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# Aptitude Made Simple

## Average

Various competitive examinations ask questions regularly based on Average. Average is one of the the important aspect which we see in each of our observation.

**Why average?**

When you plan to take bike/car you will see how much average that car will be giving, even you go for interview or placement you will be asked for average percentage of graduation degree.

When we know average, we get high level idea. Basically to make us capable of getting overall idea looking at data, average questions are asked in exams.

**Important formulae:**

1) Average $= \dfrac{\text{Sum of All Numbers}}{\text{Number Count}}$

2) Average speed when we travel from Source place A to B and come back from B to A [Assuming distance will be equal as source and destination A, B]

$$\frac{2xy}{x+y}$$

Where:

x speed from Source(A) to Destination (B)

y speed from Destination(B) to Source (A)

**Problem 1**

David obtained 76, 65, 82, 67, 85 marks out of 100 in English, Maths, Physics, Chemistry and Biology. What is average of his marks?

**Solution :**

$$\text{Average} = \frac{\text{Total of of All Marks}}{\text{Number CountNumber of Subjects}}$$

$$= \frac{76+65+82+67+85}{5}$$

$$= \frac{375}{5} = 75$$

**Answer is 75 marks**

**Problem 2**

A Student was asked to find arithmetic mean of numbers 3, 11, 7, 9, 15, 13, 8, 19, 7, 21, 14, x. He find mean to be 12. What should be number in place of x.

**Solution:**

Average is 12 and numbers count is also 12.

$$\text{Average} = \frac{\text{Sum of All Numbers}}{\text{Number Count}}$$

$$12 = \frac{13 +11+7+9+15+13+8+19+7+21+14+x}{12}$$

$$12 = \frac{137+x}{12}$$

$$137 + x = 144$$

$$x= 144 – 137 = 7$$

**Answer is 7**

**Problem 3**

What is Average of 50 natural numbers ?

**Solution :**

Sum of 1 to 50 (n natural numbers)

Sum of 1st n natural numbers $= \frac{n*(n+1)}{2}$

$= \frac{50*(50+1)}{2}$

$= \frac{50*(50+1)}{2}$

= 25* 51 = 1275

$\text{Average} = \frac{\text{Sum of All Numbers}}{\text{Number Count}}$

$\text{Average} = \frac{1275}{50} = \frac{255}{10}$

= 25.5

**Simple Tricks**

If you observe properly when you are identifying average of consecutive number:

$= \frac{\text{1st number} + \text{Last number}}{2}$

$= \frac{1 + 50}{2}$

= 25.5

**Answer is 25.5**

**Problem 4**

Average of weight if A, B, C is 45 kg. If average weight of A and B is 40 kg. Average weight of B and C is 43 kg. What is weight of B?

**Solution :**

Average weight of A, B and C is 45

$$\text{Average} = \frac{\text{Sum of All weights}}{\text{Person Count}}$$

$$45 = \frac{\text{Sum of All weights}}{3}$$

Total of weights of A +B + C = 45 * 3 = 135

A and B average weight is 40

So A + B = 40 * 2 = 80

B and C average weight is 43

So B + C = 43 * 2 = 86

To find value of B we should first get value of either C or A

A + B = (A+B+C) - C

80 = 135 - C

C = 55 kg

To get value of B we have to solve

B + C = 86

B + 55 = 86

B= 31 kg

**Answer is 31 kg**

**Problem 5**

Average of 50 numbers is 30. If 35 and 50 are removed from list what will be average of remaining numbers?

**Solution :**

As average of 50 numbers is 30

So Total of all numbers would be

50 * 30 = 1500

As 35 and 40 discarded total would we reduced by

35 + 40=75

New Total would be: 1500 – 75 = 1425

As 2 numbers removed, numbers count will be 28

$$\text{New Average} = \frac{\text{New Total}}{\text{New number Count}}$$

$$= \frac{1424}{28}$$

$$= 29.68$$

**Answer is 29.68**

**Problem 6**

Average of 11 numbers is 10.9. If average of 1st 6 numberd is 10.5 and that of last 6 numbers is 11.4. Find out middle number in series.

**Solution :**

$$\text{Average} = \frac{\text{Sum of All Numbers}}{\text{Number Count}}$$

$$10.9 = \frac{\text{Sum of All Numbers}}{11}$$

Total of all numbers = 10.9 * 11 = 119.9

1st 6 numbers average is 10.5

Total of 1st 6 numbers = 10.5 * 6 = 63

Last 6 numbers average is 11.4

Total of last 6 numbers = 11.4 * 6 = 68.4

Total of 12 numbers = Total of 1st 6 numbers + Total of last 6 numbers – Middle number

This is because as you can see middle number is common in both places and added twice.

| 1 | 2 | 3 | 4 | 5 | **6** | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1st 6 numbers** | | | | | | | | | | | |
| | | | | | **Last 6 numbers** | | | | | | |

119.9 = 63 + 68.4 – Middle number

Middle number = 131.4 – 119.9 = 11.5

**Answer is 11.5**

**Problem 7**

Average of 36 students in group 14 years. When teachers age is added to it average increases by 1. What is teacher's age?

**Solution :**

Average weight = $\frac{\text{Sum of All Weights}}{\text{Number of Students}}$

Sum of all weights = 36 * 14 = 504

Assume teacher’s weight x.

Once teacher’s age is added average is increased by 1.

New average = 15

New Person count = 37

Student + Teacher weight = New average * New count

504 + x = 15 * 37

x = 555 – 504 = 51

**Answer is Teacher’s age is 51 years**

**Problem 8**

In 50 Over ODI match, in 1st 10 overs of cricket game run rate was only 3.2 What should be run rate in remaining overs to reach target of 282?

**Solution :**

In 10 overs run rate was 3.2 runs

So total score after 10 overs = 10 * 3.2 = 32

Total target = 282 runs

Pending runs after 10 over = 282 – 32 = 250

Remaining overs = 50 – 10 = 40

$$\text{Required run rate} = \frac{\text{Remaining Runs}}{\text{Remaining Overs}}$$

$$= \frac{250}{40}$$

$$= 6.25$$

**Answer is Required run rate is 6.25**

**Problem 9**

Grocer has sale Rs 6435, Rs 6927, Rs 6855, Rs 7230, Rs 6562 for 5 consecutive months. How much should be in 6th month to have average sale is 6500?

**Solution :**

In order to get average sale for 6 month 6500 Rs.

Total of sales of 5 months = 6500 * 6 = 39000 Rs

Total of initial 5 months = 6435 + 6927 + 6855 + 7230 + 6562

= 34009

6th Month sales should be = Total sales – $1^{st}$ 5 month sales

= 39000 – 34009

= 4991

**Answer is $6^{th}$ month sale should be 4991 Rs**

**Problem 10**

Motorist travel 150 km away at average of 30 km/hr and returns at speed of 50 km/hr

His average speed is?

**Solution :**

Please don't confuse here with distance as it is not required at all.

Average speed when we travel from Source place A to B and come back from B to A [Assuming distance will be equal as source and destination A, B]

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

Where:

x speed from Source(A) to Destination (B)

y speed from Destination(B) to Source (A)

$$= \frac{2 * 30 * 50}{30 + 50}$$

$$= \frac{3000}{80}$$

= 37.5

**Answer is Average speed is 37.5 km/hr**

**Problem 11**

A cricketer has certain average of 10 innings in 11th inning he scored 108 runs thereby increasing average by 6 runs. His new average??

**Solution :**

We have last inning's score as 108 and total number of innings 11.

Let us assume x is original average

So new average is x + 6

Total of 1st 10 innings + 108 = 11 * New average

10 * x + 108 = 11 (x + 6)

10x + 108 = 11x + 66

x = 108 – 66 = 42

Old average is 42

New average = x + 6 = 42 + 6 = 48

**Answer is New average is 48**

**Problem12**

Average weight of 8 person is increases by 2.5 kg when new person comes in place of one of them weighs 65 kg. What might be weight of new number?

**Solution :**

Average weight of 8 person increased by 2.5 kg.

So Original total weight would increase by 8 * 2.5 = 20 Kg

In order to get total increase by 20 Kg, new person's weight should be more than 20 from old person

New person weight = old person weight + 20

New person weight = 65 + 20 = 85

**Answer is new person's weight is 85 Kg**

**Problem 13**

Average of 10 number is 7 if each number is multiplied by 12 then average of new number is

**Solution :**

Let us look at small example before we solve this:

Average of 1, 2, 3, 4, 5 will be 3

Let us multiply each number by 10

Average of 10, 20, 30, 40, 50 will be 30  [ 3 * 10 = 30 as all number multiplied by 10]

So you can observe if you multiply all number by common constant

Original average of 10 numbers is 7

If we multiply all numbers by 12, average would also will increase by 12

So new average = 7 * 12 = 84

**Answer is 84**

**Problem 14**

Average of 35 student is 16 years. Average of 21 students is 14 years

What is average age of remaining 14 students?

**Solution :**

35 student age average 16 years.

So total of 35 student ages = 35 * 16 = 460

21 students age average is 14 years

So total of 14 student ages = 21 * 14 = 294

We have to find average of pending 14 students

Total of ages of 35 students= Total of ages of 21 students +Total of ages of 14 students

460 = 294 + Total of Remaining 14 student ages

Total of remaining 14 student ages = 460 – 294 = 166

Average of 14 student ages = $\frac{\text{Total of remaining 14 student ages}}{14}$

$= \frac{166}{14}$

$= 19$

**Answer is average of remaining 14 students is 19 Years**