

Percentage..

Concepts

Normal Method

Rs. 2800 of

60%

$$\frac{50}{100} \times 2800 = 1400$$

Mind Calculation

Rs. :- 2800 of

50%

2800 - half - 1400.

50% = 1400) - 25%.

25% = 700)

10% = 280) - 10%.

1% = 2.8) - 1%.

20% = 28) 1 x 3

20% = 280 x 2 = 560.

$$25\% = \frac{2125}{250} \Rightarrow 2120$$

$$\frac{4250}{8500} \Rightarrow 50\%$$

$$10 = 850$$

$$1 = 85$$

$$35\% \Rightarrow 30\% + 5\%$$

$$\begin{array}{rcl} & \downarrow & \downarrow \\ 30\% + 10\% & = 140 & \\ & = 280 \times 3 & \end{array}$$

$$\Rightarrow 840$$

$$\Rightarrow 840$$

$$\frac{140}{980}$$

$$23\% \Rightarrow 20 + 3$$

$$20\% = 540, 3 = 84$$

$$\begin{array}{r} \Rightarrow 540 \\ 84 \\ \hline 624 \end{array}$$

Problem:- \oplus

vice versa.

$$\boxed{x\% \text{ of } y = y\% \text{ of } x} \quad \text{APPLY here}$$

36% of 50.

$$x\% \text{ of } y = y\% \text{ of } x$$

Question:-

① If 50% of P = 25% of Q then, P = x% of Q. Find x?

\Rightarrow

$$50\% \text{ of } P = 25\% \text{ of } Q \Rightarrow P = ?$$

$$\boxed{\frac{P}{Q} = \frac{50}{25}}$$

Problems:-

Sol:-

If $50\% \text{ of } P = 25\% \text{ of } Q$ then, $P = x\% \text{ of } Q$ find x

$$2P = Q$$

$$\boxed{P = \frac{Q}{2}}$$

$$P = x\% \text{ of } Q$$

$$\frac{Q}{2} = \frac{x}{100} \times Q$$

$$250$$

$$\boxed{100x = 50}$$

Q₂ :- If $20\% \text{ of } (P+Q) = 50\% \text{ of } (P-Q)$ then,

find $P:Q$

Sol:-

$$20\% \text{ of } (P+Q) = 50\% \text{ of } (P-Q)$$

$$20 \times (P+Q) = 50 \times (P-Q)$$

$$20P + 20Q = 50P - 50Q$$

$$7Q = 3P$$

$$\frac{7}{3} = \frac{P}{Q} = 7:3$$

?

Q₃ :- If $90\% \text{ of } A = 30\% \text{ of } B$ and $B = 2x\%$

of A , Then the value of x is

$90\% \text{ of } A = 30\% \text{ of } B$

$$\frac{90}{3} \times A = \frac{30}{1} \times B$$

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

$$B = 2 \times \% \text{ of } A$$

$$B = \frac{2 \times}{+100} \times \frac{B}{3}$$

$$\boxed{x = 150}$$

?

$40\% \text{ of } (A+B) = 60\% \text{ of } (A-B)$ then,

QH:

$$\frac{2A - 3B}{A+B} \text{ is ?}$$

Solution:

$$\cancel{40\%} \times (A+B) = \frac{30}{60\%} \times (A-B)$$

$$20A + 20B = 30A - 30B$$

$$2A + 2B = 3A - 3B$$

$$5B = A$$

$$\boxed{\frac{A}{5} = B}$$

$$\frac{2A - 3}{5}$$

$$A + \frac{A}{5}$$

$$\Rightarrow \frac{10A - 3A}{5} \Rightarrow \frac{7A}{5}$$

$$\frac{6A}{5} \Rightarrow \frac{7}{6}$$

$$\frac{2A - 3A}{A + \frac{A}{5}}$$

$$A + \frac{A}{5}$$

$$= 2A - \frac{3A}{5}$$

$$\frac{6A}{5}$$

27

Q5:- If 20% of a is equal to 80% b, then
 $(b+a)/(b-a)$ is equal to:

Solution:-

$$20 \times a = 80 \times b$$

$$\boxed{a = 4b}$$

Solve:-

$$\frac{(b+4b)}{(b-4b)} \Rightarrow \frac{5b}{3b}$$

$$\Rightarrow \boxed{\frac{5}{3}}$$

Practice:-

If 20% of $(A+B)$ = 50% of B, then

the value $(2A-B)/(2A+B)$ is.

→ term

Q6:- If x is 20% less than y , then find the value of $(y-x)/y$ and $x/(x-y)$?

$$x - 20\% = y$$

$$x - \frac{20}{100} = y \quad (\text{or})$$

$$\boxed{x = 50y}$$

$$x : y$$

$$100 - 20 : 100$$

$$80\% : 100$$

$$\Rightarrow \frac{100-80}{100} \frac{(y-x)}{y}$$

$$\Rightarrow \frac{20}{100} \Rightarrow \frac{1}{5}$$

$$\Rightarrow \frac{-20}{-20} \Rightarrow -4$$

$$\Rightarrow \boxed{\frac{1}{5}}, \boxed{-4}$$

Q7: If 8% of $x = 4\%$ of y , then 20% of x is.

$$\frac{8x}{2} = \frac{4y}{1}$$

20% of x

$$2x = y$$

$$\frac{20}{100} \times y$$

$$\frac{1}{5} y$$

$$\frac{1}{5} y \Rightarrow y \text{ of } 10\%$$

Q8: If 60% of $A = 30\%$ of B , $B = 40\%$ of C ,

$C = ?\%$ of A Then the value of x is
Find the value of x ?

$$60^2 \times A = 30 B$$

$$2A = B$$

$$B = 40\% C$$

~~$$B = 40\% C$$~~

$$C = \frac{B}{40} \quad A = \frac{B}{2}$$

~~$$C = x\% A$$~~

~~$$\frac{B}{40} = x \times \frac{B}{2}$$~~

$$B \Rightarrow 2A$$

$$2A = \frac{2}{100} \times C$$

$$A = \frac{C}{5}$$

$$C = \frac{x}{100} \times \frac{C}{5}$$

$$C = 500$$

3) what Percentage:-

Formula 1:-

$$x \text{ is what } \boxed{y \text{ or } \%} = \frac{x}{y} \times 100$$

$$\text{What } \boxed{\% \text{ of } x} \text{ is } y = \frac{y}{x} \times 100$$

Formula 2:-

x is what y . $\boxed{\text{more or less than } y}$

$$y = \frac{x-y}{y} \times 100$$

Ans = value
More

Questions:-

Ans = - value
Less

If x is 10% more than y then; by what percentage is y less than x ? $\rightarrow ?$

\hookrightarrow already mention.

$$y = \frac{x-y}{y} \times 100$$

$$x \quad | \quad y$$

$$100 = 110 - 100 \quad | \quad \cancel{100}$$

$$110 \quad | \quad 100 \Rightarrow 10\%$$

$$x = \frac{y-x}{y} \times 100 = \frac{100-110}{110} \times 100$$

$$= \frac{-100}{11}$$

$$\frac{100}{11} \Rightarrow 9 \frac{1}{11}$$

$$\Rightarrow \frac{-10}{11} \times 100$$

$$= \frac{-100}{11} \text{ or } -9 \frac{1}{11}$$

Q2:- If A's percent height is 10% more than B height, how much percent less is B's height than of A? \rightarrow than (or) of by formula 2

$$\begin{array}{c} B \quad A \\ 100 \quad 110 \cdot x \Rightarrow \frac{Y - x}{x} \times 100 \\ 10\%. \end{array}$$

$$= \frac{10}{110} \times 100 \Rightarrow \frac{100}{11}$$

$$= -100/11 \Rightarrow 9(\frac{1}{11})$$

\rightarrow Mixed fraction conversion.

Q3:- B got 20% marks less than A.

~~then~~ What %

$$\begin{array}{c} A \quad B \\ 100 \quad 80 \\ -20\%. \end{array}$$

marks did A got more than B?

$$B = \frac{A - B}{B} \Rightarrow \frac{100 - 80}{80} \times 100$$

$$\frac{20}{80} \times 100$$

$$\frac{1}{4} \times 100 \Rightarrow 25\%$$

Qn:6

If x earns 25% more than y . What per less does y earn than x ?

$$\begin{array}{rcl} & x & y \\ & 128 & 100 \\ & \underbrace{\quad}_{25\%} & \\ & 100+25 & \end{array} \left| \begin{array}{l} x = \frac{y+x}{x} \times 100 \\ x = \frac{100+125}{125} \times 100 \\ \Rightarrow \frac{225}{125} \times 100 \\ \Rightarrow 200 \\ \boxed{x \Rightarrow 20\%} \end{array} \right.$$

Qn 6:-1 ~~basic~~

Two numbers are resp $12(1\frac{1}{2})\%$ and 25% more than a third num. The first num is what percentage of second?

$$\begin{array}{ccc} A & B & C \\ 12(1\frac{1}{2})\% & 25\% & x \\ \swarrow & \searrow & \\ 12(1\frac{1}{2})\% & 25\% & \end{array}$$

~~↳ First formula.~~

$$C = Y 100$$

$$B = 125$$

$$A = 12(50) \Rightarrow 600$$

$$\frac{A}{B} \Rightarrow \frac{600}{125}$$

A B C
12(1/2)% 28% X

$$12 \times \frac{1}{2} = 12\% \quad 100$$

$$\frac{25}{2} \times \frac{1}{100}$$

$$\frac{25}{200} \times \frac{1}{100}$$

$$A = \frac{25}{200}$$

$$A \times C$$

$$\Rightarrow \frac{25}{200} \times 2 = \frac{225}{125 \times 2} \times 100$$

$$A = \frac{25}{2} = \frac{225}{2} \Rightarrow 90\%$$

Practice:- If first num is 28% less than third num by 30%
and 37% resp. Then the perc by which second

num is less than the first is

$$0.021 < \frac{0.05}{0.01}$$

$$0.01 \times 0.031 < 0.05 \Rightarrow 0.031 - 0.01 = 0.02$$

$$0.01 \times 0.021 < 0.037 \Rightarrow 0.021 - 0.01 = 0.01$$

$$0.021 < 0.037$$

(ii) Percentage Based on Salary.

Base value - if not given.
100% - If not given value
→ Salary Always 100 percentage

Ques:-

Radha spends 40% of her salary on food,
20% on house rent,
10% on entertainment,
10% on conveyance.

her Salary Saving after Spend is 15000

then her salary per month is ?

100% -> Salary
'Base'

Salary not given

So need to

Take percentage.

40% of 100%

$$20\% \Rightarrow 1500 \text{ *5}$$

201. 06. 10 0

10% of 100

10% of 100

$$100\% \xrightarrow{\sim} 80\%$$

$$20\% = 1500 \xrightarrow{\text{I know}} 20\% \cdot 20 \Rightarrow 1500 \times 100$$

$$\begin{array}{l} 20\% = 1500 \\ \swarrow \quad \searrow \end{array} \quad \begin{array}{l} \text{Find} \\ 100\% = x \quad 80\% \end{array}$$

$$20 \times x = 1500 \times 100$$

$x = 77500$

Ques 2:-

Kishan Spends 30% of his Salary on Food
and donates 3% in a Charitable Trust.
He Spends $\boxed{\text{Rs. } 2810}$ on these two items,
then Total Salary for that Month is?

30% - Food

\rightarrow 33%

3% - donates

$$33\% \Rightarrow 2810, \text{ base} \Rightarrow 100\%.$$

$$100\% \Rightarrow x$$

$$33 \times 100 \Rightarrow 2810 \times 100$$

$$\boxed{x = 7000}$$

Question 3:-

Expense
Savings

Mr. X Spends 35% of his Salary on food

5% on children education.

In Jan he Spend Rs. 17600 on these
two item. His Salary for this Month

$$\Rightarrow 35\% + 5\% \Rightarrow 40\% \Rightarrow 17600$$

$$100\% \Rightarrow x$$

$$40 \times x \Rightarrow 17600 \times 100$$

$$\boxed{x \Rightarrow 44000}$$

Question 4:-

Keshav spent Rs. 554.75 on his birthday on buying home Appl. & and remaining 25% of total amount cash, what is total amount?

Birthday \rightarrow 554.75 Rs.

Home App \rightarrow 285.25 Rs.

$\boxed{25\%}$ Remaining.

$\boxed{75\%}$

Saving.

$$75\% = 84000$$

$$100\% = x$$

$$75 \times x = 84000 \times 100$$

$$x = 112000$$

$$\begin{matrix} 3100 \\ 310 \end{matrix}$$

Question 5:- Ms Sujata invests 7% Rs. 2170.

of her monthly salary invested 18% $\frac{31000 \times 3}{100\%}$.

$$7\% \Rightarrow 2170 \times 100 \quad 31\% \Rightarrow 31000$$

$$100\% \Rightarrow x$$

$$x = 31000$$

MF

$$100\% - (7\% + 18\% + 6\%)$$

$$100\% (31\%)$$

31%

Q The monthly salaries of A and B together amount to Rs. 40000. A spends 85% of his salary and B, 95% of salary. If now their savings [are the same], then the salary (in Rs.) of A is.

$$\begin{array}{cc} A & B \\ 20000 & 20000 = 40000 \rightarrow \text{Same} \end{array}$$

$$(M.C) \quad (40000 - x) \quad [S_1 = S_2]$$

$$x \times \frac{15}{100} \quad [40000 - x] \times \frac{5}{100}$$

$$3x = 40000 - x$$

$$2x = 40000$$

$$x = 10,000 \rightarrow A \text{ [Value]}$$

Now apply in B

$$A = 10,000$$

$$B = 30000$$

Lesson - 5 Election Percentage

→ Question - Two parties - Who wins, invalid, individual votes.

Points

- ① DMK got 5000 votes and won election
- ② ADMK won the ele by Majority / 5000 voice

~~✓ Note's~~ Total votes ✓
 Majority 100% difference,
 By } Winner ~ Loser
 difference

Question 1:- (Always need to find with value)
 Two person contested an ele of
 Parliament. The winning candidate secured
 57% of total and won by an Majority
 of 42000. The total num of votes polled

$$\begin{array}{cccc}
 T & W & L & 57 - 43 = 14\%
 \\ \hline
 100\% & 57\% & 43\% & \text{Majority} = 14\%
 \\ & \underbrace{}_{100 - 57} & & \\
 & 14\% = 42000 & & \\
 & \cancel{100\%} = x & & \\
 & 14x & &
 \end{array}$$

Question 2:-

In a election, a candidate Secured 40%
Secured but is defeated by only candidate
by Majority of 298 votes. Find the total
no. of votes.

T	W	L	Majority	Majority Percentage
100%.	60%	40%	298	20%

$$20\% = 298$$

$$100\% = x$$

5

$$x = 1490$$

Question 3:-

In a election b/w two candi, one get

72% of total. If total votes are 8200

by how many votes did the winner \rightarrow total
win the election: \rightarrow P. difference given
 \rightarrow find

W	L	T	M
72%	28%	100%	percentage = 44%
			100% = 8200

$$44\% = x$$

$$100\% = 8200$$

$$x = 3608$$

Question 9:-

In an election b/w two candidates the candidate getting 60% of votes elected by majority of 14000. The no. of votes polled by winning candidate is ?

$$\frac{T}{100\%}, \frac{W}{60\%}, \frac{L}{40\%}, \frac{M}{20\%}$$

$$\left\{ \begin{array}{l} 20x = 14000 \\ 100x = x \\ x = \end{array} \right. \quad \left\{ \begin{array}{l} 20x = 14000 \\ 60x = x \\ x = 3 \\ \text{winning} \Rightarrow 4200 \end{array} \right.$$

it is wrong

not asking total

votes.

asking total winning
votes

Question 6:-

In an election, three candidates contested.
1st 40% and Second got 36%.
Total no. of votes polled were 3600
Find no. of votes got by the third?

1st 2nd 3rd 3rd
40% 36% 24% ~~40 - 36 = 4%~~

40
36

~~100% = 3600~~ $\times \frac{76}{100}$

$$\begin{array}{r} 36 \\ \times 24 \\ \hline 144 \\ 72 \\ \hline 8640 \end{array}$$

~~100% = 3600~~

~~24% = x~~

$$x = 8640$$

Votes

Question 3: (Votes Invalid) .

In collage there b/t 2 candidate
10% of votes cast are invalid.
The winner gets 70% of the valid
votes and defeats the Loser by
1800 votes. How many votes
Totally cast

$100\% - 10\% \text{ (invalid)} \rightarrow \text{final } 100\%$. find
90% - valid votes. Converting
winner acc to 90%.

~~W L~~
~~70% 20%~~
 $\frac{70}{+100} * 90 \Rightarrow 63\%$.

To find Loser.

$$63 - 90 \Rightarrow 27\%.$$

$$W = 63\%, L = 27\%, T = 90\%.$$

diff

$$M = 36\%.$$

$$\cancel{36\%} = 1800$$

$$100 \times 18 = ?$$

2

$$n = \boxed{6000}$$

[cast]

$$\frac{100 \times 1800}{36} = ?$$

Q:- In collage election b/w two cand, 10% of
votes not cast So, consider 100%.

87. of the votes in an election did \textcircled{D} \textcircled{D} [not cast their votes] in this election, there were only two candidates. The winner by obtaining 48% of total votes defeated his contestant by 1100 votes. The total no. of voters in the election was.

Sol:-

87. - not cast

100% - Total votes

48% - w

100% - 87% \Rightarrow 92%

44% - L Take 100 as it is

$$100x = 1100$$

$\frac{25}{100}$

$$4x = 1100 \times \frac{100}{25}$$

$$x = \frac{1100 \times 100}{25} \Rightarrow 27500$$

Q:- In an assembly election, a candidate got 55% of total valid votes. 2% of the total votes were declared invalid. If the total num of votes is 104000, then the num of valid votes polled in favour of the candidate

Lesson-6 Percentage on Marks

Exe

Question : -

In an exam, there were 1000 boys and 800 girls. 60% of the boys and 50% of the girls passed. Find the per. of the candidates failed.

	B	G
Boys	60%	50%
Girls	40%	50%

$$\rightarrow 1800 \Rightarrow 100\%$$

$$\frac{50}{100} \times 1000 = 50\% \text{ of } 800 = \frac{40}{100} \times 1000 = 400$$

$$\frac{50}{100} \times 1000 + \frac{40}{100} \times 1000 = 500 + 400 = 900$$

$$900 \Rightarrow \frac{900}{1000} \times 100 = 90\%$$

$$50\% \times 1000 = 500$$

$$40\% \times 1000 = 400$$

$$500 + 400 = 900$$

$$\frac{900}{1000} \times 100 = 90\%$$

Q₁: In an examination, a candidate must secure ~~40% marks to pass~~. A candidate, who gets ~~20 Marks~~, fails by 20 marks. What are maximum marks for the examination?

must gets
40% \Rightarrow 20 Marks

Failed

240 \rightarrow

$$40\% \Rightarrow 240.$$

$$100\% \Rightarrow x$$

$$x = \frac{6}{40} \times 240 \Rightarrow 600.$$

Q₂: For an exam, it required to get 36%.

of Maximum Marks to pass. A student got 113 Marks and failed by 85 marks. The Maximum marks?

Marks?

Pass Mark	Student	
36%	113 \rightarrow failed by 85	113 $\frac{85}{198}$

$$36\% \Rightarrow 198$$

$$100\% \Rightarrow x$$

$$x = \frac{198 \times 100}{36} \Rightarrow 550.$$

Q4:- A student has to obtain 33% of total marks to pass. He got 25% of total marks failed by 40 marks. The no. of total marks.

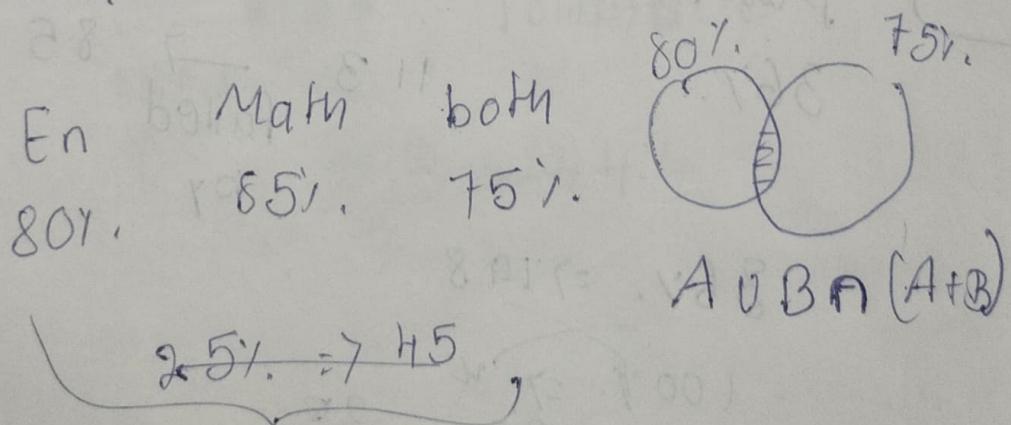
Pass Total
 33% 25% → 40
 ↓ ↓
 Failed 8% → margin.

$$8\% = 40$$

$$100x \Rightarrow x$$

$$x \Rightarrow \frac{40 \times 100}{8} \Rightarrow 500$$

Q5:- In an exam, 80% of the boys passed in English and 85% passed in Maths while 75% passed in both. The no. of boys who sat for the exam: - If 45 boys failed in both



$$80 + 85 - 75$$

$$\Rightarrow 90\% \Rightarrow \boxed{90\%} \text{ Boys Passed.}$$

$$\Rightarrow 10\% \text{ Failed}$$

$$10\% \Rightarrow 45$$

$$100x = ?$$

Ques:- In an exam 75% of students Passed in Maths

48% passed in Physics and 30% passed in both. How much percentage of students failed in both?

$$65 + 48 - 30 \Rightarrow 83\% \text{ passed}$$

$$83 \Rightarrow 17\% \text{ failed}$$

Practice:- In an exam 70% of students passed in English.

80% passed in Maths 10% failed in both the subjects. If 144 candidates passed in both. What

is the total no. of candidates?

70% → Passed in Eng

①

Passed → 144

180% → Maths

10% → Failed both

90% → 144

②

Failed

100% → 70% + 80% - 10% → Fail

100% → 160% - x

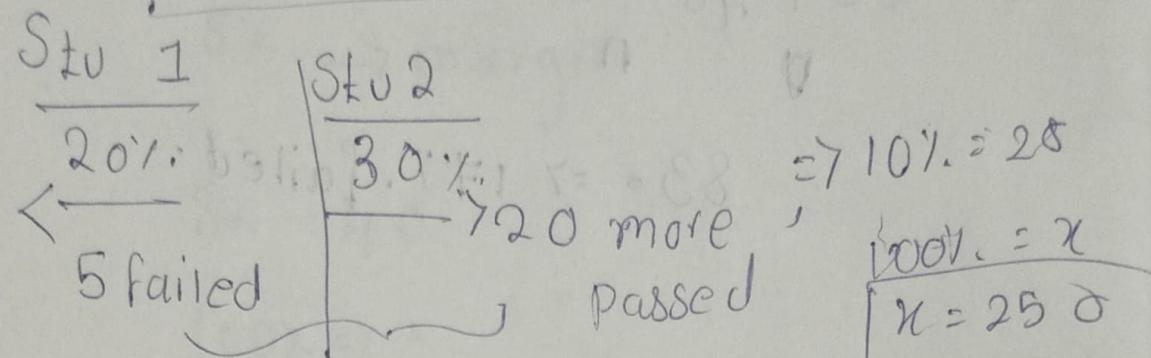
x = 60%

60% → 144

100% → n

x = 240

Q10 In an exam, a student who gets 20% of the maximum marks fails by 5 marks. Another student who scores 30% of the maximum marks gets 20 marks more than the pass marks. The necessary percentage for pass?



not diff opposite

Pass Mark \Rightarrow 85

$$20\% = 50 + 5$$

↓ ↓ ↓ ↓ ↓
Pass

$$\text{Perc} \Rightarrow \frac{\cancel{55}}{\cancel{200}} \times 100^{11} 2$$

$$\text{丁} \Rightarrow 22^{\circ}.$$

In an exam, there are 3 sub of 100 marks each. A student scores 60% in the first

80% in second : ~~both~~ or aggregate
Scored 70% → What is in third

$$100\% \Rightarrow 60\% + 80\% \Rightarrow 70\% + x\%$$

$$= 70\% + 70\% + x\%$$

$$100\% = 70\% + x\%$$

$$\boxed{x = 30\%}$$

$$\begin{array}{ccc} 100 & 100 & 100 \\ \downarrow & \downarrow & \downarrow \\ 60\% & 80\% & n\% \end{array} = 300$$

$n\% = 70\%$ aggregation

$$60 + 80 + x\% = 210$$

$$x\% = 210 - 140$$

$$\boxed{x = 70\%}$$

Average:-

$$\boxed{\text{Avg} = \frac{\text{Sum of obs}}{\text{tot. no. of obs}}}$$

Consecutive No.:-

$$n, n+1, n+2, n+3$$

Consecutive odd no.:-

$$n, n+2, n+4, n+6$$

Consecutive Even no.:-

$$n, n+2, n+4, n+6$$

- 1) 1, 3, 5, 7, 9 $\Rightarrow 5$
- 2) 26, 28, 30, 32, 34 $\Rightarrow 30$
- 3) 96, 97, 98, 99, 100 $\Rightarrow 98$
- 4) 101, 102, 103, 104 $\Rightarrow 102.5$
- 5) 52, 54, 56, 58 $\Rightarrow 55$