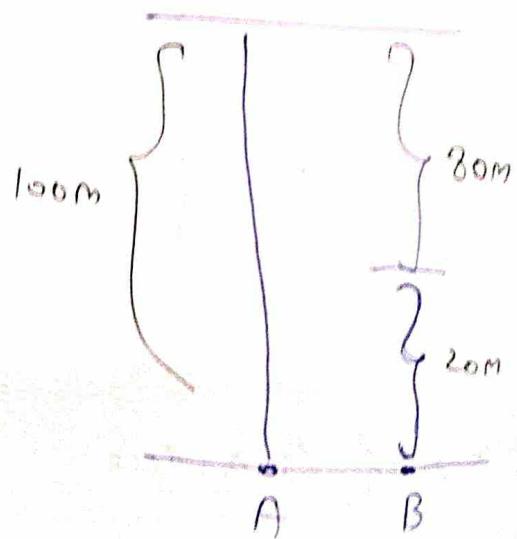


In 100m → A gave a headstart of 20m

A → 100m

B → 80m

(A) (B)



Some time to finish

⑥

In a race of 200m, A can beat B by 31m and C by 18m.

In a race of 300m, C will beat B by?

a) 21m

b) 19m

c) 20m

d) 22m

A — B — C

200 m 169m ← 31m

~~325m~~ ← 300m

⑦

In a 500m race the ratio of the speeds of two

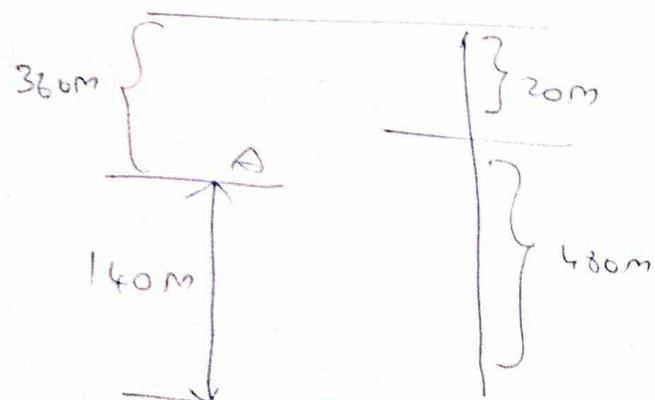
Contestants A and B has a head start of 140m then A will
win by.

a) 400m

b) 20m

c) 40m

d) 480m



A → 360m

B → 300m

A B

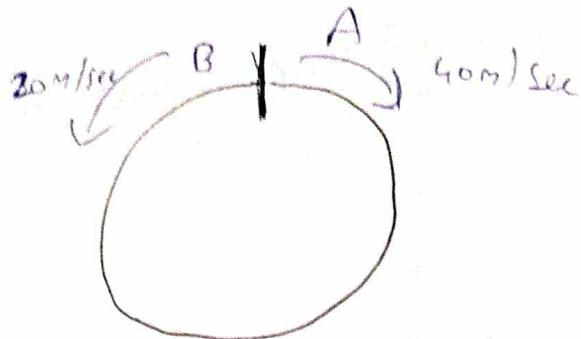
3m → 4m

360m → x

$$x = \frac{4 \times 360}{3} = 480 \text{ m}$$

Concept of Circular Race

300 M



Relative speed.

$$\text{Time} = \frac{D}{S}$$

$$= \frac{300}{40+20} = \frac{300}{60} = 5 \text{ sec}$$

opposite direction

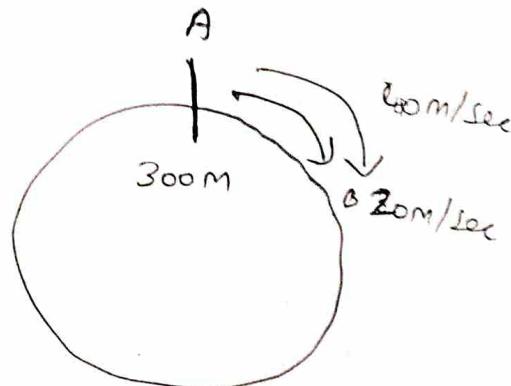
$$T = 5 \text{ sec}$$

Relative Speed

$$\text{Time} = \frac{D}{S}$$

$$T = \frac{300}{40-20} = \frac{300}{20} = 15 \text{ sec}$$

$$T = 15 \text{ sec}$$



Two Persons

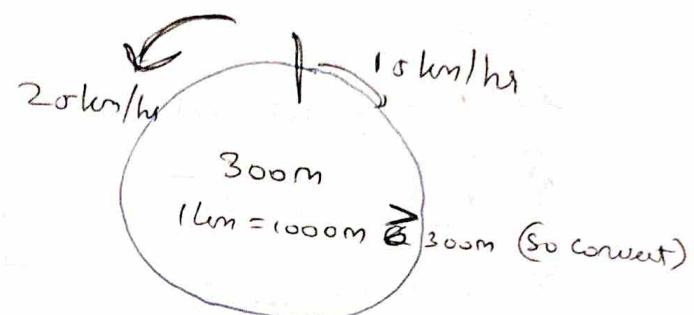
② Two persons start running simultaneously around a circular track of length 300m from the same point of speeds of 15 km/hr and 20 km/hr. When they will meet for the first time anywhere on the track if they are moving in opposite.

a) 27 sec

b) 31 sec

c) 23 sec

d) 29 sec



$$T = \frac{D}{S} = \frac{300}{11.11} = \frac{300}{15 + 25} = \frac{300}{40 \text{ km/hr}}$$

= 27 sec

$$\frac{15 \text{ km/hr}}{1 \text{ hr}} = \frac{15 \times 1000 \text{ m}}{1 \times 3600 \text{ s}} = \frac{15000}{3600} = \frac{5}{12} \text{ m/s}$$

= 11.11 m/sec

$$\frac{20 \text{ km/hr}}{1 \text{ hr}} = \frac{20 \times 1000 \text{ m}}{1 \times 3600 \text{ s}} = \frac{20000}{3600} = \frac{5}{9} \text{ m/s}$$

= 11.11 m/sec

$1 \text{ km/hr} = 5/18 \text{ m/s}$

$1 \text{ m/s} = 18/5 \text{ km/hr}$

Shortcut

$$\text{km/hr} \longrightarrow \text{m/s} \times \left(\frac{5}{18}\right) \text{ small value}$$

$$\text{m/s} \longrightarrow \text{km/hr} \times \left(\frac{18}{5}\right) \text{ big value}$$

Three Persons

Q) Three friends A, B and C run around a circular track of length 120 meters of speeds 5 m/sec, 7 m/sec and 10 m/sec starting simultaneously from the same point and in the same direction. How often will the three of them meet?

A) Every 30 seconds

B) Every 60 seconds

C) Every 120 seconds

D) None of These

\therefore Here There are Three Persons

$$\boxed{\text{Time A \& B}} \rightarrow D = 120m \quad T \rightarrow 120/2$$

$$R-S = 7-5$$

$$= 2m/sec$$

$$= 2m/sec$$

$$\boxed{\text{Time B \& C}} \rightarrow D = 120m$$

$$R-S = 10-7$$

$$= 3m/sec$$

$$= 13sec$$

$$\boxed{\text{Time A \& C}} \rightarrow D = 120m$$

$$R-S = 10-5$$

$$= 5m/sec$$

$$= 12sec$$

LCM of time taken

$$= (60, 15, 12)$$

$$= 60 sec$$

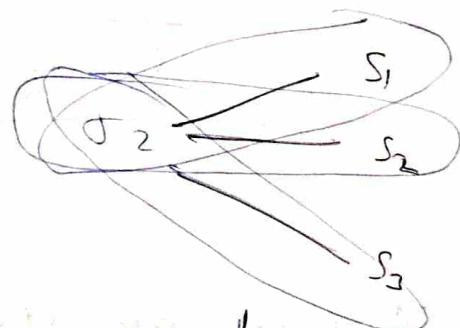
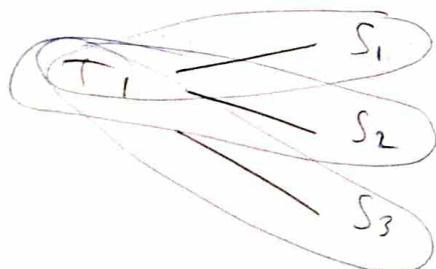
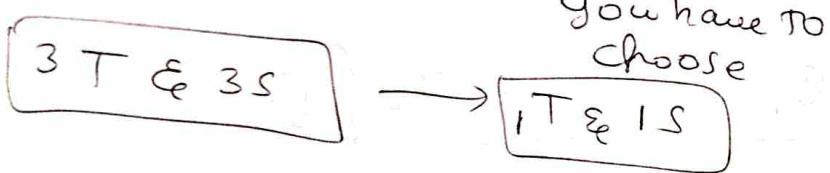
Permutations and Combinations

Color → ways to choose

Blue white Black

① + ① + ① → 3 ways of selection

choosing



3 ways

3 ways

6 ways

AND → Multiply
OR → Add

Q) In a shopping mall has 3 distinct glass door and 2 distinct metal door for entry and has 5 distinct glass door and a wooden door for exit.

- A) In how many ways can you enter the mall? $\rightarrow 5$ ways
- B) In how many ways the entry and exit can happen? $\rightarrow 30$
- C) In how many ways can you leave the mall? $\rightarrow 6$ ways

Entry \rightarrow G_1, G_2, G_3, M_1, M_2 { 5 }

Entry & Exit $\rightarrow 5 \times 6 = 30$ ways

Exit \rightarrow $G_1, G_2, G_3, G_4, G_5, W_1$ { 6 }

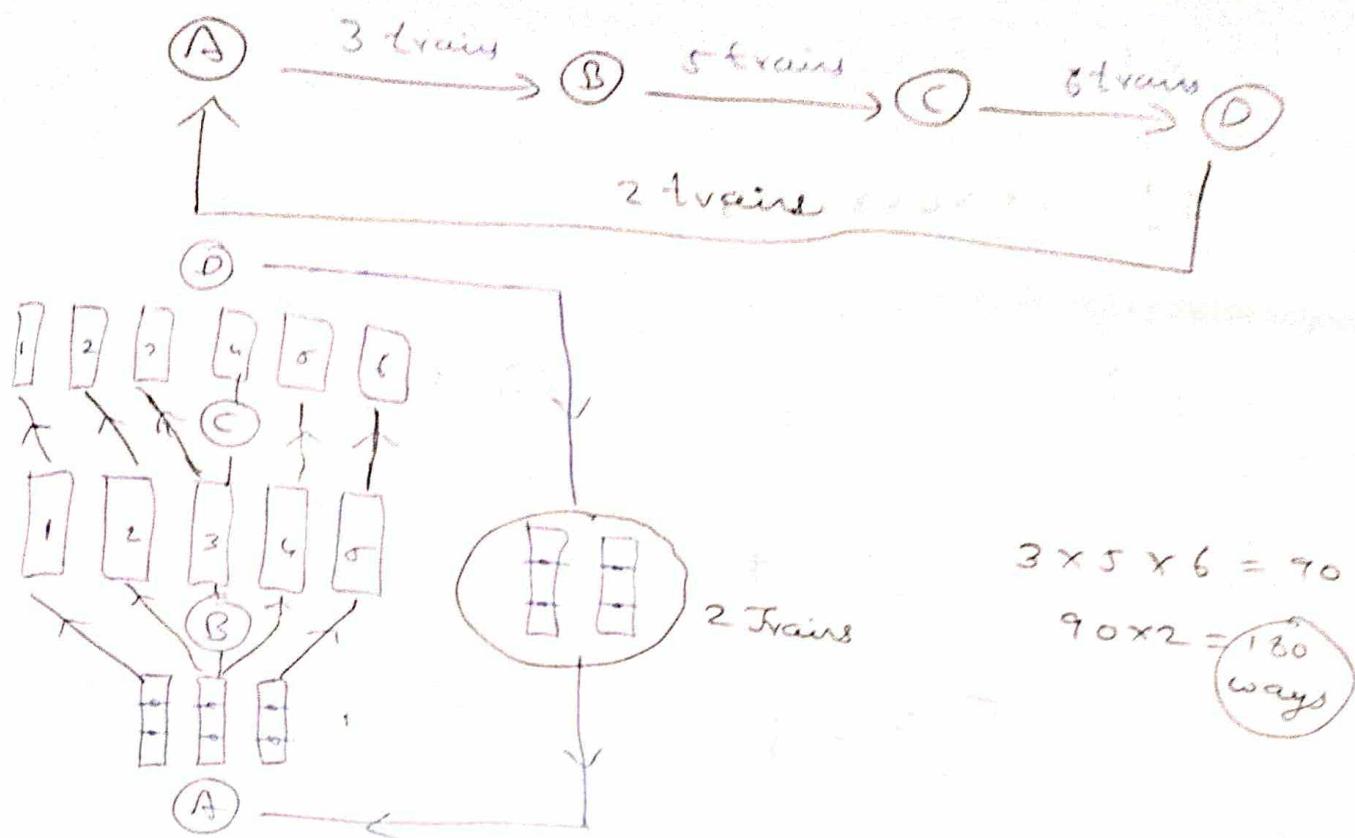
Q) If There are 3 trains from A to B, 5 trains from B to C, 6 trains from C to D, 2 trains from D to A.

In how many ways can a person travel from A to D (via B to C) and return back to A again?

A) 180

- B) 360
C) 200
D) 240

Solved by own



- ⑥ The Total no of ways of answering Objective Type Question, Each having ④ Options?

A) 1024

B) 1020

C) 620

D) 20

$$\textcircled{Q_1} - \textcircled{Q_2} - \textcircled{Q_3} - \textcircled{Q_4} - \textcircled{Q_5}$$

$$4 \times 4 \times 4 \times 4 \times 4$$

$$= 1024$$



Combination

$n!$

$$5! \rightarrow 5 \times 4 \times 3 \times 2 \times 1$$

factorial

(10!)

$$10C_2$$

$$= \frac{10 \times 9}{1 \times 2}$$

$$\Rightarrow 45$$

② $5C_3$

$$\frac{5 \times 4 \times 3}{1 \times 2 \times 1}$$

$$= 10$$

Eg:
③

$$nC_n = 1 \quad \rightsquigarrow$$

$$\text{Eg: } 5C_5 = \frac{5 \times 4 \times 3 \times 2 \times 1}{1 \times 2 \times 3 \times 4 \times 5} = 1$$

$$nC_1 = n \quad \rightsquigarrow$$

$$\text{Eg: } 5C_1 = \frac{5}{1} = 5$$

$$nC_{n-1} = n \quad \rightsquigarrow$$

$$\text{Eg: } 5C_4 = \frac{5 \times 4 \times 3 \times 2}{4 \times 3 \times 2 \times 1} = 5$$

OR → Addition

AND → Multiplication

Most Important Question

(x) (x)

25tr

- ② A conference is attended by 25 participants. If each participant shakes hand with each other participant what will be the resultant number of hand shakes?

A) 25

B) 325

C) 300

D) 50

$$25 C_2 \rightarrow \text{Two hand shakes}$$

$$\frac{25 \times 24}{1 \times 2} = 300$$

- ③ A department contains 18 male employees and 15 female employees. In how many ways can a male and a female employee be chosen to represent the department?

A) 275

B) 32

C) 270

D) None of these

$$= 18 \text{ male} \times 15 \text{ female}$$

$$= 18 C_1 \times 15 C_1$$

$$= 270$$



4 points



3 points



6 points



4 points



0 points



4 points

$$\textcircled{1} \quad 10P_2 = \frac{10 \times 9}{1 \times 2!} = 45$$

$$\textcircled{2} \quad 11P_2 = \frac{11 \times 10}{1 \times 2!} = 55$$

arrangement = Permutation

\textcircled{3}) How many 3 letter words can be formed by using different alphabets?

$$\textcircled{4}) \quad 26C_3 = \frac{26 \times 25 \times 24}{1 \times 2 \times 3} = 26 \times 25, 24 \\ = 15,600$$

\textcircled{5}) Out of 6 consonants and vowels, How many words 3 consonants and 2 vowels can be formed.

Answer:

6 Consonants & 5 Vowels
 ↴ ↴
 3 consonants & 2 vowels
 Z

$$= (6C_3 \times 5C_2) \times 5P_5$$

$$\Rightarrow \frac{6^2 \times 5 \times 4 \times 3}{1 \times 2 \times 1} \times \frac{5 \times 4}{1 \times 2} \times 120$$

$$\Rightarrow = 200$$

$$= 20,000$$

$$\begin{array}{r} 200 \\ \times 20 \\ \hline 000 \\ + 20 \\ \hline 20,000 \end{array}$$

$$\begin{array}{r} 200 \\ \times 20 \\ \hline 000 \\ + 20 \\ \hline 20,000 \end{array}$$

Q) How many ways 5 letter word can be formed using the letters of the word "GREAT".

① If repetition of alphabet is allowed.

~~G R E A T~~

$$\frac{5}{G} \times \frac{5}{(ov)} \times \frac{5}{R} \times \frac{5}{(ov)} \times \frac{5}{E} \times \frac{5}{(ov)} = 5^5$$

$$A \quad | \quad | \quad | \quad | \quad |$$

$$T \quad | \quad | \quad | \quad | \quad |$$

② If repetition of alphabet is not allowed

② Alphabets Letters

t
Letters → remove and count.

$$\begin{matrix} 3 & 5 & 5 & 5 & 5 \\ \cancel{e} & \cancel{e} & \cancel{e} & \cancel{t} & \cancel{r} \end{matrix}$$

G R E A T

$$5 \otimes 4 \otimes 3 \otimes 2 \otimes 1$$

G (ov)
R (ov)
E (ov)
A (ov)

$$= 5^3$$

FORMED

$$= 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

Repetition of words

① Banana $\rightarrow \frac{6!}{3! \times 2!}$

a $\rightarrow 3!$
 n $\rightarrow 2!$

② Engagement $\rightarrow \frac{10!}{3! \times 2! \times 2!}$

g $\rightarrow 2!$
 n $\rightarrow 2!$
 e $\rightarrow 3!$

③ 5 digits 5, 1, 6, 7 and 4 (Repetition not allowed)

$$\Rightarrow \frac{5 \times 4 \times 3 \times 2 \times 1}{5!} = 120$$

$\Rightarrow 120$

④ How many 4 digit's numbers can be formed on having the number 0, 1, 2, 3 and 4? (repetition not allowed)

A) 120

B) 106

C) 96

D) 85

$$4 \times 4 \times 3 \times 2 = 96$$

$$\begin{array}{r} 16 \\ \times 4 \\ \hline 64 \\ \times 3 \\ \hline 192 \\ \times 2 \\ \hline 384 \\ \end{array}$$

Tricky

(Solved on own)

How many four digit even numbers can be formed by using the digits 1, 3, 7 and 8 only once?

A) 6 -

- a) 8
- c) 1
- d) 3

ways

$$\frac{3 \times 2 \times 1}{\text{---}} = 6$$

 1 way

$$3 \times 2 \times 1 = 6 \text{ ways}$$

⑥

LOGARITHMS

(Solved on own)

$$10 \times 9 \times 8 \times 7$$

Q)

Evaluate $20! / 23!$ (Solved on own)

a) 620

b) 800

c) 320

d) 600 -

$\Rightarrow \frac{20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 14 \times 13 \times 12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{23 \times 22 \times 21 \times 20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 14 \times 13 \times 12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1} = 600$

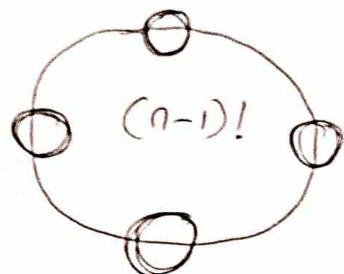
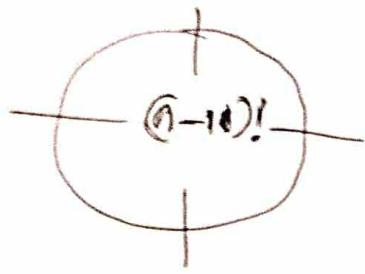
$\frac{20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 14 \times 13 \times 12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{23 \times 22 \times 21 \times 20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 14 \times 13 \times 12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1} = 600$

Concept of Circular and Line Permutation

6 People

$$\underline{6} \times \underline{5} \times \underline{4} \times \underline{3} \times \underline{2} \times \underline{1}$$

Necklace, Garland



Q) In how many ways can 5 friends sit around a table?

$$(n-1)! = (5-1)! = 4! = 4 \times 3 \times 2 \times 1 = 24 \text{ ways.}$$

Q) How many ways 4 Judges can be arranged in a round table?

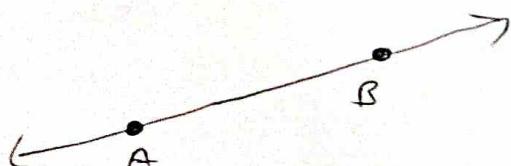
$$(4-1)! = 3! = 3 \times 2 \times 1 = 6 \text{ ways}$$



Geometry

[Lines / Angles / Triangles / Quadrilaterals / Circles / Polygons]

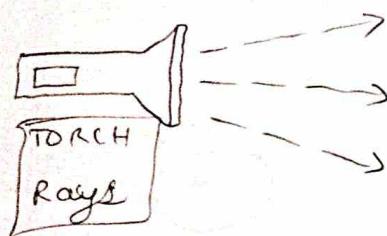
Lines: A line is a figure formed when two points are connected with minimum distance between them and both are extended to infinity.



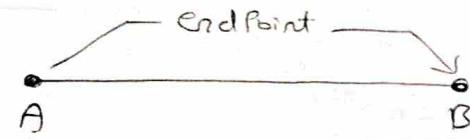
Rays



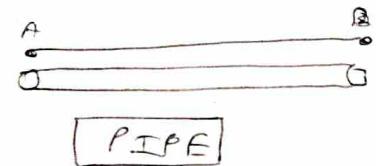
certain beginning and no ending.



Segment



Certain Beginning and Certain ending



Horizontal line



Vertical line

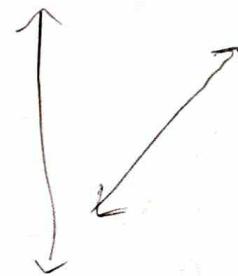


Parallel lines



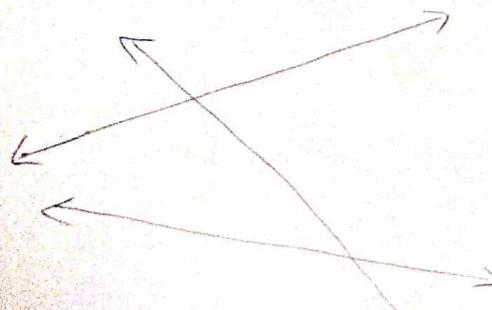
(LINES NEVER
INTERSECT)
are called
parallel lines

Non parallel

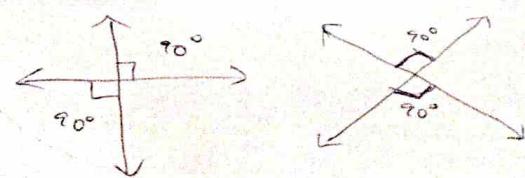


(LINES NEVER INTERSECT)
NON PARALLEL LINES

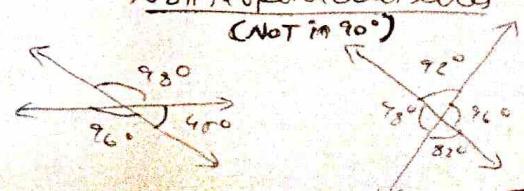
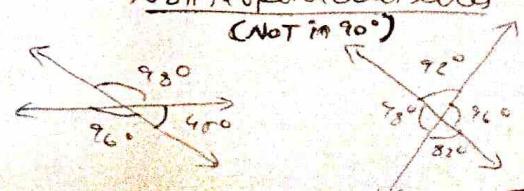
Intersecting lines



Perpendicular lines (90°)



Non perpendicular lines
(NOT in 90°)



Angles.

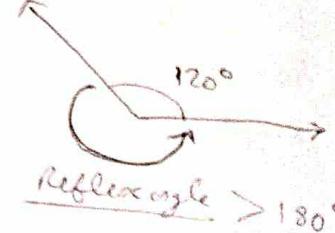


Right Angle



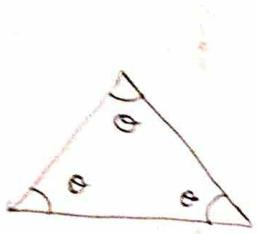
Acute angle

Obtuse angle

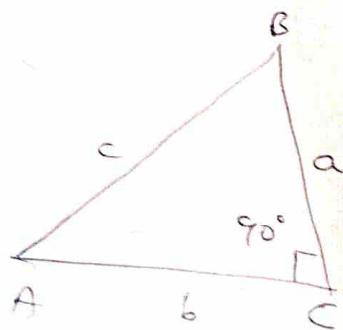
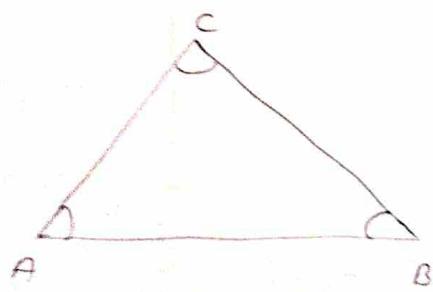
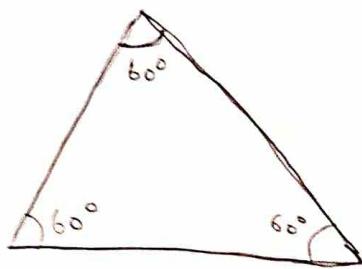


Reflex angle $> 180^\circ$

Triangles

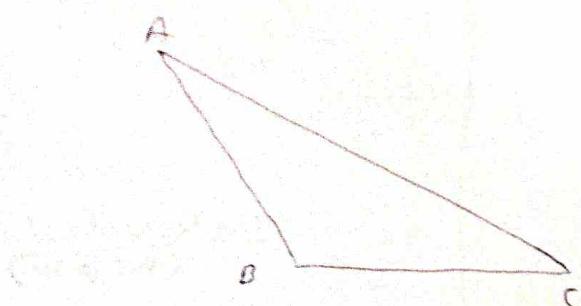


Equilaterals

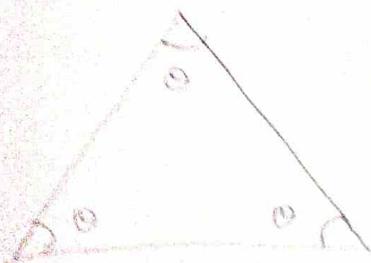


ACUTE ANGLE
TRIANGLE

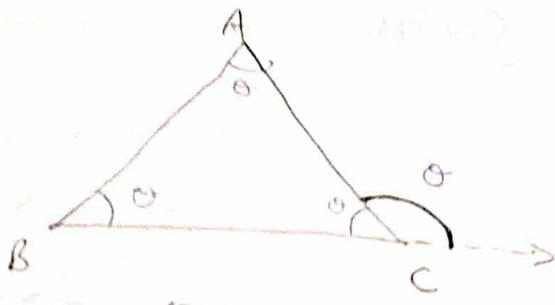
RIGHT ANGLE
TRIANGLE



OBTUSE ANGLE
TRIANGLE



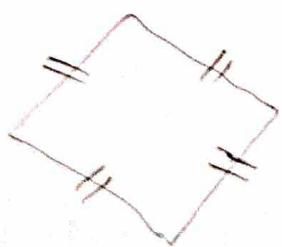
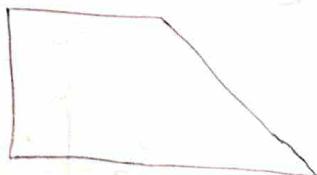
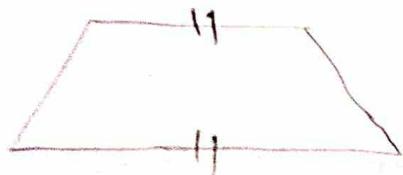
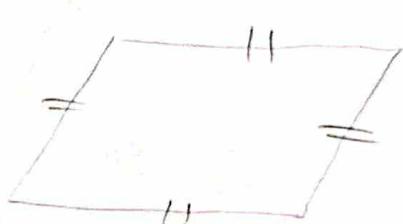
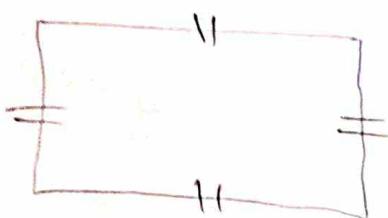
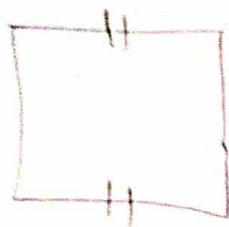
Interior angle



External angles

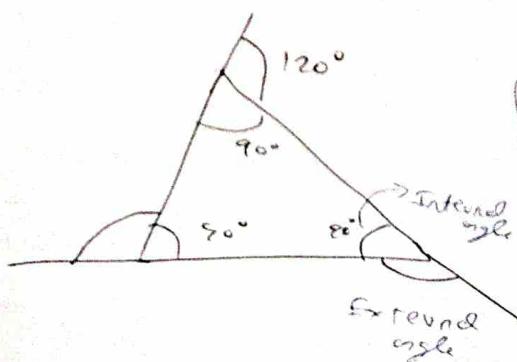
Quadrilaterals

Opposite Sides are Parallel to each other.



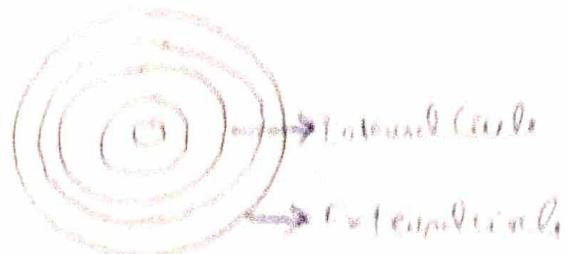
[PROBLEMS REFER VIDEO]

Regular polygon

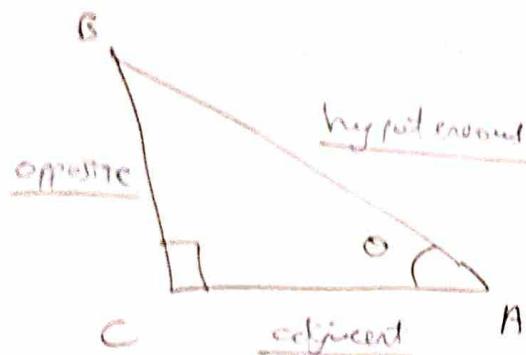


{Internal angle + External angle}

Conc.



Trigonometric ratios



$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{BC}{AB}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\operatorname{cosec} \theta = \frac{1}{\sin \theta} = \frac{\text{hyp}}{\text{opp}}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hyp}}{\text{adj}}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\frac{\text{opp}}{\text{adj}}$$

$$\cot \theta = \frac{1}{\tan \theta} = \frac{\text{adj}}{\text{opp}}$$

TRIGONOMETRIC TABLE

	0°	30°	45°	60°	90°
$\sin \theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	N.D.
$\cot \theta$	N.D.	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
$\sec \theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	N.D.
$\csc \theta$	N.D.	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0

[PROBLEMS VIEW RECORDED VIDEO]

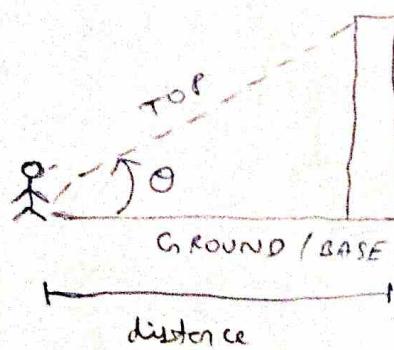
TRIGONOMETRIC IDENTITIES

$$\sin^2 \theta + \cos^2 \theta = 1 \quad || \quad \sec^2 \theta + \tan^2 \theta = 1 \quad || \quad \csc^2 \theta - \cot^2 \theta = 1$$

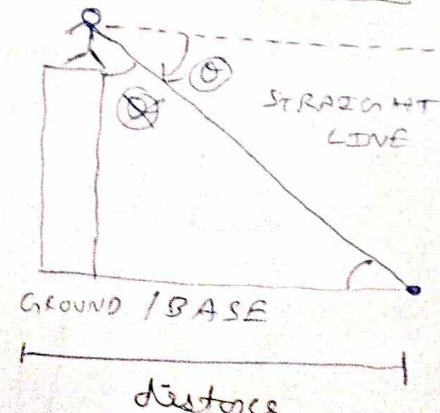
[Refer Video]

Heights and distances

Angle of Elevation



Angle of depression



[REFER VIDEO]

ADVANCE

Pie chart.

④ Expenditure Incurred by a Family and Their Savings

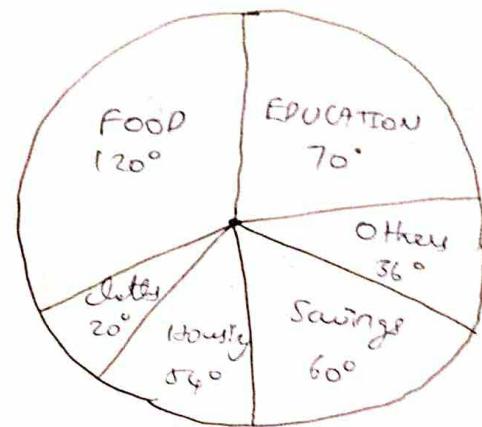
② The ratio expenditure of Food to Savings is

A) 3:1

B) 3:2

C) 2:1

D) 10:0



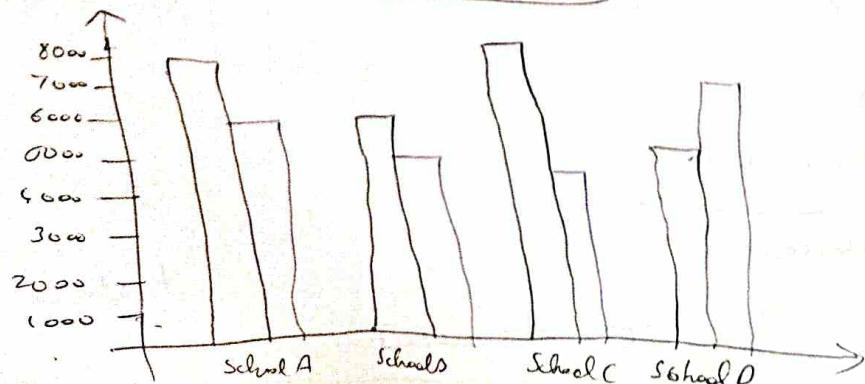
[Food : Savings]

120 : 60

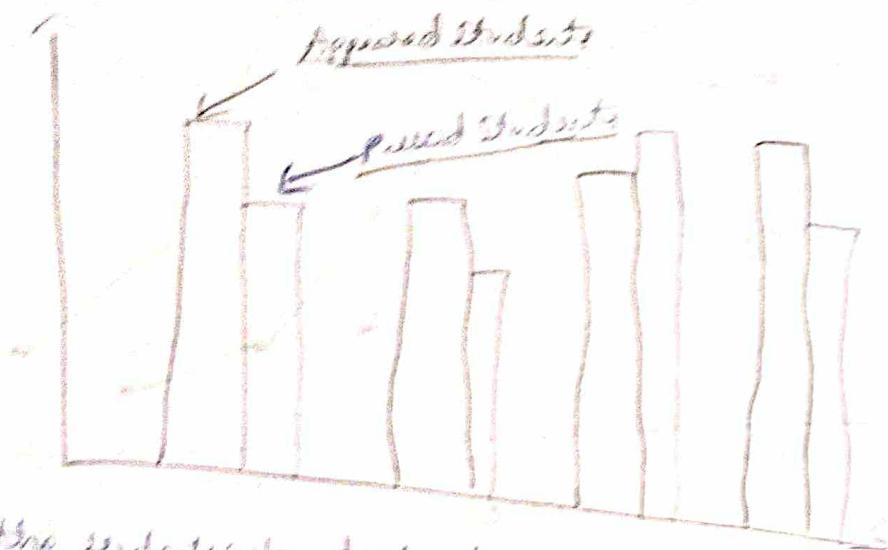
2 : 1

Formula : Income - Expenditure = Savings

Bar chart



Appeared Students \rightarrow Different
 Passed Students \rightarrow Different
 Failed Students \rightarrow Different



Find No. students who did not pass the test?

$$\begin{aligned} \text{Did not pass} &= \text{Appeared students} - \text{Passed students} \\ &= 9000 - 7000 \end{aligned}$$

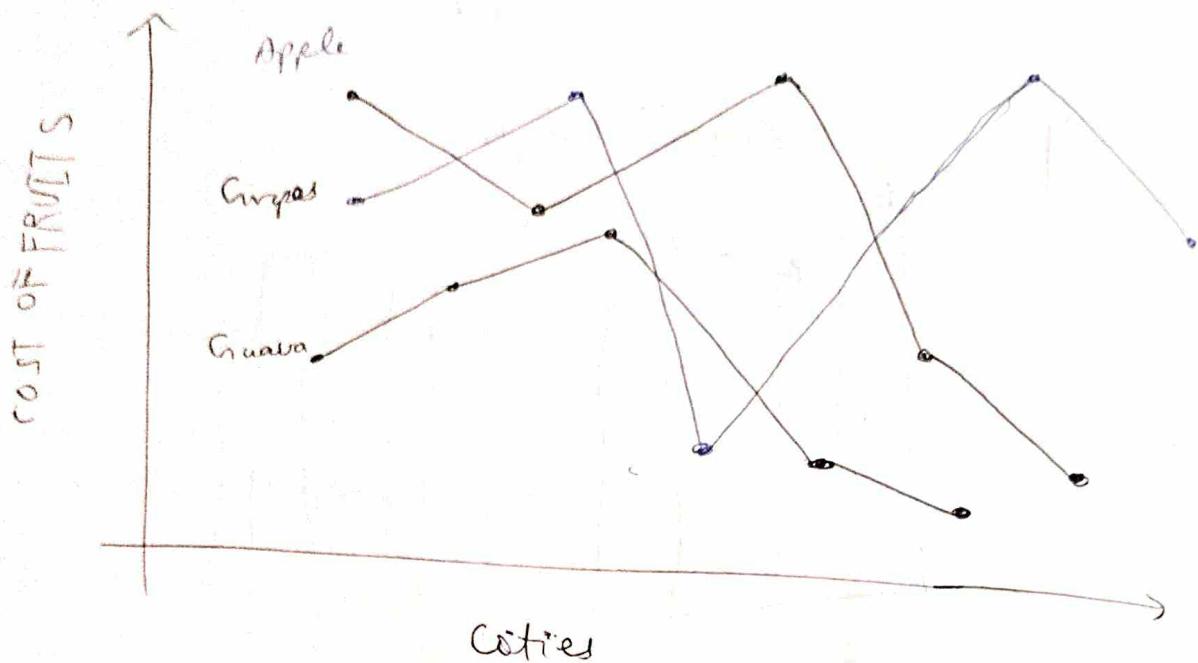
$$= 2000$$

- ② Find the difference between the average of the students who appeared in all classes and that of the students who passed in all classes.

$$\boxed{\text{d)} ₹1600}$$

Graph

④ Cost of Three Different Fruits



① $1 \text{ kg} = 1000 \text{ g}$ (grams)

1 kg
cost
Gandhar = ~~61~~, ~~91~~, ~~121~~, ~~31~~

$\frac{2 \text{ kg}}{2000}$

Gandhar = ~~60~~, ~~90~~, ~~10~~

~~60~~, ~~60~~, ~~90~~

Data Interpretation

→ Siddhatha has decided to start a new company
"Siddhatha Travels"

He wants to buy

- ① Furniture
- ② table
- ③ chair
- ④ Air conditioners
- ⑤ Desktop Computer - Monitor, CPU, keyboard, mouse
- ⑥ Lights.

- Q) What is the ratio of the cost of CPU to the total cost of a mouse and a keyboard together?

(Answer)

Keyboard : ₹ 4000

Mouse : ₹ 1000

CPU : ₹ 15,000

$$\text{Ratio} \Rightarrow 15000 : 5000$$

Simple Interest & Compound Interest.

S-I & C-I

Principle / Sum = both are same.

- ② If I am borrowing ₹1000 from my friend.
and I am telling him that I will give this after
Two years. He puts me some interest 100₹ per
year.

Answer:

Principle / Sum = 1000

Number of years = 2

Rate of Interest = 10%.

Without formula :

$$1^{\text{st}} \text{ year} = 10\% \times \frac{10}{10\%} = 100\text{₹}$$

$$2^{\text{nd}} \text{ year} = 10\% \times \frac{10}{10\%} = \underline{\underline{100\text{₹}}}$$

$$\Rightarrow 1000 + 200 = 1200\text{₹}$$

(X)
↑

Instead of Doing This

There is a formula called.

With formula :

(A)

$$S.I = \frac{P \times R}{100}$$

$$= \frac{10 \times 2 \times 10}{100}$$

$$= 20 \times 10$$

$$\boxed{= 200}$$

$$= 1000 + 200 = 1200\%$$

Anud Interest = Simple Interest.

Ans

② If we know This Formula we can solve any kind of Problem regarding Simple Interest.

$$SI = \frac{P \times R}{100}$$

Find P?

Find N?

Find R?

Shortcut:

Find P value N value and R value using answer given. ✓

③ A cell phone it is available for 600 (or) for RS 300 cash down payment together with RS 360 to be paid after Two ~~years~~ months. Find the rate of interest charged under this scheme.

A) 20%

B) 50%

C) 120%

D) 130%

$$SI = \frac{PNR}{100}$$

$$60 = \frac{300 \times 4\% \times x}{100}$$

$$60 = \frac{2x}{1}$$

$$60 = \frac{1}{2} x$$

$$120 = x$$

$$x = 120\%$$

Concept of Compound Interest.

$$P = 1000$$

$$r = 10\%$$

$$N = 3 \text{ years}$$

Simple Interest / Compound Interest

$$1^{\text{st}} \rightarrow 1000 \times \frac{10}{100} = 100$$

$$2^{\text{nd}} \rightarrow 1100 \times \frac{10}{100} = 110$$

$$3^{\text{rd}} \rightarrow 1210 \times \frac{10}{100} = \underline{\underline{121}}$$

$$\underline{\underline{331}}$$

$$\Rightarrow 1000 + 331$$

$$C.I = 1331$$

$$C.I = P \left[\left(1 + \frac{r}{100} \right)^n - 1 \right]$$

P - Principle
N - No of year
R - Rate of Interest

$$C.I = P \left(\left(1 + \frac{r}{100} \right)^n - 1 \right)$$

$$\text{Amount} = P \left(1 + \frac{r}{100} \right)^n$$

Complex Method $P = 1000$ $r = 10\%$ $t = 3 \text{ years}$

$$\begin{aligned} C.I &= 1000 \left(\left(1 + \frac{10}{100} \right)^3 - 1 \right) \\ &= 1000 \left(\left(\frac{110}{100} \right)^3 - 1 \right) \\ &= 1000 \left((1.1)^3 - 1 \right) \\ &= 1000 (1.331 - 1) \\ &= 1000 \times 0.331 \\ &= \boxed{331} \end{aligned}$$

⑥ Find the compound interest on Rs 8000 at 5% per annum for 3 years when C.I is reckoned yearly?

- a) 1261
- b) 1440
- c) 1125
- d) 1346

$$\begin{aligned} (1^{\text{st}}) &\rightarrow 8000 \times \frac{5}{100} = 400 \\ (2^{\text{nd}}) &\rightarrow 8400 \times \frac{5}{100} = 420 \\ (3^{\text{rd}}) &\rightarrow 8820 \times \frac{5}{100} = 441 \\ &\hline 1261 \end{aligned}$$

Half yearly Compounding:-

$$\text{rate of Interest} = i \left(\frac{1}{2}\right)$$



$$\begin{array}{c} \text{1 year} \quad \text{6 Months} \\ \hline \text{101} \quad \oplus \quad 1 \\ \boxed{n = 31} \end{array}$$

$$P = 8000$$

$$r = 5\%$$

$$n = 3$$

(5.p.c) per annum

↳ means 5%.

$$6\text{pc.} \rightarrow 6\%$$

$$7\text{pc.} \rightarrow 7\%$$

$$8\text{pc.} \rightarrow 8\%$$

$$9\text{pc.} \rightarrow 9\%$$

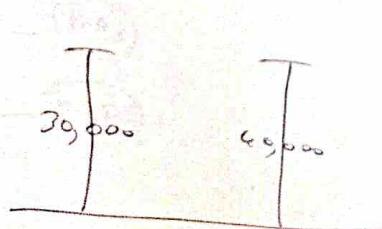
Q) Some Times Question might be find both SI and CI.

Q) Card O Invested 30,000 and 40,000 respectively in a business for one year and earned 7,700 at the end of the year Find the profit?

A) 3800

B) 3300

C)	4400
D)	4000



$$30,000 : 40,000 = 3 : 4$$

$$3 : 4 = 7P = 7700$$

$$1P = 1100$$

$$\text{D's profit } 4P = 4 \times 1100$$

$$= 4400$$

$$\text{C's profit} = 3 \times 1100$$

Simple Method

$$3p,000 : 4q,000 = 7700$$

$$3x : 4x = 7700$$

$$3x + 4x = 7700$$

$$7x = 7700$$

$$x = 1100$$

$$3(1100) + 4(1100)$$

$$3300 + "4400"$$

D's investment.

$$\sum x \quad \text{X}$$

Concept of Average

$$\boxed{\text{Average} = \frac{\text{Sum of Terms}}{\text{No of Terms.}}}$$

$$2, 6, 4, 8 \rightarrow \frac{2+6+4+8}{4} = \frac{20}{4} = 5$$

Concept of Alligation

Type 1

10kg
Only one sells

Type 2

20kg
Net sell

MIX 161 - Percent

② A trader has 1600 kg of sugar. He sells - he sells a part at 8% profit and the rest at 12% profit. If he gains 11% on the whole find the quantity sold at 12%.

A) 1200 kg

- B) 1400 kg
- C) 1600 kg
- D) 800 kg

8% & 12%

what we are going to mix

8% 12%

11%

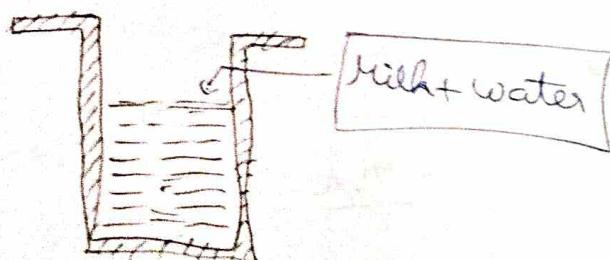
1 : 3

$$\begin{array}{l} \text{11 : 3} \\ \text{11 + 3 = 14} \\ \frac{1600}{14} \times 3 = 400 \\ \frac{3}{4} \times 1600 \\ = 1200 \text{ kg} \end{array}$$

$$\begin{array}{l} 11+1=12 \\ 11-3=8 \end{array}$$

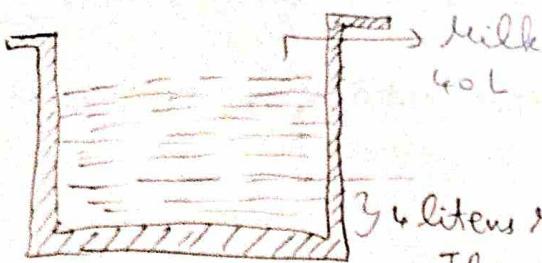
~~(X)~~

Concept of Mixture



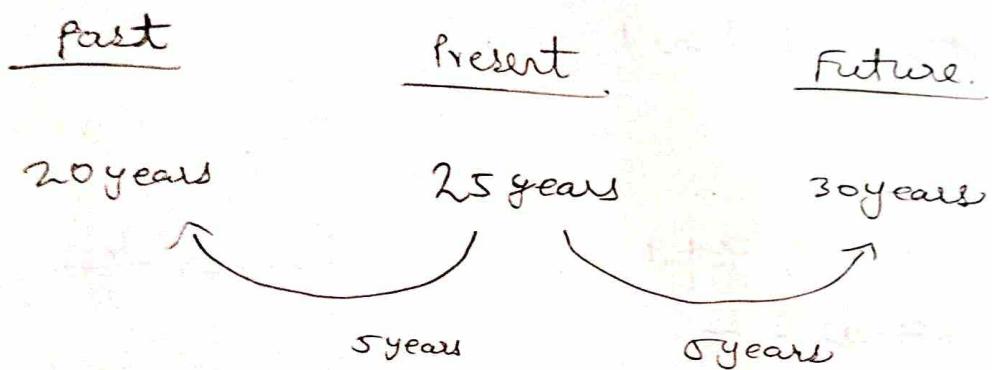
[Refer Video]

Concept of Replacement



[Refer Video]

3 liters milk
Tanks are [replaced]
by water.



Q) The sum of ages of 5 children born at the interval of 3 years each is 50 years. What is the age of the youngest child?

- (A) 4 years
- (B) 8 years
- (C) 10 years
- (D) 12 years.

$$x, x+3, x+6, x+9, x+12 = 50$$

(4)

$$5x + 30 = 50$$

$$5x = 20$$

$$x = 4$$

[Refer Video]

Ages Based on Ratio

(Q) Dinesh is younger to Roshan by 9 years. If their ages are in the respective ratio of 4:5 how old is Dinesh?

a) 36 years

b) 23 years

c) 29 years

d) Cannot be determined

$$\text{Roshan} = x + 9$$

$$\frac{D}{R} = \frac{4}{5}$$

$$\text{Dinesh} = x$$

$$\frac{x}{x+9} > \frac{4}{5}$$

$$5x = 4x + 36$$

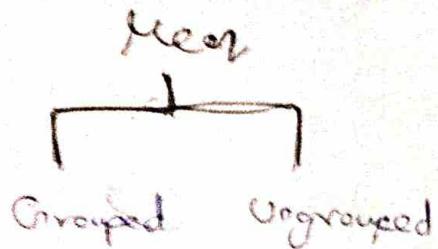
$$5x - 4x = 36$$

$$1x = 36$$

$$x = 36$$

[Refer Video]

Mean, Median, Mode



$$\boxed{\text{Mean} = \frac{\text{Sum of Data}}{\text{No of Data}}} = \frac{2+4+6+8+10+15+20}{7}$$

$$= 65/7 \boxed{= 9.28}$$

② If the mean of the data 5, 7, 10, 14, x, 20, 32, 19 is ∞
what is the value of x ?

- a) 14
- b) 15
- c) 14.5
- d) 16

$$\boxed{\frac{\text{Sum of Data}}{\text{No of data}} = \infty}$$

$$\frac{5+7+10+14+x+20+32+19}{8} = \infty$$

$$112 + \overbrace{x} = 8\infty$$

$$7x = 112$$

$$x = 112/7$$

$$\boxed{x = 16}$$

[Refer Video]



Concept of Median

↓
Centre

Ungrouped data

5, 3, 4, 6, 8

arrange in ascending order

3, 4, 5, 6, 8
Median

$$\boxed{\text{Median} = \frac{(n+1)^{\text{th}}}{2}}$$

$$= \frac{5+1}{2} = \frac{6^{\text{th}}}{2} = 3$$

2, 4, 5, 5, 7, 8
Median

Median = Avg of

$$\frac{n+1}{2} \quad | \quad \left(\frac{n}{2} + 1 \right)^{\text{th}}$$

$$\frac{6^{\text{th}}}{2} \quad | \quad \left(\frac{6}{2} + 1 \right)^{\text{th}}$$

3 & 4th observation

$$\frac{3+4}{2} = \frac{7}{2} = 3.5$$

Median

$$\text{odd} = \frac{(n+1)^{\text{th}}}{2} \quad \text{observation}$$

$$\text{Even} = \frac{n+1}{2} / \left(\frac{n}{2} + 1 \right)^{\text{th}} \text{ observation}$$

⑭ The collection of numbers which comprise the data given below is arranged in ascending order
 $(3, 7, 9, N-1, 15, 18, 19, 20)$ If the median of the data is 12.5 what is the value of N ?

A) 10.5

B) 9

C) 11

D) 12

$3, 7, 9, \textcircled{N-1}, \textcircled{15}, 18, 19, 20$

Table

class	0-10	10-20	20-30	30-40
Frequency				

↑
 [Refer video]

Median = $\frac{x^{\frac{n}{2}}}{x}, \frac{x^{\frac{n}{2}+1}}{x}$

$\frac{N-1+15}{2} = 4, 5$

$\frac{N-1+15}{2} = 12.5$

$N+14 = 25$

$N=11$

Concept of Mode

②, 4, 5, 6, ②, 7, 8, ② 4, 10, 11

Mode = 2

4 → only 2 times

⊗ which appears most frequently

4, 6, 8, 10, 11 \rightarrow Mode for this data

2, 2, 2, 2, 3, 3, 5, 6, 6, 18

$$2 \rightarrow \textcircled{1}$$

$$3 \rightarrow \textcircled{2}$$

$$5 \rightarrow \textcircled{3}$$

$$6 \rightarrow \textcircled{4}$$

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

Refer video ✓

Range = Highest - Lowest

Eg: 4, 6, 9, 17

$$9 - 3 = 6$$

Eg: 8, 16, 17, 17, 18, 3616

$$3616 - 5 = \underline{\underline{3611}}$$

Q) What is the range of the following numbers?

$$6, 11, 17, 22, 26, 32, 2, 11, 6, 13, 27, 15, 6, 2$$

a) 11

b) 68

Highest value $\rightarrow 22$

c) 47

Smallest value $\rightarrow -5$

d) 81

$$\text{Range} = \text{Highest} - \text{Lowest}$$

$$= 22 - (-5)$$

$$= 22 + 5 \Rightarrow 27$$

Mean Deviation

Concept of Deviation

Q) 2, 4, 6, 8

$$\text{Mean} = \frac{2+4+6+8}{4}$$

Average

$$= \frac{20}{4} = 5$$

Deviation

Mean of Numbers

$$2 - 5 = -3$$

$$4 - 5 = -1$$

$$6 - 5 = 1$$

$$8 - 5 = 3$$

$$\frac{3+1+1+3}{4} = \frac{8}{4} = 2$$

Step: 1 \rightarrow Find Mean

Step: 2 \rightarrow Find deviation

Standard deviation

Variance $\rightarrow \frac{\sum (x-\bar{x})^2}{n}$

Population SD $\rightarrow \sqrt{\frac{\sum (x-\bar{x})^2}{n}}$

Sample SD $\rightarrow \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$

Q) Find the Standard deviation (easy question)

Mon	Tue	Wed	Thur	Fri	Sat	Sun
47	15	37	20	38	42	18

A) 18.4

B) 12.0

C) 15.2

D) 16.4

Mean = $47+15+37+20+38+42+18$

$= \frac{217}{7}$

$\Rightarrow 31$

SD = $\sqrt{\frac{(47-31)^2 + (15-31)^2 + (37-31)^2 + (20-31)^2 + (38-31)^2 + (42-31)^2 + (18-31)^2}{7}}$

$= \sqrt{\frac{206+206+36+121+47+131+169}{7}}$

$= \sqrt{\frac{1009}{7}} = \sqrt{144} = 12$

Diff between Range and Standard Deviation

Range = S.D

Concept of Mean, Median, Mode.

0-10 6 6

10-30 7 3

30-40 12 26 → odd class

40-60 17 42 → modal class

60-70 8 50
 25



[FINISHED]

Program Specifics

(x) International Trade 9

Binary to Decimal :- 1001 → ?

Octal to Decimal : = $512 \rightarrow 5 \times 8^3 + 1 \times 8^2 + 2 \times 8^0 \rightarrow 310$

$$\text{Hexadecimal to Decimal: } \begin{array}{r} 11 \\ \text{(1)} \\ \hline 16^0 + 16^1 \\ = 12 + 16 + 9 \\ = 37 \end{array}$$

Decided to Binary:

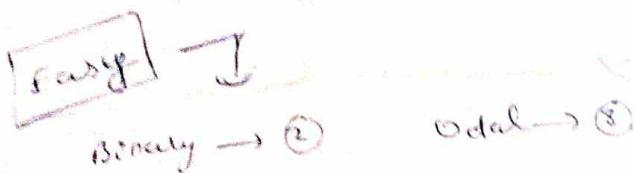
Convert to octal:

Decimal to Hexadecimal:

Binary to octal:

Octal to Binary:

Hex	1 2 3 4 5 6 7 8 9 0 A B C D E F
Decimal	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

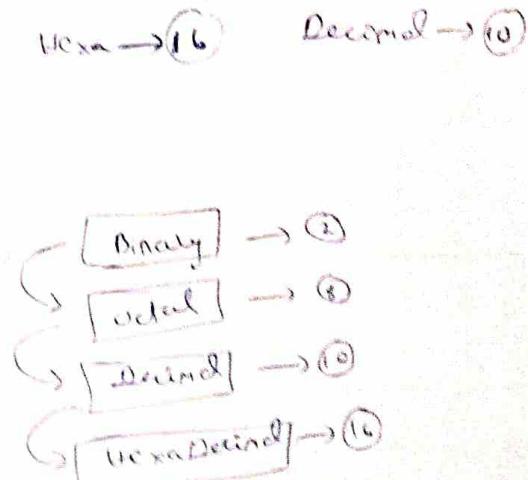


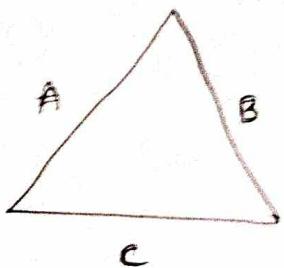
$$\text{Binary} \rightarrow 2^0 + 2^1 + 2^2 + 2^3$$

$$\text{Octal} \rightarrow 8^0 + 8^1 + 8^2 + 8^3$$

$$(hexagon) \rightarrow 16^0 + 16^1 + 16^2 + 16^3$$

$$\text{Demand} \rightarrow 10^0 + (10^1 + 10^2 + 10^3)$$





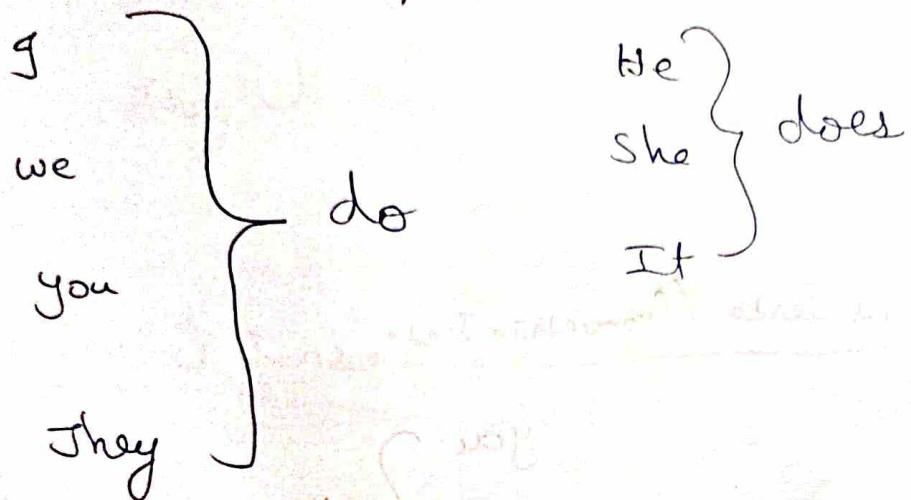
All the sides of Triangle are equal \rightarrow Equilateral triangle.

Two sides of Triangle are equal \rightarrow Isosceles triangle.

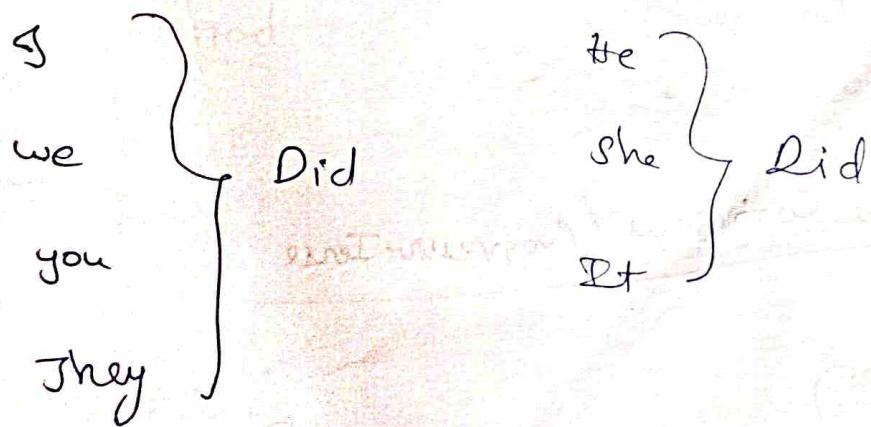
No sides of Triangle are equal \rightarrow Scalene triangle.

Basics

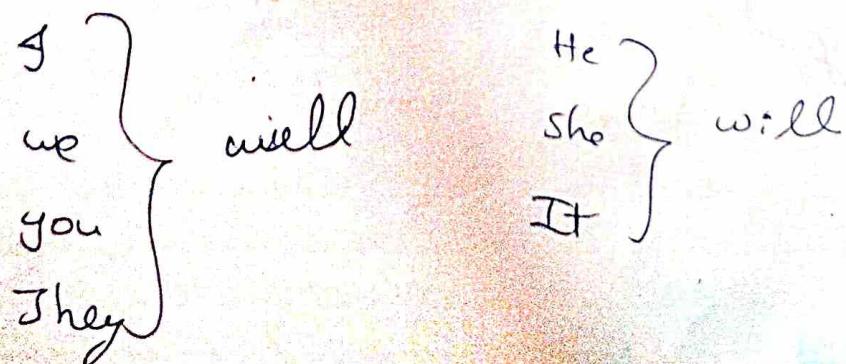
① Simple present Tense



② Simple Past Tense



③ Simple Future Tense



④ Present Continuous / Progressive Tense

I } am
we }
you } are
They }

He }
she } is
it }

⑤ Past Continuous Tense / Progressive Tense

I } was
He }
she }
it }

you } were.
we }
They }

⑥ Future Continuous / Progressive Tense

I }
we } will be
you }
They }

He }
she } will be
It }

⑦ Present Perfect Tense

I }
we } have
you }
They }

He }
She } Has
It }

⑧ Past Perfect Tense

I }
we } had
you }
They }

He }
She } Had.
It }

⑨ Future Perfect Tense

I }
we } will have
you }
They }

He }
She } will have
It }

⑩ Present Perfect Continuous Tense

I }
we
you
They } have+been
He }
She
It } has+been

⑪ Past Perfect continuous Tense

I }
we
you
They } had+been
He }
She
It } had+been

⑫ Future Perfect Continuous Tense

I }
we
you
They } will+have
+been
He }
She
It } will+have+
been

Concept of Articles

Articles → Definite
Indefinite

A/An (Indefinite)



~~An~~ An American

~~An~~ A European

~~An~~ An Indian

~~A~~ An Horse

~~An~~ An Umbrella

Vowels: a, e, i, o, u

Consonants: except a, e, i, o, u
b, c, d, f, g, h etc...

Global language: English

National language: Hindi

अ - इ : → Vowel Sounds

क - ख : → Consonant Sounds

An ^अ Honour

A ^ए Uniform

An MBA

A ^य University

(Definite)

① A, An, The

Eg: An apple

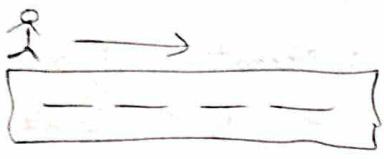
The book

A European

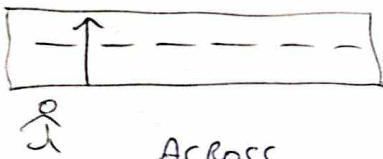
Concept of Prepositions

- in, on, at, inside, outside, beside, above, below, ... etc.
- into, onto, off, out of etc..
- along / across

along / across

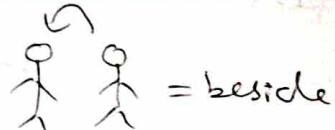


ALONG



ACROSS

beside / besides



= beside

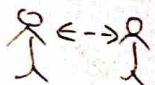
A is beside TO B

besides

in addition to

between / among

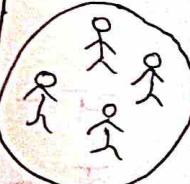
between



between: 2 people

Among

more than two people



class among a group of people

Confused Prepositions

for / from / since

for → duration / Period of Time (For 4 years)

from → Starting To Ending (1995 - 2000)

since → Starting & it Continuous (since 1995)

Concept of Direct and Indirect Speech.

① Direct Speech → " "

② Indirect Speech → " " → Reported speech

Tense change

"now" → Then

"Today" → That day

"yesterday" → The day before

"tomorrow" → The next day

"here" → There.

"He" → Him

"She" → Her

Concept of Active and Passive voice

Subject - Verb - Object.



Concept of Vocabulary

- Synonyms
- Antonyms
- One word Substitution,

Vocabulary → The richer you concentrate on vocabulary (Focus) the greater you can enrich your language in communication.

Prefix / Suffix
(before) (After)

Course of Action

Eg: only I only I & II

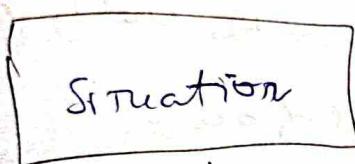
(Understanding the question
is important)

only II only I & III

only III only III and I



Drawing Assumptions Inference and Conclusion

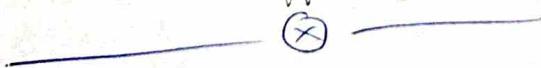


circumstances Based Questions

- Cause / Effect
- Assertion / Reason
- Strong / weak Arguments

① India is an influential country [Cause]

② The Government decided to ban selling of eggs
in the state [Effect]



- The midday meal system has started by the government to provide a free meal to all students in government schools.
- Undernourishment in children is a wide spread problem in the country.

Ans: Both the statements I and II are the effects of some common cause.

- ① Ten hardcore criminals escaped from the custody of the police while on the way to the jail of a city.
- ② All schools in the city remained closed for two days.

Ans: If both the statements I and II are effects of independent cause.

Assertion (A) → A Statement
Reason (R) → Explanation of Statement.

Read the following information and answer the question below

Six swimmers A, B, C, D, E and F compete in a race. The outcome is as follows

- ① Exactly two swimmers finish ahead of B
- ② Only two swimmers precede E and D
- ③ A is behind P and E
- ④ B is ahead of E with one swimmer in between
- ⑤ F is ahead of P.

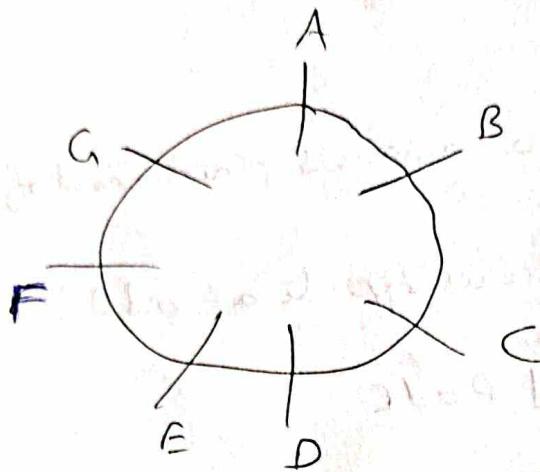
Who stood fifth in the race

- ① A
- ② B
- ③ C
- ④ D
- ⑤ E

Answer:

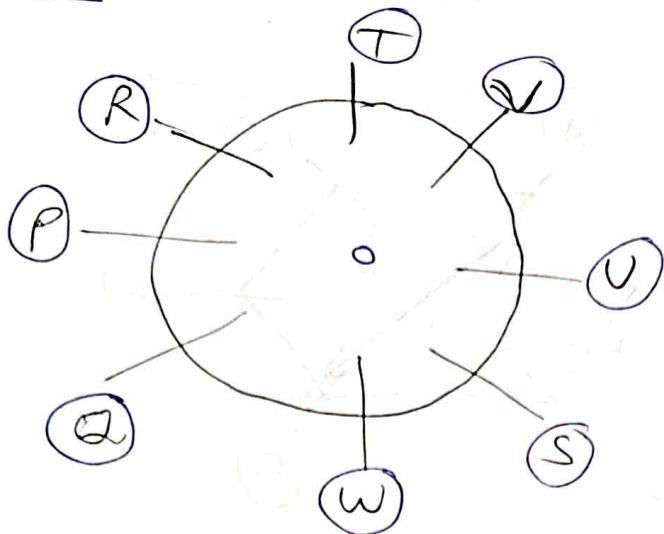
- 1st → F
- 2nd → D
- 3rd → B
- 4th → C
- 5th → E ✓
- 6th → A

Neighbour (ov) adjacent → 'Person who is
near To You'



- ① A is adjacent to B
- ② E is adjacent to D
- ③ A is adjacent to C
- ④ A is neighbour to B
- ⑤ E is neighbour to D
- ⑥ A is neighbour to C

Facing Centre:

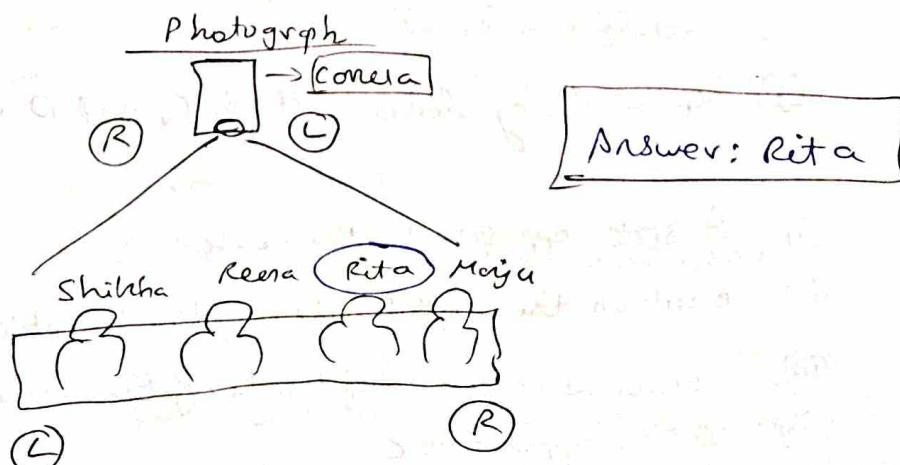


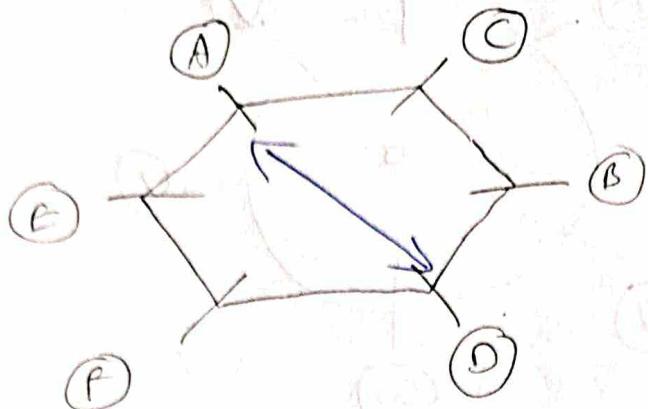
Q) who is not the neighbour

- a) RV
- b) UV
- c) RP
- d) QW

(Answers on Back Side) (Practice Question)

Q) Four girls are sitting on a bench to be photographed. Shikha is to the left of Reena, Meera is to the right of Reena. Rita is between Reena and Meera, who would be second from the left of photograph?





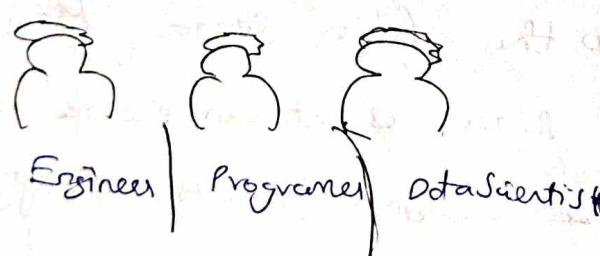
Q who is sitting opposite of A

Answer : D

Q who is sitting opposite of C

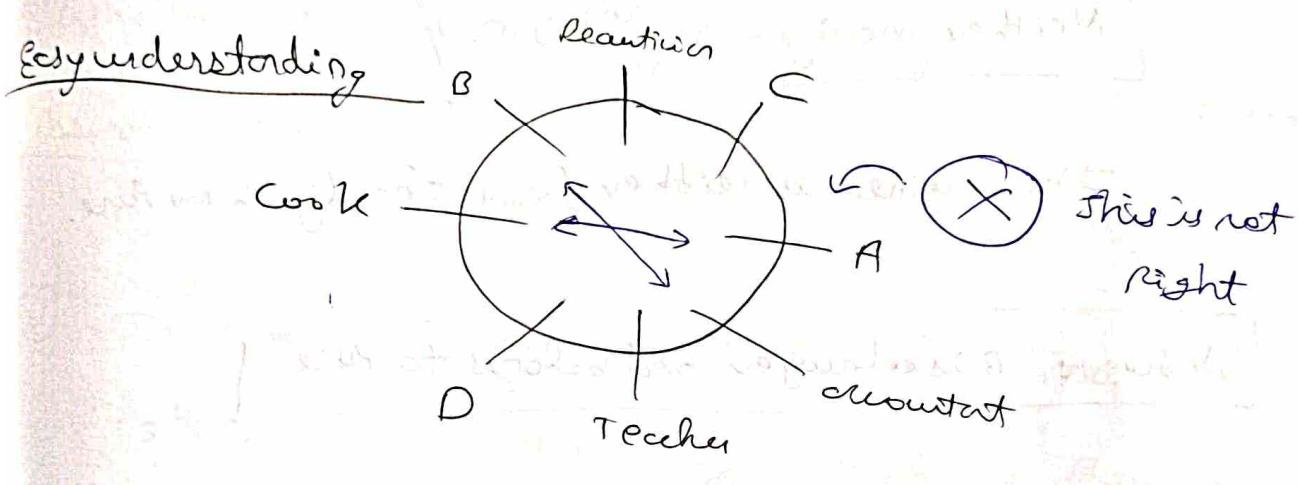
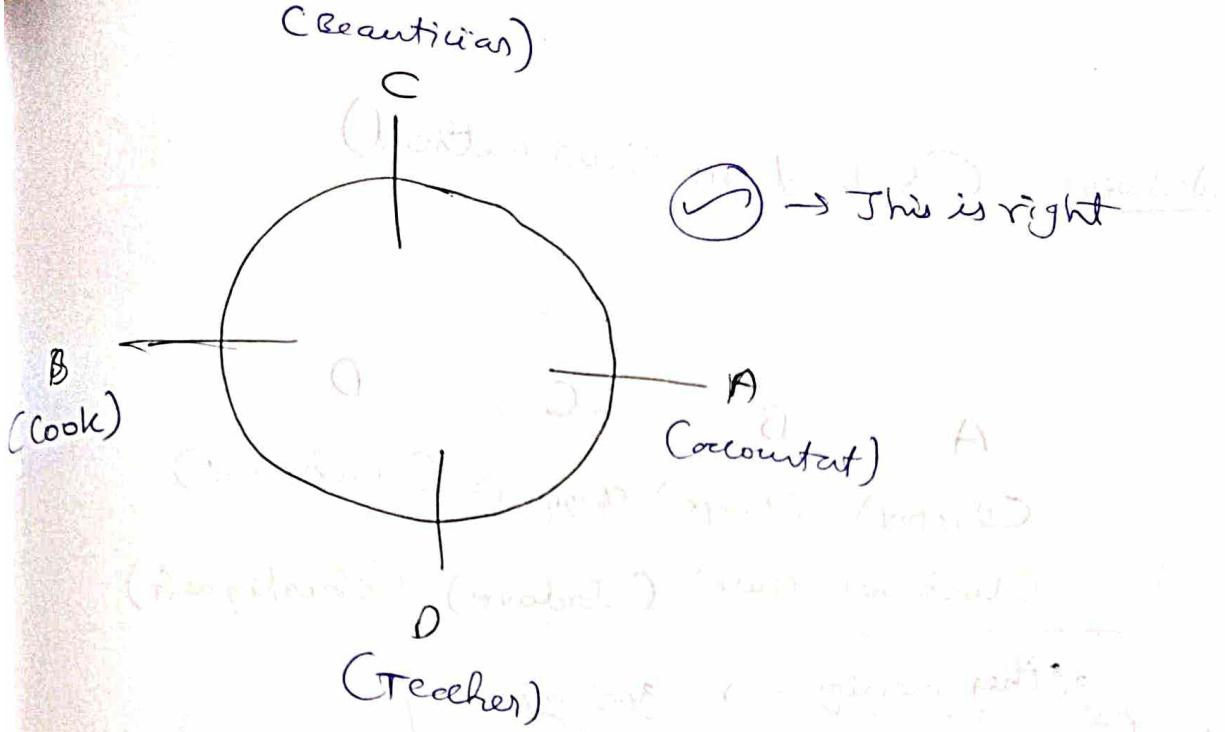
Answer : F

Concept of Data arrangement.



Q) 4 working ladies A, B, C, and D are sitting around a table

- A sits opposite to the cook
- B sits on the right side of the beautician
- Teacher is on the left side of the accountant
- D sits opposite to C
- C is on the right of the accountant.



② What are the occupations of A and B?

Answer: Accountant and Cook.

- ③ Four friends A, B, C and D have one of the four professions i.e Doctor, architect, engineer and lawyer. Each friend belongs to one of the four different cities Chandigarh, Lucknow and Pune. A is not a lawyer or engineer. The doctor is from Lucknow, D is an architect. The lawyer is from Pune. The engineer is neither from Chandigarh nor Pune. D is from Pune, C is from Indore. Which of the following statement is correct from B?

Answer: (Solved on Own method)

A B C D
(Doctor) (Lawyer) (Engineer) (Architect)
(Lucknow) (Pune) (Indore) (Chordigash)

either meaning → going

Neither meaning → Division

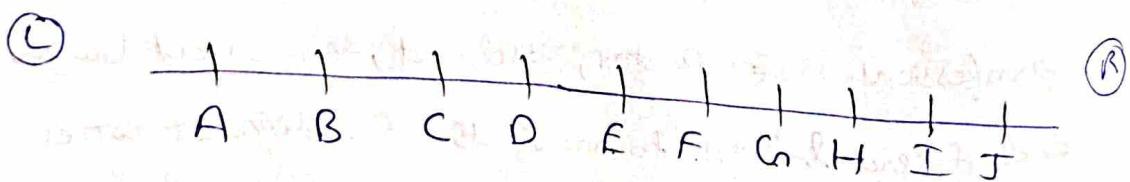
The engineer is neither from Chordigash nor Pune.

Answer: B is a Lawyer and belongs to Pune.



Concept of Order detection

↳ Position of People.



→ D is 4th from left end ② 7th from right end

③ How many people are there in a Row

Ans: 10 Peoples

$$7 + 4 = 11$$
$$11 - 1 = 10$$

Rank

A → 1st

B → 2nd

C → 3rd

D → 4th

Position → (-1)

Rank → (+1)

$$4 - 3 + 1 = 2$$

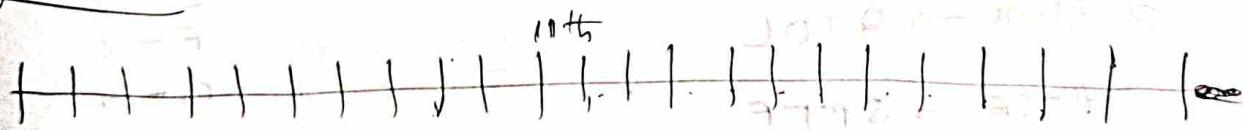
Q) what is the Rank of B if it is 3rd from the bottom

Answer: B → 2nd rank

Q) In a row Sonjay is at 11th position from top and 13th position from bottom. How many people are there in a row?

Answer: 23

Long Method



Shortcut

$$11 + 13 = 24$$

$$24 - 1 = 23$$

Deciphering write Codes

Coding / Decoding.

EJOTY
 5 10 15 20 25

"LEARN" → MFBSO

"SUNDAY" → TVOEbz

"DAY" → "JGE"

"way" → "CGE"

Q PINK → QJOL

ROSE → SPTF

Q TIGER → QDFHS

FISH → G^AB^HE

20 9 7 5 19
 T I G E R
 11 4 6 8 19
 Q O F H S

6 9 19 8
 F I S H
 7 18 8 5
 G R H E

Should know place value

A - 1
 B - 2
 C - 3
 D - 4
 E - 5
 F - 6
 G - 7
 H - 8
 I - 9
 J - 10
 K - 11
 L - 12
 M - 13

N - 14	V - 22
O - 15	W - 23
P - 16	X - 24
Q - 17	S - 19
R - 18	D - 20
T - 21	Z - 26

① CALENDAR → BBFKEMSZ

HEADLINE → "FGEZJKFM"

3 1 12 5 14 4 1 18
CALENDAR
+1 -1 +1 -1 +1 -1 -1
BBFKEMSZ
2 2 6 11 5 13 19 26

8 5 1 4 12 9 14 5
HEADLINE
| | | | | | |
6 7 5 26 10 1 6 9 3
FGEZJKFM

② S P O R A D I C

A C D I O P R S.

1 3 4 9 15 16 18 19

Answer: MANGROVE

A E G M N O R V
1 5 7 13 14 15 18 22

801 ← 407 001

Concept of Newlee Codes

Code \rightarrow 27

$$3+15+4+5 \rightarrow 27$$

Cricket \rightarrow 66

$$3+18+9+11+5+20$$

- Q In a language RANGE is coded as 12345 and RAND is coded as 123678. How MANGO will be coded Then?

Answer: 82347

BASEBALL \rightarrow 53

$$2+1+19+4+2+1+12+12$$

BATHMITTEN \rightarrow 103

$$2+1+20+13+9+20+20+4+14$$

YOUTUBE \rightarrow 108

$$25+15+21+20+21+2+4$$

Concept of Classification

Q) 4, 9, 256, 529, 573 which of These does not belong to the Group

Answer: 573

4, 9, 256, 529, ~~573~~

$2^2, 3^2, 16^2, 23^2$, Not a square.

Q) 17, 20, 46, 147, 599, 3015, 18108

Answer:

$$17 \times [1+3] \rightarrow 20$$

$$20 \times [2+6] \rightarrow 46$$

$$46 \times [3+9] \rightarrow 147$$

$$147 \times [4+12] \rightarrow 600$$

$$600 \times [5+10] \rightarrow 3015$$

$$3015 \times [6+18] \rightarrow 18108$$

Q) Find the one out.

A) R S O W

B) B C E H

C) L M O X

D) H I K N

$$\begin{array}{cccc} 18 & + & 19 & + \\ \swarrow & & \searrow & \\ R & S & O & W \end{array}$$

$$\begin{array}{cccc} 2 & + & 3 & + \\ \swarrow & & \searrow & \\ B & C & E & H \end{array}$$

$$\begin{array}{cccc} 12 & + & 13 & + \\ \swarrow & & \searrow & \\ L & M & O & R \end{array}$$

$$\begin{array}{cccc} 8 & + & 9 & + \\ \swarrow & & \searrow & \\ H & I & K & N \end{array}$$

Find the next term in the series

② $24 : 50 :: 102 : ?$

A) 204

B) 206

C) 152

D) 156

$$\begin{array}{ccc} 24 & \xrightarrow{\times 2+2} & 50 \\ 102 & \xrightarrow{\times 2+2} & 206 \end{array}$$

③ Temperature : Fahrenheit :: Time : ?

A) Seconds

B) Unit

C) Einstein

D) Light year

④ Puducherry : Union Territory :: ? : State

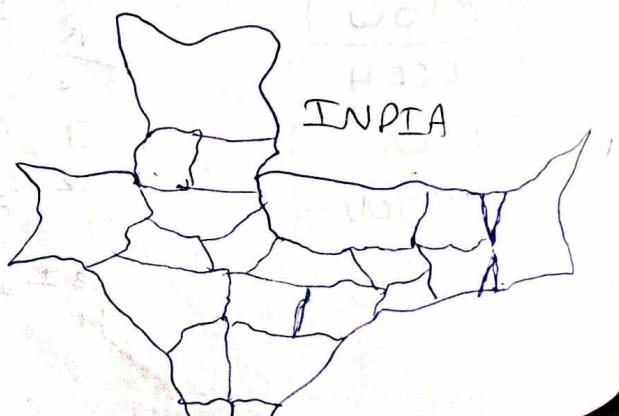
A) Kolkata

B) Shravan

C) Chandigarh

D) Karnataka

In order to answer this we should know the states



Find the correct term of the following analogy

Paint: Artist :: wood: ?

- A) Furniture
- B) Forest
- C) Fire
- D) Carpenter

→ Took carefully
It speaks about Profession

Data sufficiency

- (i) Statement I and II
- (ii) Statement I and III
- (iii) Statement III and IV

→ Check whether Data is sufficient or not.

→ Preceded → Parson



Concept of Blood Relations

Shortcut

○ → Female

□ → Male

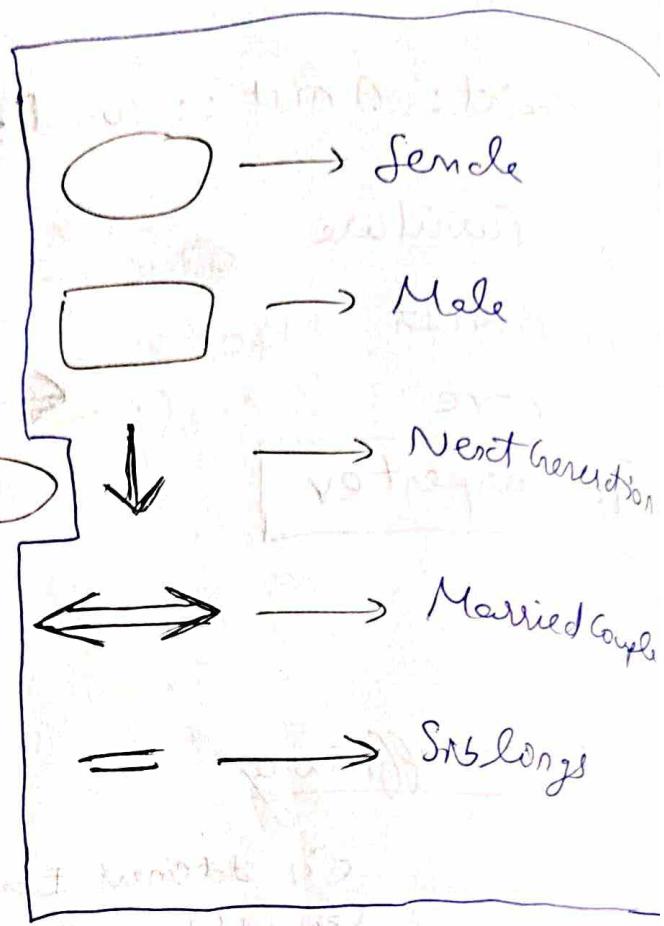
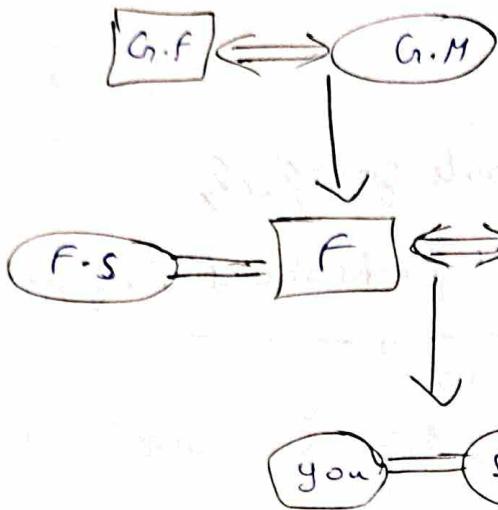
↓ → Next generation

↔ → Married

= → Siblings

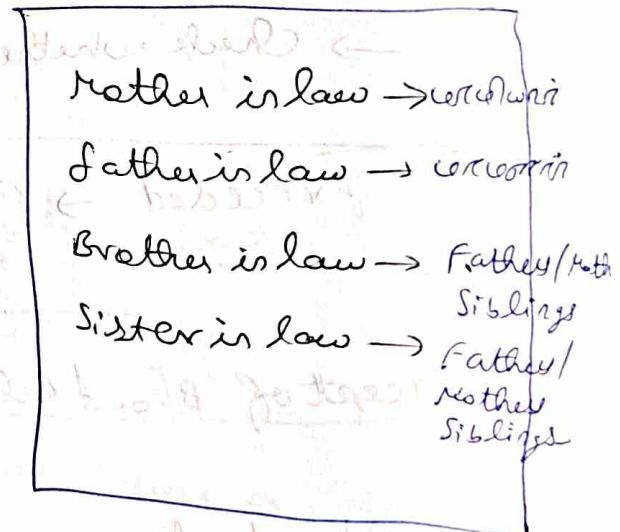
Blood relations

Example:



② Relation of brother with F.S

⇒ Sister in law



(*) Important

Maternal

Paternal

→ Relation comes from Father's side.

→ Relation comes from Father's side.

Maternal G.F, Maternal G.M

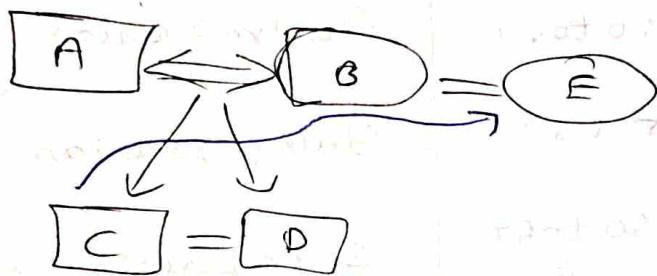
Paternal G.F, Paternal G.M

Brether - in - law → Sister's husband

Sister - in - law → brother's wife

brother / Sister's Son → Nephew
brother / Sister's Daughter → Niece

Example:



How is \textcircled{E} related to \textcircled{C} ?

→ Always look from $(\textcircled{2nd})$ person Point of view

a) Nephew

b) Aunt

How is \textcircled{C} related to \textcircled{E} ?

→ Always look from $(\textcircled{2nd})$ person Point of view

a) Nephew

b) Aunt

AGECHART

Person between 0 to 9	CHILD
Person between 10 to 19	dearian
Person between 20 to 29	Vicenarian
Person between 30 to 39	tricenarian
Person between 40 to 49	Quadragerian
Person between 50 to 59	Quisquagenerian
Person between 60 to 69	Sexagenerian
Person between 70 to 79	Septuagenerian
Person between 80 to 89	Octogenerian
Person between 90 to 99	Nona generian
Person between 100 to 109	Centenarian
Person between 110 to above	Super centenarian

Real life Questions:

① Prakash is the son of Pramod, Neha is the daughter of Abhishek, Ruchi is the mother of Neha, Ajay is the brother of Neha.

How is Abhishek related to Ajay?
1st 2nd

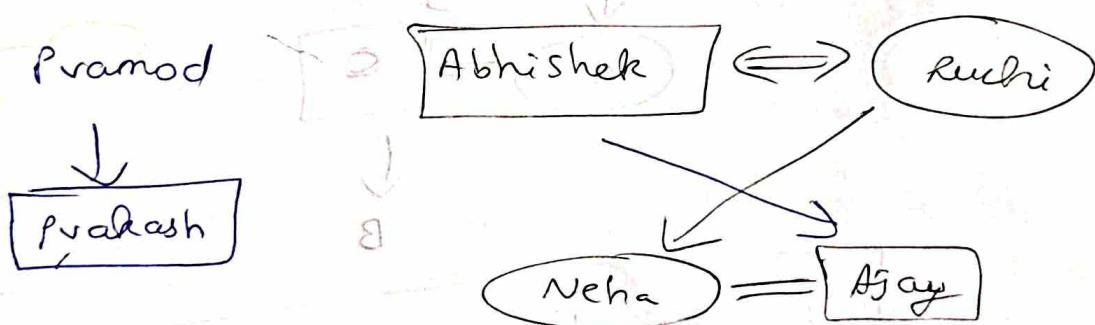
a) Father

b) Brother

c) Son

d) Grandfather

Solved on own (Correct Answer)



② Balu \Rightarrow He is a boy

Balu \Rightarrow She is a girl

Balu \Rightarrow Couldn't able to determine
Balu is a boy or girl.

Concept of Notation / Symbol based Question:

$P+Q$ → P is the father of Q

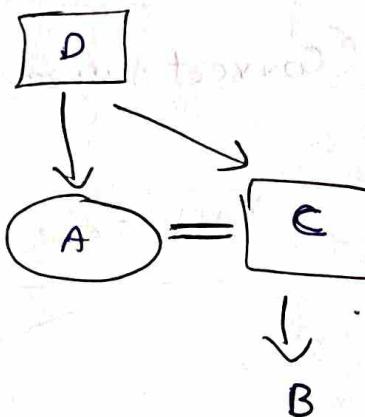
$P-Q$ → P is the wife of Q

$P\times Q$ → P is the brother of Q

$P|Q$ → P is the daughter of Q

If $A|B + C+B$ which of the following is true?

Answer: A is the aunt of B .

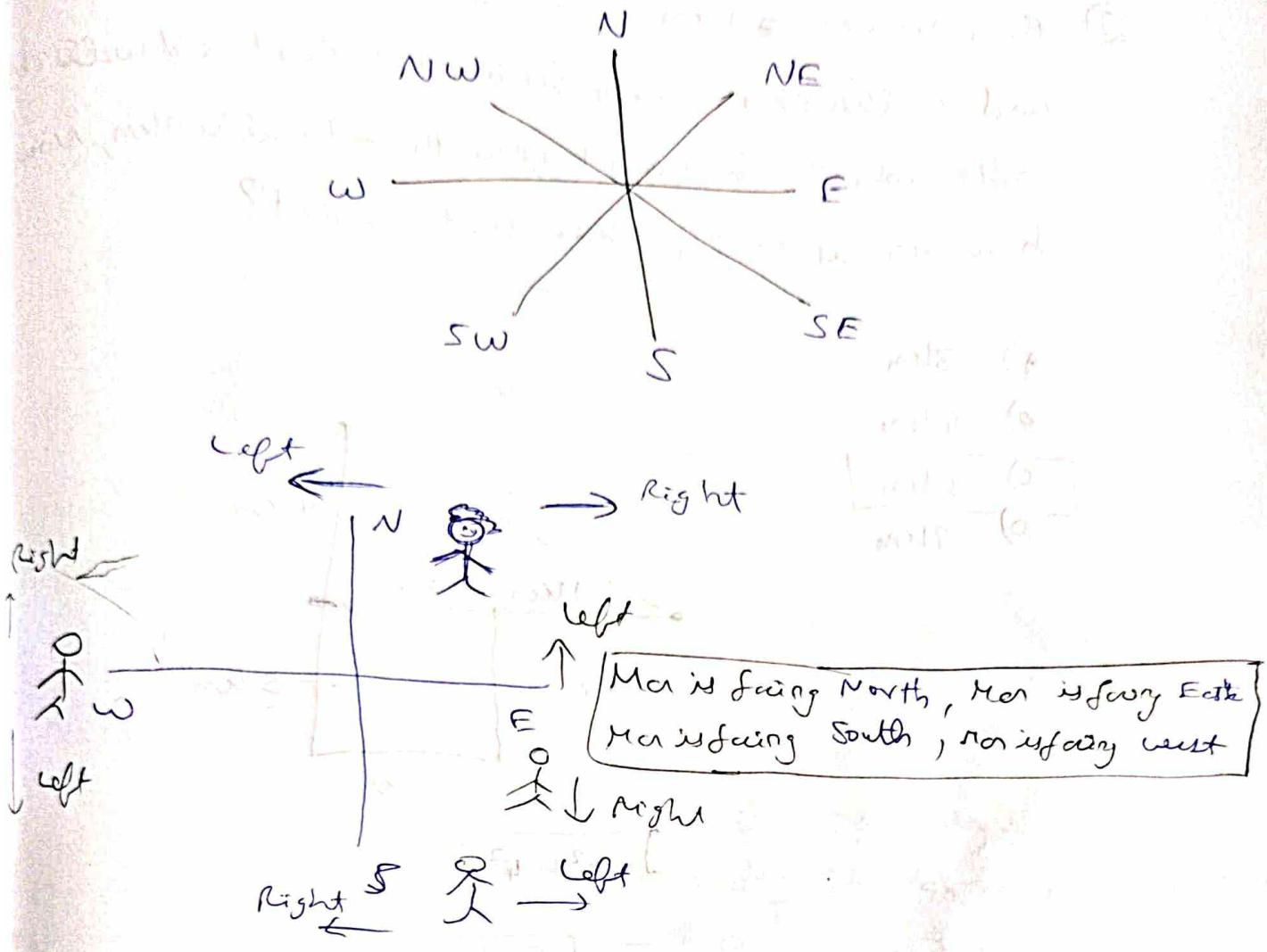


◻ → Male

○ → Female

$+, -, \times, \div \rightarrow$ symbol based questions

Concept of Direction Sense

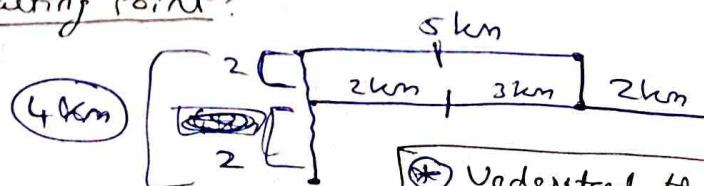


* Be clear in this chart to know the direction.

② Tricky Question, in the table which one is true?

- ① Seetha walks 4 km towards North, turns right and walks 5 km. Then she turns towards South and walks 2 km. Again she takes a turn towards west walk 3 km and stops for a while. Then she further walks 2 km. What is the distance of Seetha from starting point?

- 16 km
 2 km
 4 km
 3 km



* Understand the Question

② Tricky Question

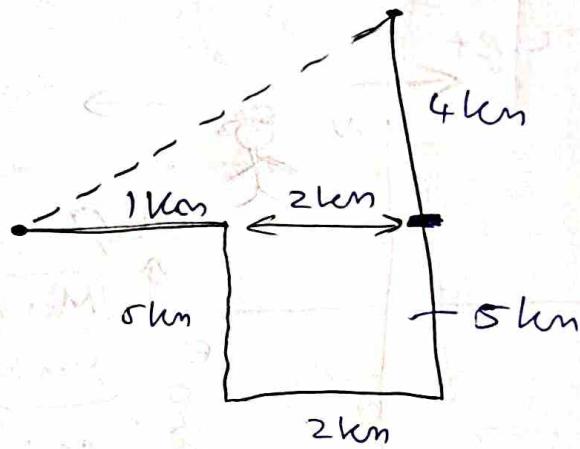
② Ram walks 1 km towards East and he turns to South and walks 5 km. Again he turns to East and walks 2 km after which he turns to North and walks 9 km, Now how far is he from his starting point?

A) 3 km

B) 4 km

C) 5 km

D) 7 km



$$\sqrt{3^2 + 4^2}$$

$$= \sqrt{9 + 16}$$

$$= \sqrt{25} = 5 \text{ km}$$

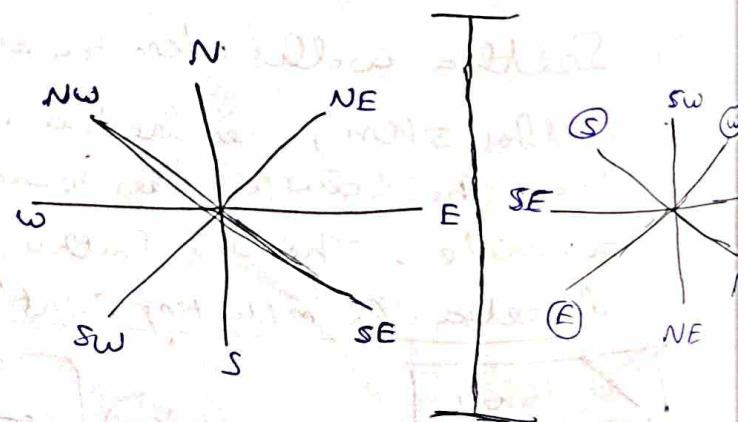
② If South-East becomes North, North-East becomes, West and so on. What will West become?

A) North-East

B) North-West

C) ~~South-East~~ South

D) South-West.



Concept of Notation / Symbol based Question:

$P+Q$ → P is the father of Q

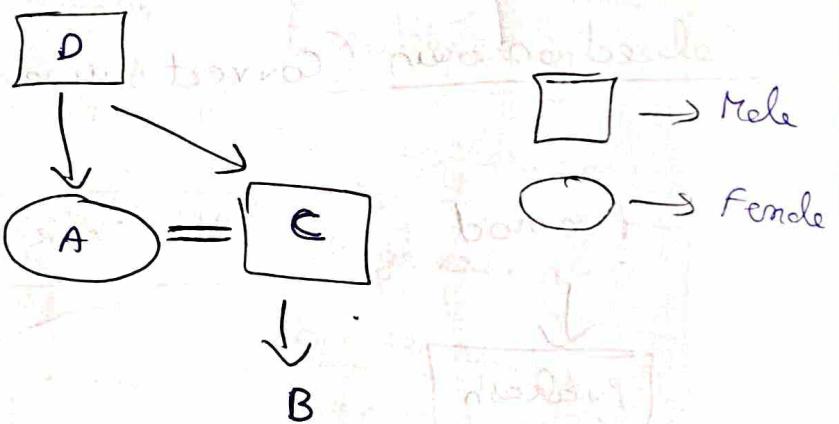
$P-Q$ → P is the wife of Q

$P\times Q$ → P is the brother of Q

$P|Q$ → P is the daughter of Q

If A/O + C+B which of the following is true?

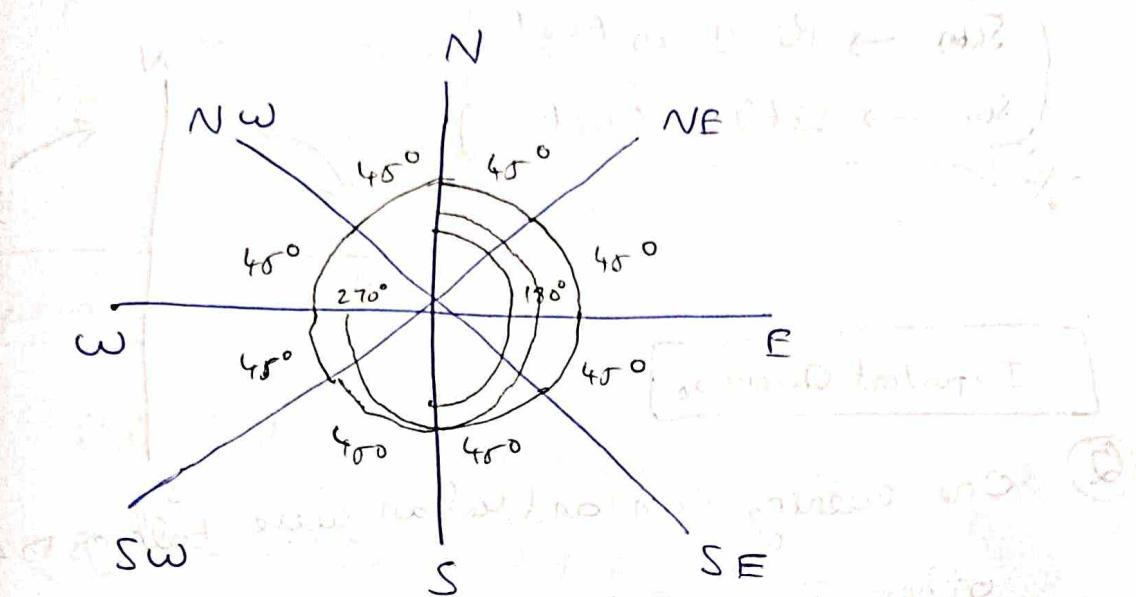
Answer: A is the aunt of B.



$+, -, \times, \div \rightarrow$ Symbol based questions

Important

- ① know the degree of each angle.



$$\underline{45^\circ} \rightarrow 45^\circ \text{ degree}$$

$$\underline{45^\circ + 45^\circ + 45^\circ} \rightarrow 135^\circ \text{ degree}$$

③

$$\underline{45^\circ + 45^\circ} \rightarrow 90^\circ \text{ degree}$$

②

$$\underline{45^\circ + 45^\circ + 45^\circ + 45^\circ} \rightarrow 180^\circ \text{ degree}$$

④

$$\underline{45^\circ + 45^\circ + 45^\circ + 45^\circ + 45^\circ + 45^\circ} \rightarrow 270^\circ \text{ degree}$$

⑥

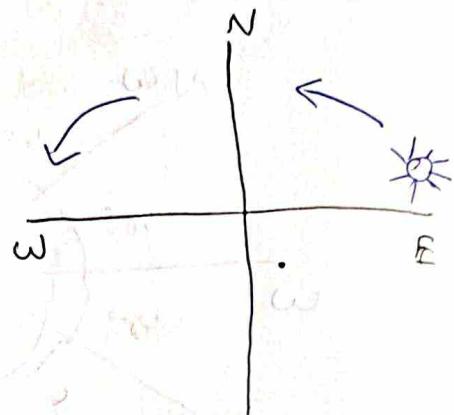
$$\underline{45^\circ + 45^\circ + 45^\circ + 45^\circ + 45^\circ + 45^\circ + 45^\circ} \rightarrow 360^\circ \text{ degree}$$

⑧

Concept of shadow:

Shadow → always falls on opposite side

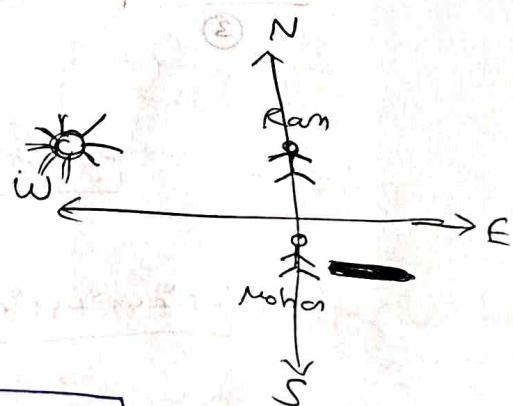
Sun → Rises in East
 Sun → Sets in West



Important Question

(Q) One evening Ram and Mohan were talking to each other face to face. If the shadow of Mohan was exactly to the right of Mohan, then which direction was Ram facing?

- A) North
- B) South**
- C) East
- D) West.

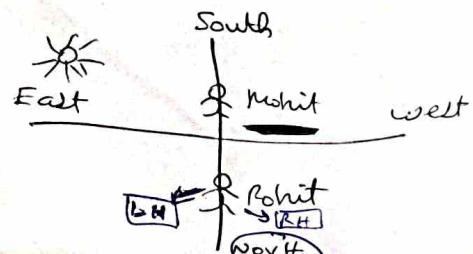


Important and tricky Question

At sunrise Rohit and Mohit are having a conversation standing in front of each other. The shadow of Mohit is formed toward the right hand of Rohit. What direction is Mohit facing?

→ Note this clearly.

- A) North
- B) South
- C) East
- D) West



Concept of Selection Criteria

- (i) 80% Marks, 10^4 , Index
- (ii) 60% Marks in B.Tech
- (iii) 2 years bond

Exception:

- (i) Candidate moved onto HR Manager
- (ii) Candidate moved to Director.

Point:

- (i) ✓
- (ii) ✓
- (iii) ✓
- (iv) ✓

If all the conditions satisfied don't look at Exception

Exception

- (i)
- (ii)

Concept of Approximation

$$4.2837463 \Rightarrow 4.3 \approx 4.2837463$$

⇒ Round off to 3 decimal

Check whether it is > 5 or $= 5$

$$\rightarrow 4.28374\overset{\swarrow}{6}3$$

$$\rightarrow 4.28374\overset{\swarrow}{6}$$

$$\rightarrow 4.2837\overset{\swarrow}{8}$$

$$\rightarrow 4.28\overset{\swarrow}{3}8$$

$$\rightarrow 4.2\overset{\swarrow}{8}4$$

$$\rightarrow 4.3$$

Concept of chain of digits / Operations:-

$(+)$ (\times) (\div) $(-)$
 Addition | Multiply | Divide | Subtract.

Consider $(+)$ and (\times)

$$28 \% 7 \times 8 - 6 + 4 \rightarrow \text{BODMAS}$$

$$4 \times 8 - 6 + 4$$

$$32 - 6 + 4$$

$$36 - 6$$

$$= 30$$

ADVANCE ENGLISH

Identification / Sentence correction

Bird (s)

Birds (p)

fly (s)
flies (p)

Bird flies

Birds fly

Chair

chairs

Pen

pens

Nouns	Verbs
Xs → s	Xs → p
s → p	s → s

He is a good person (is/are) (s) (p)

They were playing (was/were) (s) (p)

① Raju has a pencil (have/has)

② Rani (or) Rawi are attending the Party (is/are)

③ Kiron (or) Shaji were fighting (was/were)

④ I love you (love/loves)

I = mostly Play = Plural

I	we
we	you
you	They

→ Plural

⑤ I was reading, when you come (was/were)

I am thinking

⑥ You are beautiful (is/are)

④ words which take singular form.

Everyone are here (is/are)

Everybody is here (is/are)

Non-Intervention Principle

① They are playing (is/are)

② The students and the teacher are going to class

③ The child is addition to the drivers (is/are)
Ready for the drive (is/are)

④ He along with his friends is going to the party (is/are)

Proximity Principle

- ① Either me (or) mom cooks food (cook/cooks)

② Either the man or his friends, knows (know)
knows)

Collective Nouns :-

- ① The Team is (is/are) playing.

③ The Tony were analyzing all the evidence in turn.
→ रासूरी कोटमा,

Modified Errors

- ① The Servant served a roll to the lady well
→ The Servant served a well cooked roll to the lady.

② She answered all the questions quickly
→ She quickly answered all the questions.

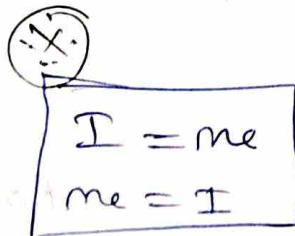
Parallelism Error.

- ① Rohit ate Mongees, drank Soda and ~~was dancing~~^{danced} in his room.
- ② The computer network is safer, stronger and more secure.
(Sentence is correct)
- ③ Counting stars, watching the moon and ~~to think~~^{thinking} of my school days always makes me feel happy.

Comparison error (odd's)

- ① Seetha's marks are higher than Rahul.
→ Seetha's marks are higher than Rahul's.
- ② The color of his shirt is lighter than me.
→ The color of his shirt is lighter than mine.
- ③ The Taj Mahal has a higher ceiling than my college.
→ The Taj Mahal has a higher ceiling than my college's ceiling.

Pronoun Antecedent Error.



Eg: If anybody wants to succeed in life

They have to know the rules of the game.

(P)

→ If anybody wants to succeed in life one has to know the rules of the game.

Eg: Steve Bill and me went to the market.

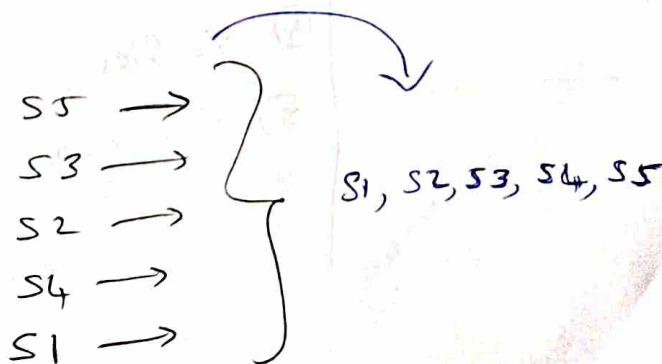
→ Steve Bill and I went to the market.

Eg: You and I are very close friends.

You and me are very close friends.



Sentence Rearrangement:-



Paragliders → 2 Tyres

Fixed Paragliders

Moving Paragliders

Fixed Paragliders

S1 Fixed Paragliders.

a }
b } cargo
c }

S2 Fixed Paragliders.

S1 Fixed

a }
b }
c } rearage
d }

a }
b }
c }
d }

S3 Fixed

Moving Paragliders.

a }
b }
c }
d }
e }
f }
g }
h } rearage

— X —

How to answer

① Opening / Closing

Opening

Closing

- ① Once upon a time
- ② First of all
- ③ There was a time
- ④ Earlier
- ⑤ Long ago.

- ① In conclusion
- ② Lastly
- ③ Therefore
- ④ Finally
- ⑤ At the end

Identify the pair / links

a

b

c) Not only ARUN is innocent.

d

e) but also he is sophisticated.

(Pair of sentence)

Noun / Pronouns.

- a) He was a student of class IX
- b) He has achieved best in class X
- c) Ravi was a student.

① Signpost

① He is a well known person an influential man.

② I am selling good I will not come to the meeting.

③ Cause - Effect

① → Cause.

② → Effect.

Sign post → +SP → Context Never changes.

→ -SP → Context changes.

Select the arrangement of each sentence.

- A) when compared to prosperous and progressive nations
B) the percentage of people having basic education
C) and that is why they are poor and backward.
D) In the under development and developing countries is
dismally low.

(A) ABCD

AC (X)

- (B) BDAC
(C) BDAC
(D) ACBD

Select the arrangement of each set of fragments

- a) Jawaharlal Nehru was born in Allahabad on 14 November 1889.
b) Nehru met Mahatma Gandhi in February 1920.
c) In 1905 he was sent to London to study at a school called Harrow.
d) He became the first Prime Minister of Independent India on 15 August 1947.
e) He married Kamladevi Kaushal in 1915.

A) DECBA

B) CBADE

C) ACEBD

D) ACBDE

Timeline

1889, 1905, 1915, 1920, 1947

- ③
- A) He returned to acting in 1946 and gave it up in 1963 and is now a full time writer.
 - B) During the World War - II (1939-45) he joined the US Navy and was present at the sinking of the Bismarck.
 - C) In 1940 he got married and started teaching at a Samaritan School in Bloomsbury but his writings were not recognized.
 - D) Samaritan School in Bloomsbury

A) ABCD

~~not~~ CBAD

C) BADC

D) ACBD

AD

①

- ④
- A) Developing countries have a competitive advantage.
 - B) The Prime Minister said that the developing countries
 - C) were concerned about the high tariffs imposed by
 - D) developed countries, on those products in which

BCDA

✗ BCAD

✗ ABCD

✗ DBCA

keyword: If any Two sentences gets linked

e.g.: AC, AD, BA, DA stay on with it.

Sentence Formation

Sub + verb + object.

He / reads / books

S V O

Direction :-

- 1) medicine
- 2) a
- 3) Neeta
- 4) gives
- 5) was

Options: 35421

- 1) Suresh
- 2) and
- 3) is
- 4) kind
- 5) loving

Options: acdbe

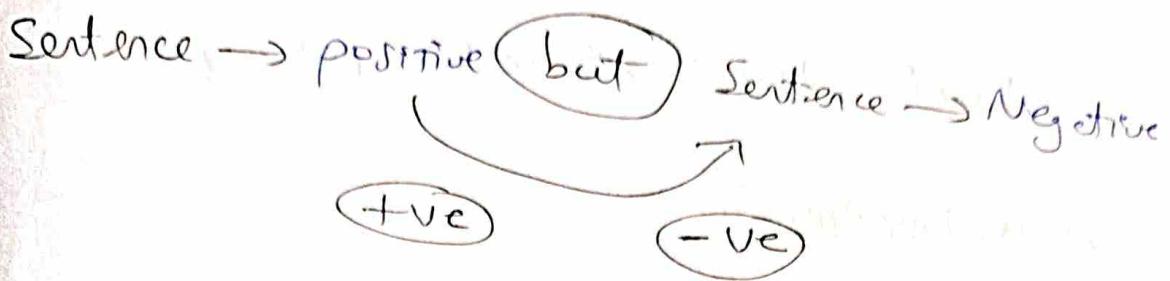
- 1) will
- 2) human
- 3) replace
- 4) technology
- 5) never
- 6) love

Options: 415326

- 1) Party started
- 2) afternoon and
- 3) very early
- 4) till night
- 5) went

Options: 13254

Missing Letters



Formal / Informal Sentences.

Shouldn't → Should not
(Informal) (Formal)

wouldn't → would not
(Informal) (Formal)

Didn't → Did not
(Informal) (Formal)

Concept of Reading Comprehension

Strategies

Paragraph

P1 → Paragraph 1

P2 → Paragraph 2

P3 → Paragraph 3

1) Scholar Approach

↳ wide knowledge on a Topic / paragraph

Time ↑ = More time to read a paragraph

2) Hurter Approach

↳ Focus on something clearly



→ find Questions

↓
Keywords

3) Balanced Approach

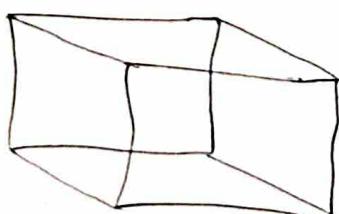
(① + ②)

(Scholar + Hurter) = Direct + Indirect.



Concept of Boxes and Cubes.

Cube



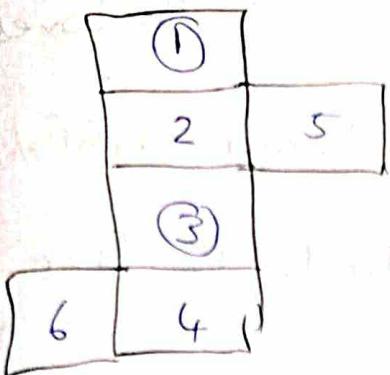
6 - Phases

length → some

width → some

height → same.

TRICK / SHORTCUT :-



Find opposite of adjacent first.

1 - 3 → opposite
2 - 4 → opposite
5 - 6 → opposite

1 - 2 → adjacent.
3 - 4 → adjacent.
2 - 5 → adjacent.
6 - 4 → adjacent.

Practice Questions

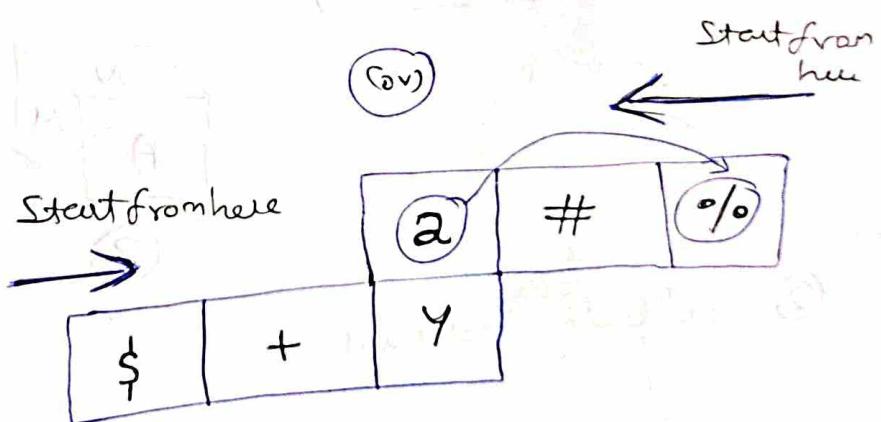
Q) A cube is made by folding the given sheet. In the cube so formed which letter/ symbol will be on the opposite face to face having the symbol %?

A) Y

B) a

C) +

D) \$



(X) Don't start at centre.

Q) Which of the following patterns of the boxes can be formed when the sheet given below is folded?

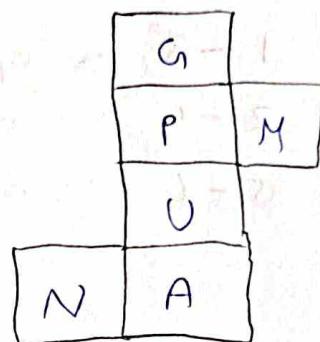
If the letters are shown to indicate the size only.

(A) Only 1 and 2

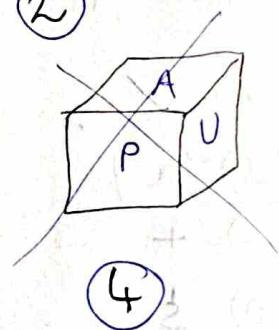
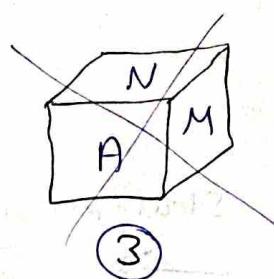
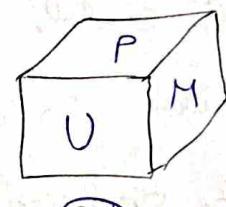
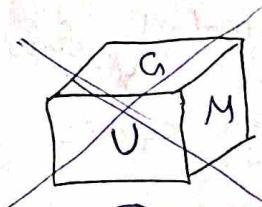
(B) Only 2 and 3

(C) Only 2

(D) Only 1, 2 and 4



Be clear with
adjacent and opposite
sides



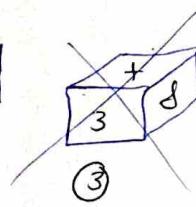
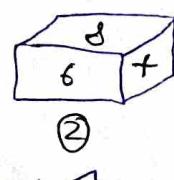
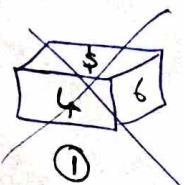
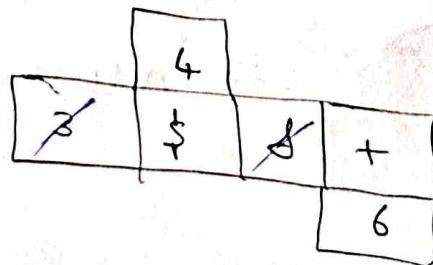
Q) Following patterns

(A) Only 1, 2 and 4

(B) Only 1 and 2

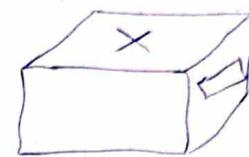
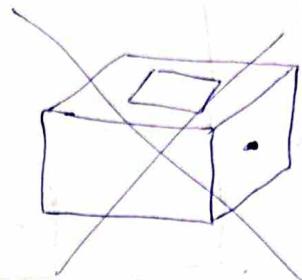
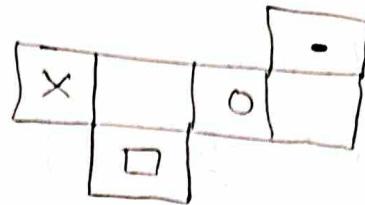
(C) Only 2 and 4

(D) Only 2, 3 and 4



Following Patterns

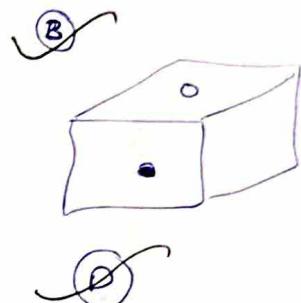
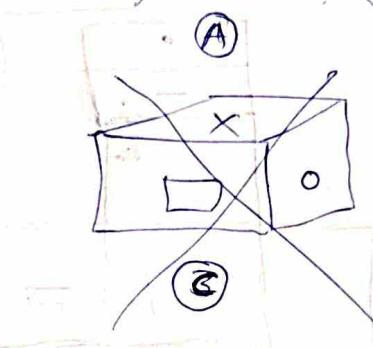
- ① B and C only
- ② A and D only
- ③ A, B and D only
- ④ B and D only



X - O → opposite

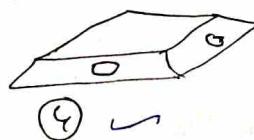
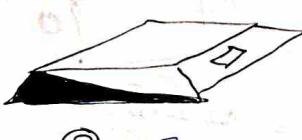
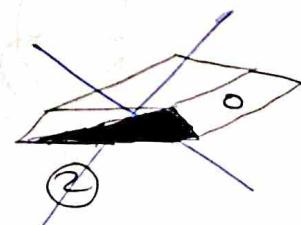
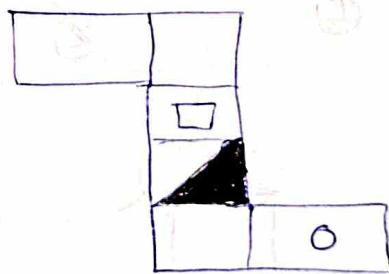
□ - □ → opposite

□ - - → opposite



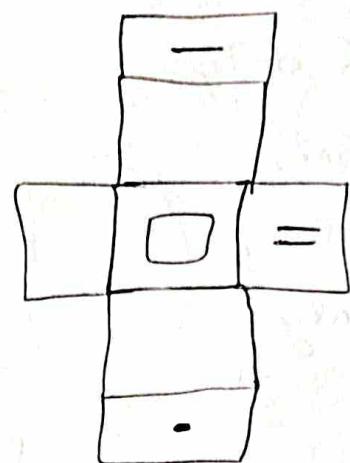
Following Pattern

- ① 1, 3, 4 only
- ② 2 and 3 only
- ③ 1 and 2 only
- ④ 2 and 4 only

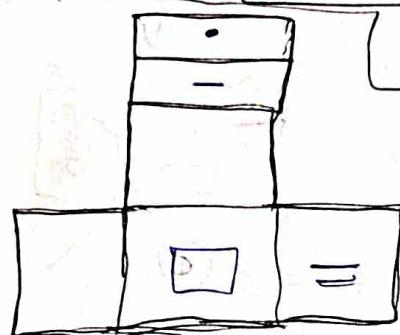


Q) following Important one

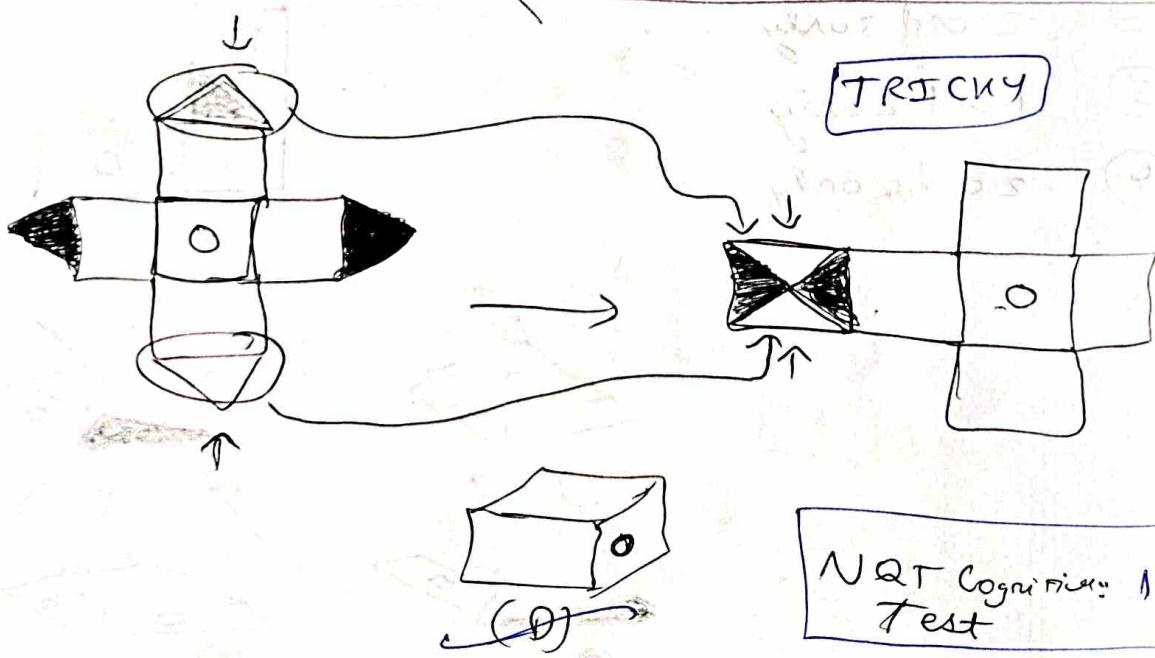
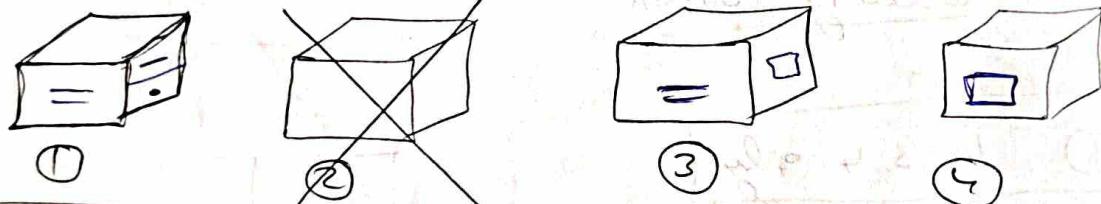
- A) 1 and 2 only
- B) 1, 2 and 3 only
- C) 1, 3 and 4 only
- D) 1, 2, 3 and 4.



7-Phase



6-Phase



NQT Cognitives 11/15
test

Concept of Puzzles

[Number Puzzle
Alphabet Puzzle
Word Puzzle]

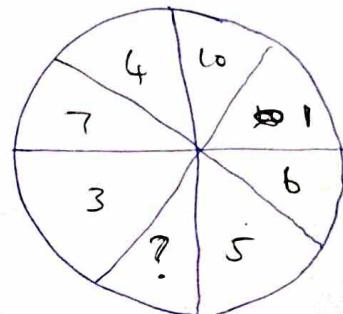
① what is the number that comes in the place of Question Mark?

A) 11

B) 15

C) 8

D) 7



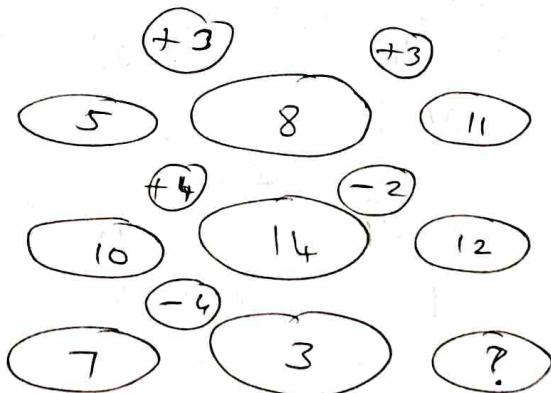
② what is the number.

A) 8

B) 6

C) 4

D) 2



$$5 + 11 = 16 - 8 = 8$$

$$(10 + 12) = 22 - 8 = 8$$

$$7 + 4 = 11 - 3 = 8$$

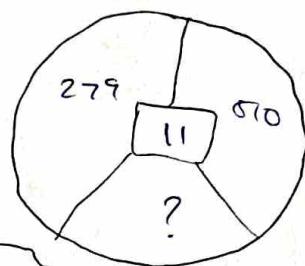
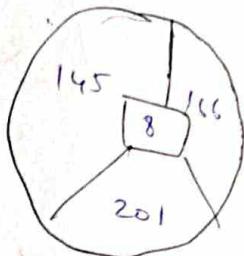
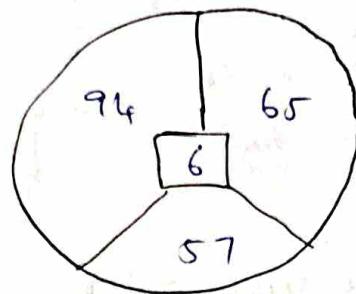
③ Question (Missing numbers)

A) 542

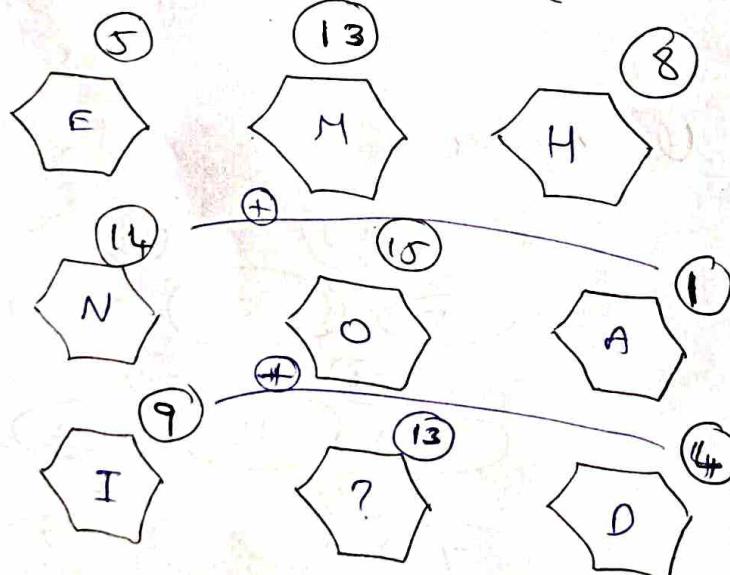
B) 498

C) 524

D) 489



④



A) M

B) J

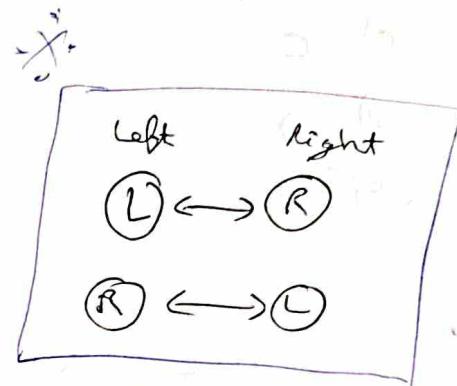
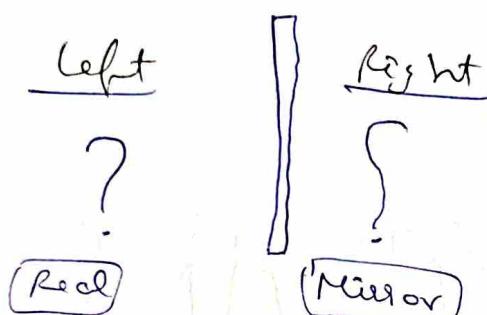
C) C

D) W

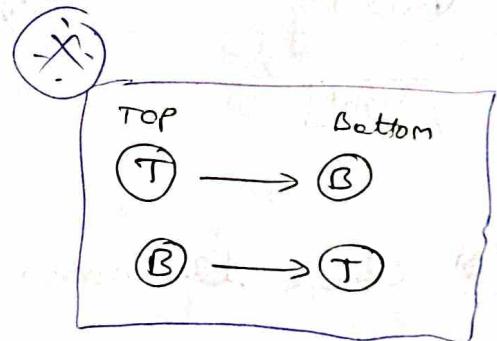
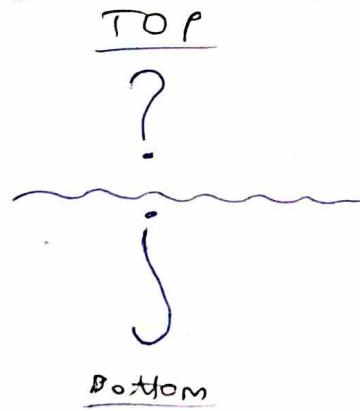
Concept of Visual Reflection

Reflection \rightarrow mirror
 \rightarrow water

Eg: Mirror

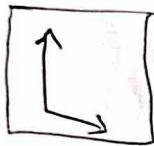


Eg: water

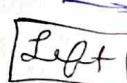
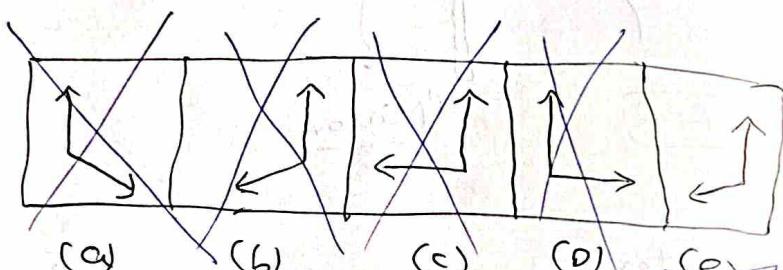


(Q) Choose the alternatives which is closely resembles the mirror image of the given combination

- a) A
- b) B
- c) C
- d) D
- e) E



(Real)



(Q) choose the mirror image

- a) A
- b) B
- c) C
- d) D
- e) E



(real)



(a)

(b)

(c)

(d)

(e)

② Mirror Images

a) A

b) B

c) C

d) D

① FUN

(a) NUF

(c) ~~NUF~~

(b) EON

(d) NUO

② Mirror Image

a) A

① 76MP035

b) B

(a) JEO9M6F (b) TEOH96F

c) C

~~(c) TEO9M6F~~

d) D

(d) EOD9M27

Both Mirror & Water Image can also be applied

Mirror

→

water

→



Concept of Embedded Images

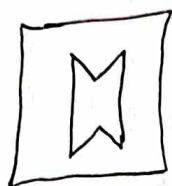
(Q)

A) 1

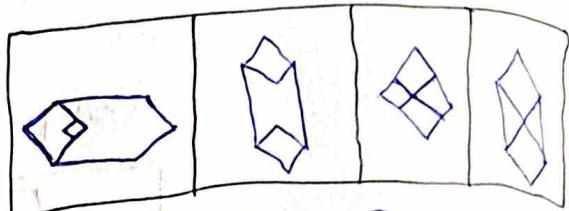
B) 2

C) 3

D) 4



(X)
[Real]



(a)

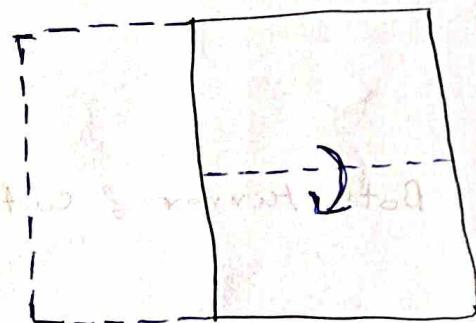
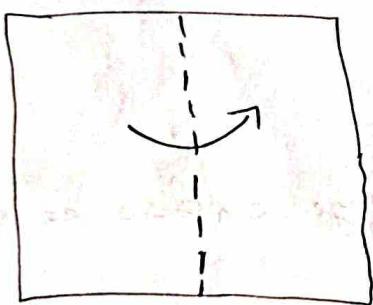
(b) ✓

(c)

(d)



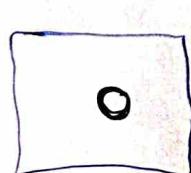
Concept of paper folding / Unfolding.



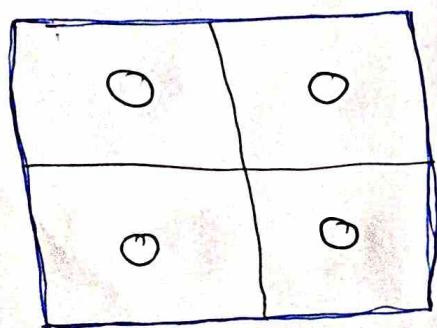
Paper

$\square \leftarrow \square$

$\square \leftarrow \square$

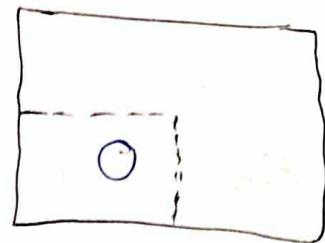
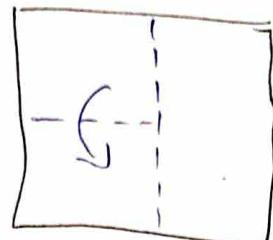
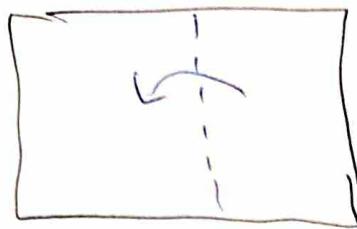


Paper (Folded)

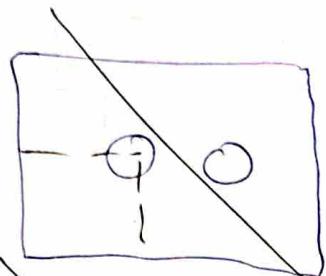


Paper (Unfolded)

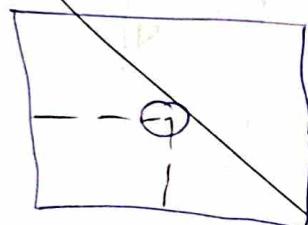
① Question



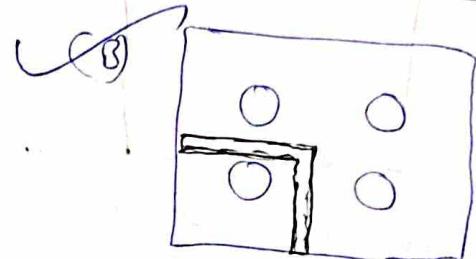
(A)



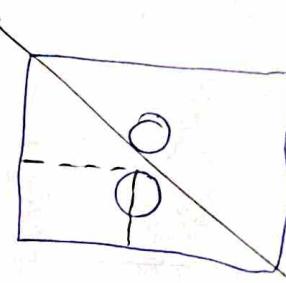
(C)



Use Reference Image

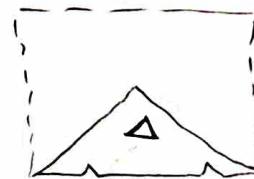
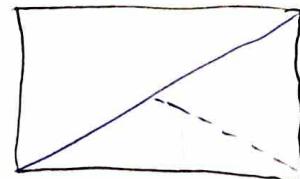
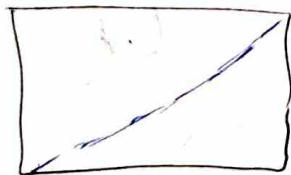


(d)

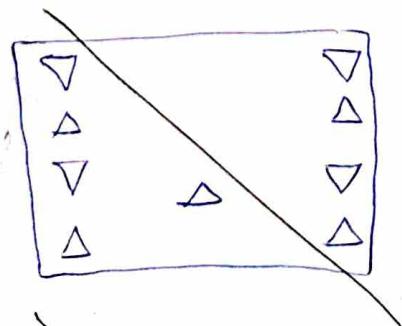


Reference Image = Original Image

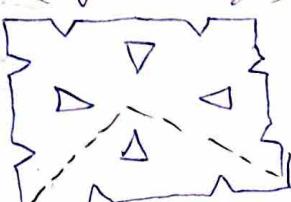
② Reference Image



(a)



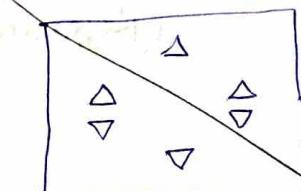
(Reference Image)



(c)

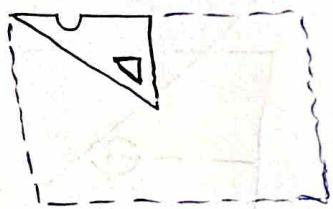
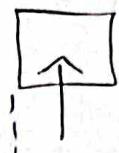
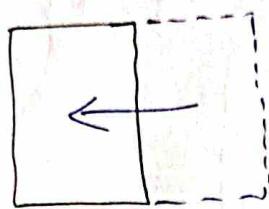
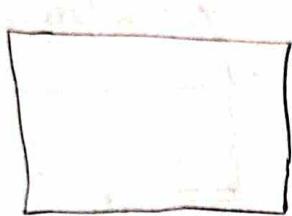


(d)

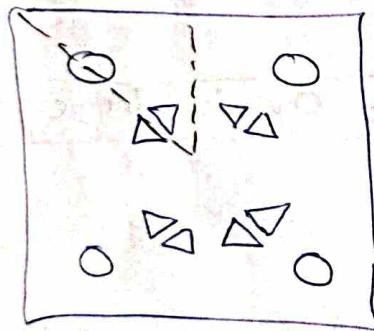


Easy way: Take the reference of the Image and check
for it

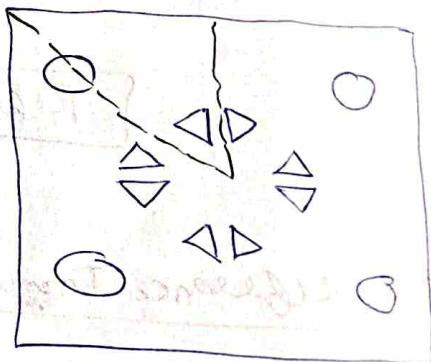
Eg



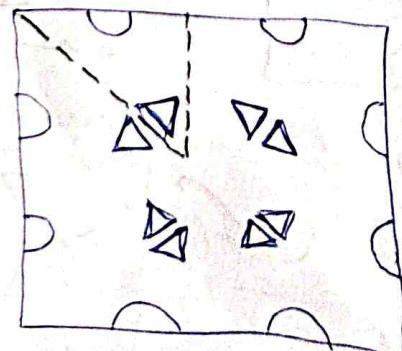
(a)



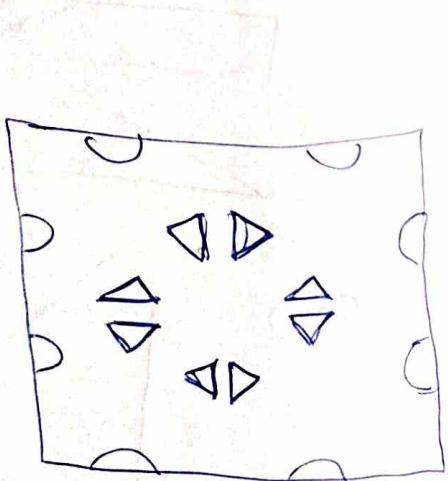
(b)



(c)

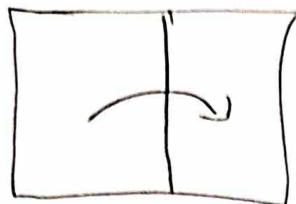


(d)

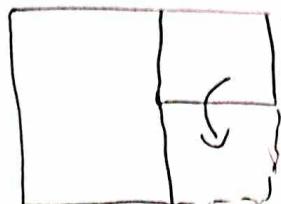


(Reference of the Image)

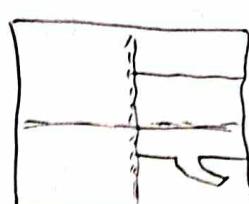
⑤ multiple folding



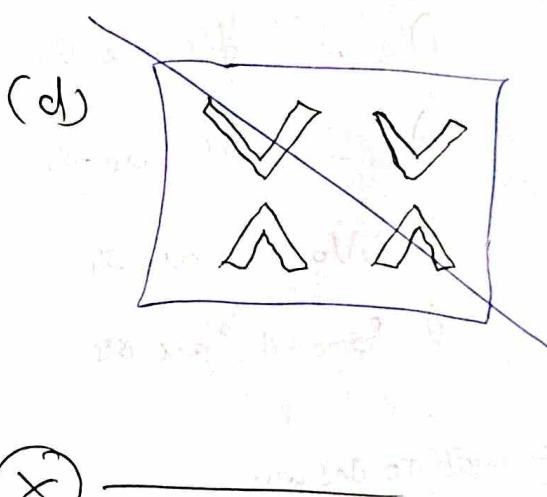
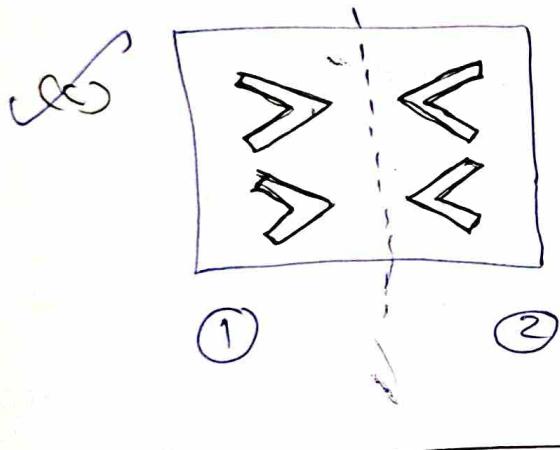
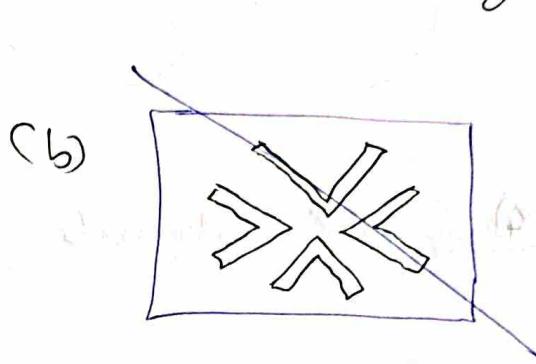
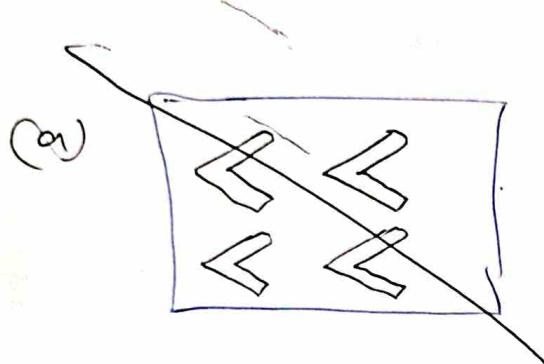
2 folding



4 folding



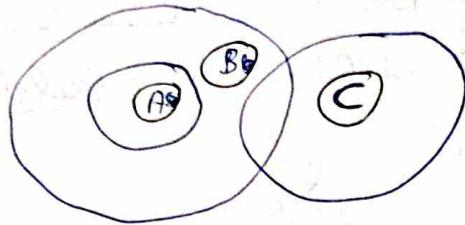
8 folding



Syllogistic Reasoning

Eg, All A's are B's

Some B's are C's



4) Types of Statements

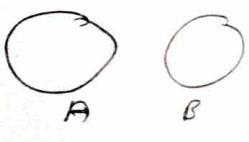
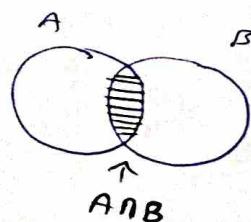
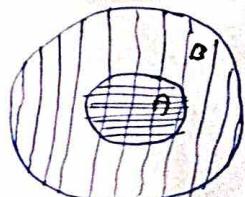
- 1) All A's are B's
- 2) Some A's are B's
- 3) No A's are B's
- 4) Some A's are not B's

ways To Answer

3 ways

- 1) Verbal
- 2) Venn diagram

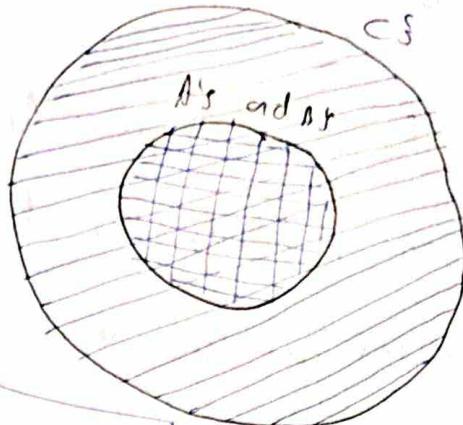
Union (All A's are B's) || Instruction || A's are B's



Eg:

All A's are B's

All B's are C's



Answer:

- ① Some A's are C's
- ② All B's are C's

② Statement

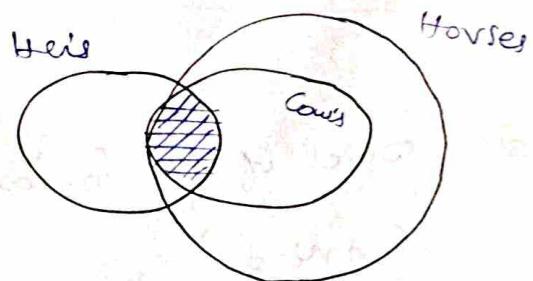
Some hen's are cows

All cow's are horses

Conclusions:-

1) Some horses are hen's.

2) Some hen's are horses.



Ans: Both I and II follows.

Infering and Intesections

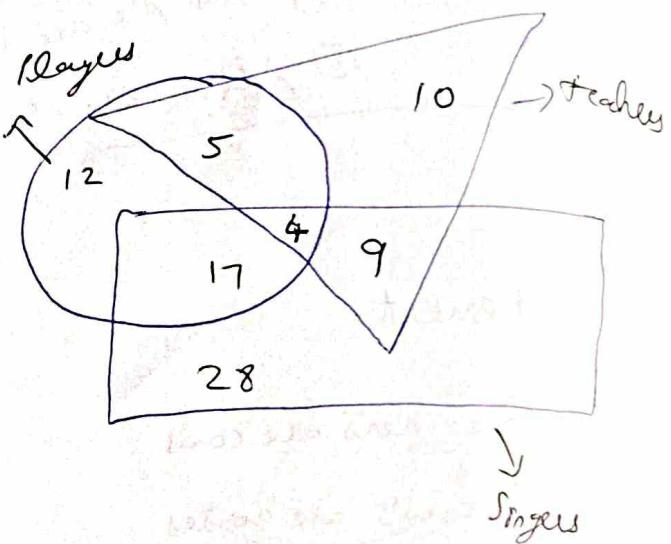
- Q) The diagram represents teachers, Singers and Players, Study the diagram and find out how teachers are also Singers.

- A) 4

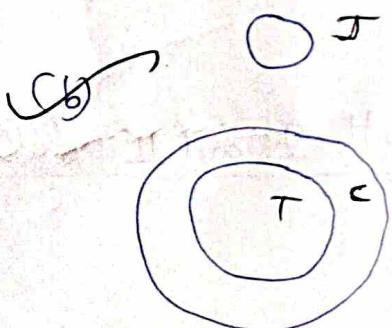
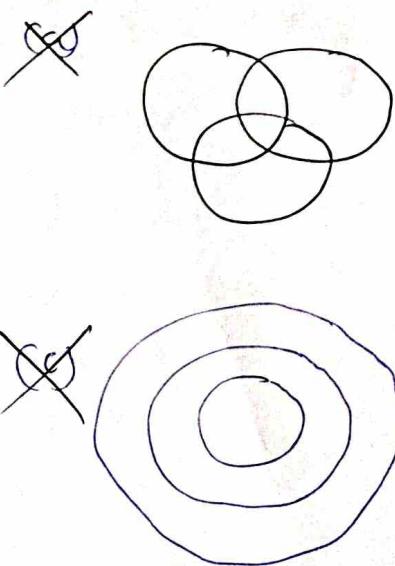
B) 17

C) 9

D) 13

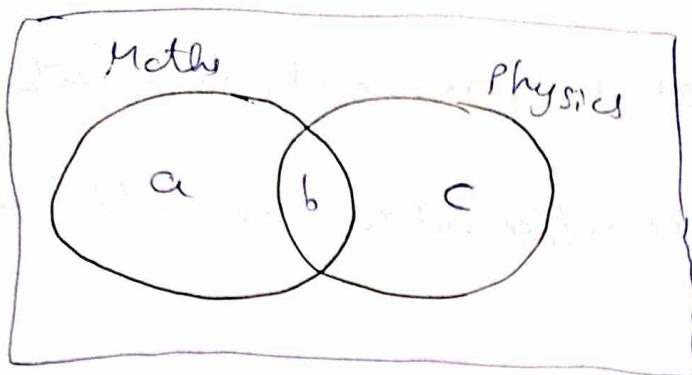


- 2) Which of the following represents Judge, Thief and Criminal?



~~(X)~~ None of These

Concept



How many students have passed only Maths: a

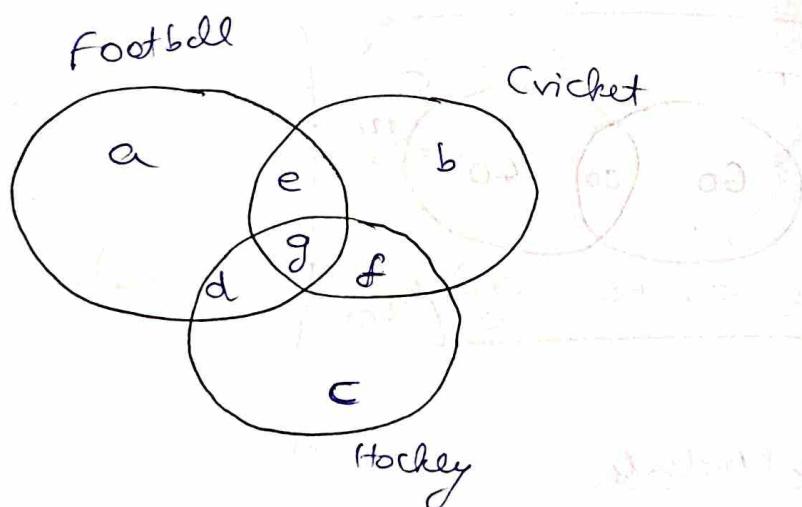
" " c

" " b

only physics: c

both Maths and Physics: b

At least one subject: a, b, c



Only Cricket: b

Only football: a

Only Hockey: c

Exactly 2 games: d+c+f

All Three games: g

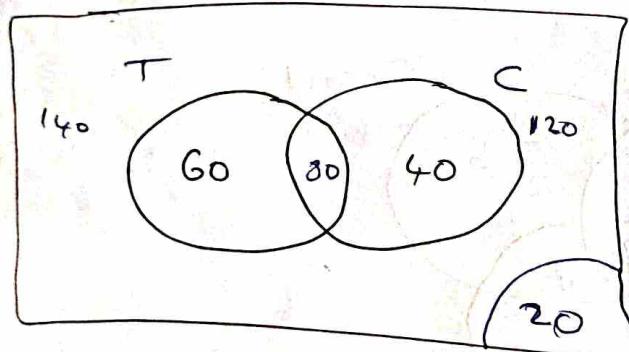
Football as well as Cricket: e+f

Cricket as well as Hockey: g+f

Q) Important Question

In a college 200 students are randomly selected.
 140 like tea, 120 like coffee and 80 like both tea and
 coffee.

- (i) How many students like only Tea 60
- (ii) How many students like only coffee 40
- (iii) How many students like neither Tea nor coffee 20
- (iv) How many students like only one of Tea or coffee? 100
- (v) How many students like at least one of the beverages?



200 Students

$$\begin{array}{l}
 a + b + c = 180 \\
 \downarrow \quad \downarrow \quad \downarrow \\
 60 + 80 + 40 = 180
 \end{array}$$

Concept of Inequality

>	Greater Than
<	Less Than
=	Equal To
\geq	Greater Than or equal To
\leq	Less Than or equal To
\neq	Not equal To.

① Solve $x+2 < 4$

$$x+2 < 4$$

Subtract ② on both sides

$$x+2-2 < 4-2$$

$$\Rightarrow x < 2$$

② Solve the inequality $3+2x \geq 15$

$$3+2x \geq 15$$

$$3+2x-3 \geq 15-3$$

$$2x \geq 12 \quad \div 2$$

$$\frac{2x}{2} \geq \frac{12}{2}$$

$$\Rightarrow x \geq 6$$

Practice Questions

- 1) A is greater than B
- 2) B is greater than A
- 3) A is not greater than B
- 4) B is not greater than A
- 5) A is equal to B
- 6) A is not equal to B
- 7) A is greater than or equal to B

Statement : $C > A \geq T, S \leq E = T$

- (I) ~~$A > E$~~ // Greater than or equal to $A \geq E$
- (II) $C > S$

Answer: Only Conclusion II follows

→ FINISHED ←