AILET

Quantitative Techniques: Averages: CLAT 2020

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Quantitative Techniques post as per CLAT 2021 on Averages.

Just Imagine your father coming home from the office and bringing 12 chocolates for you and your 3 cousins (A, B, C). You got 2 chocolates, A got 4, B got 5 and C got 1.

You and C starts fighting about how A and B got more chocolates. In your head, you calculated that everyone should have got 3 chocolates but that didn't happen. **The number 3 that you calculated is technically called an Average.**

In simple terms, an average is distributing x number of items equally in n number of groups. Here x is the sum of observations(Observations in the above description are chocolates each individual got) and n is the number of observations(No. of individuals).

Formula:

$$Average = \frac{Sum\ of\ Observations}{Number\ of\ Observations}$$

Important Notes: Averages questions can come in exam clubbed with other topics like height/weight/age/speed, time and distance/Arithmetic Progression

When a Person replaces another person in the group(age, weight, height and similar kind of Problems)

- If the average is increased: New member's age = Age of person who left+(Increase in average*total number of People)
- If the average is decreased: New member's age = Age of person who left+(Decrease in average*total number of People)

When someone joins the group

- Increase in average: New member's age = Earlier average + (Increase in average*total number of People)

- Decrease in average: New member's Age = Earlier average – (Decrease in average*total number of People)
- When the total number of terms in an AP series is odd then the average will be the term in the middle
- When the total number of terms in an AP series is even, then average can be taken from the average of two middle terms.
- Concept of Average speed in Speed, Time and Distance

$$Average\ Speed = \frac{2D}{D(\frac{1}{x}+\frac{1}{y})}$$

$$Average\ Speed = \frac{2xy}{x+y}$$

Note: With the new format of Clat one cannot expect direct questions from any topic. Implementation of whatever you learnt simultaneously is important to solve Quantitative Techniques Averages for CLAT.

Examples illustrating above shortcuts of Quantitative Techniques Averages for CLAT

1. There are 24 kids in a class and the average weight of a class is 38 kgs. If the weight of the teacher is also included then average increases by 1.5 kg. What is the weight of the teacher?

Solution: Conventional Method

*Total weight of students= Average weight of students*No. of Students*

= 38*24 = 912 kg

New average = 38+2 = 39.5 kg

Total number of People = 24+1 (including teacher) = 25

New total of weights= 39.5*25 = 987.5

Weight of teacher= New total of weights – Previous Total weights of Students

= 987.5-912 = **75.5 kg**

Shortcut: As the question says there is an increase in the average by 1.5 kg when teacher's weight is also considered so we will apply the formula discussed above

Teachers age= Earlier Average+(Increase in average*Total number of people)

= 38 + (1.5*25)

= 38 + (37.5) **= 75.5 kg**

Hence Techer's age would be 75.5 kg

See the difference in conventional and shortcut method, Due to involvement of numerous steps the conventional method becomes more time taking although it's not too long if you are in a habit of oral number crunching but if not then it is advised to use shortcuts.

1. Delhi is 805 km from Banaras. Anuj travelled from Delhi to Banaras vias train at a speed of 92 km/hr whereas he took a bus to return which travelled at a speed of 54 km/hr. Find the average speed at which Anuj travelled from Delhi to Banaras and back to Delhi.

Solution: Let the speed of Train be x and speed of bus be y. By applying the Average Speed formula we get,

Average Speed = (2*x*y)/x+y

= 2*92*54 / (92+54)

= 9936/146 = **68.05 km**

1. A café has an average of 580 customers on Sundays and 250 customers on other days. Find the average number of customers per day. Consider the number of days in a month to 30.

Solution: If the number of days in a month is 30 then there would be 4 complete weeks + 2 days. 4 weeks means 4 Sundays with 580 customers thus 26 normal days with 250 customers.

Total Number of Customers = Customers on Sunday + Customers on other days

= 580*4 + 250*26 = 2320 + 6500

= 8820

Number of Daya = 30

Average Number of Customers in a day=Total number of customers/Number of Days **=8820/30 = 294 customers/day**

1. Average runs made by Viraj in 15 matches is 42.8. the average of his first 8 matches is 55.4. What is the average of his last 7 matches?

Solution: As we need average of Viraj's last 7 matches run we will first find out how many runs he made in those last 7 matches by subtracting runs of his first 8 matches from total runs.

Total Runs made by Viraj in 15 matches=Average runs made*No. of matches = 42.8*15

= 642

Runs made by viraj in first 8 marches = 55.4*8

= 443.2

Runs made by Viraj in last 7 matches = 642-443.2

= 198.8

The average number of runs made by Viraj in his last 7 matches = 198.8/7

=28.4

1. Find the average of the Series 2, 5, 8, 11, 14. And Find the average if 17 is added at the end of the series.

Solution: Here you are provided with a series and the first thing you will do is start adding to find the average, but the trick in the question is you don't need to follow usual steps. Here apply you some logical reasoning observe that the series holds a pattern where each successive term is found by adding 3 to it. Thus making it an AP with a difference of 3.

And when you figure that you have an AP with 5 terms(odd) in the question you can directly answer without picking your pen that the middle term is your answer, i.e, 8 would be the Average of this series.

Coming to the second part of the question you are required to add a term in the series with a difference of 3 at the end and it is a successive term. Making the number of terms in the series even (2, 5, 8, 11, 14, 17) we would use the second shortcut which says find the average of middle 2 terms ((8+11)/2) i.e, 9.5.

Thus,

Average for the series 2, 5, 8, 11, 14 is 8

Average for the new series 2, 5, 8, 11, 14, 17 is 9.5

1. Data sufficiency questions in averages: “The questions would contain 2 or more statements. You have o find out where the data in those statements are sufficient to answer the question or not. After reading the statements give the answer:”

- A if statement in statement I is sufficient to answer the question while data in statement II alone is not sufficient to answer the question
- B if statement II is alone sufficient to answer the question while Statement I alone is not sufficient to answer the question
- C if data in either statement I or II alone is sufficient to answer the question
- D if data in both the statements are required together to answer the question
- E if Data in both the statement together is not sufficient to answer the question.

The average age of A, B, C, D is 32 years. Find the age of D.

Statement I: the sum of ages to A and B is 54 years

Statement II: C is 10 years older than D

Solution: Age of A and B = A+B = 54 years …eqn (i)

Sum of ages of A, B, C, D = A+B+C+D = 32*4 …eqn(ii)

Age of D = Age of C + 10 years => D=C+10 …eqn(iii)

Using the above 3 equations that came from statements I and II, we can answer the question but none of the statements alone is sufficient to answer the question. **Hence the answer would be D which says both the statements are required together to answer the question.**

Note: You don’t need to solve the whole question you just need to check where the statements lead you to a solution or some parameter is missing that leaves the question open-ended. You find the condition and answer it don’t engage your time in solving all equations.

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