

MBA PIONEER 2024

QUANTITATIVE APTITUDE

DPP: 19

Average

- Q1** A student studied four subjects in his bachelor's degree. If the ratio of marks in subject A and B is $1 : 2$, in subject B and C is $2 : 5$ and in subject A and D is $1 : 4$. If she has scored an average of 84 marks in all the subjects combined. In how many subjects did she score equal to or greater than 60 marks?
- (A) 1 (B) 2
(C) 3 (D) 4
- Q2** There are 45 students in a hostel. If the number of students increases by 5, the expenses of the mess increases by Rs. 30 per day while the average mess expenditure per head(per day) diminishes by Rs. 2. Find the original expenditure of the mess.
- (A) Rs. 1180 (B) Rs. 1170
(C) Rs. 1190 (D) Rs. 1150
- Q3** In an office of 40 people, the average salary of class-A, class-B and class-C officer is Rs. 600, Rs. 750 and Rs. 1000 a day respectively and their ratio of strength is 5:4:1 respectively. Find the monthly average salary of an officer (in Rs.)? Assume the number of days in a month to be 30.
- (A) 21000 (B) 20000
(C) 22000 (D) 23000
- Q4** 12 years ago, there were 7 members in Arun's family & then the average age of the family was 28 years. His father died three years ago from present & then the average age of the family was 26 years. Then his father died at the age of
- (A) 101 years (B) 110 years
(C) 103 years (D) 105 years
- Q5** The average weight of three men A, B and C is 65 kg. Another man D joins the group and the average now becomes 68 kg. If another man E whose weight is 4 kg less than that of D, replaces A then the average weight of B, C, D and E becomes 67 kg. Find the weight of A?
- (A) 77 kg (B) 75 kg
(C) 72 kg (D) 78 kg
- Q6** The average age of 40 teachers in a school in 2007 was 35 years. In 2009, 10 teachers retired from the job, whose average age was 50 years. In 2012, 20 teachers joined the school, whose average age was 30 years. What was the total age of all the teachers in 2015 assuming that no teacher joined or left the school apart from the ones mentioned in the question?
- (A) 1820 years (B) 1920 years
(C) 1810 years (D) 1800 years
- Q7** The average age of ' x ' students in class 8 is $(x - 6)$ years. If two teachers whose age is 36 years and 40 years join the class, then the average age of people (including the teachers) in class 8 increases by 2 years. In class 9, there are $(x + 35)$ students out of which 25% are girls. In class 9, if the average age of each girl is 14 years and that of each boy is 16 years, then find the average age of each student in class 9.
- (A) 14.8 years (B) 15 years



- (C) 14.9 years (D) 15.5 years
- Q8** Average runs scored by Virat in 36 innings is 48 . Difference between highest and lowest scores scored by him is 151 and if these two innings are excluded then his overall average decreases by 3.5 . Find highest score scored by him.
 (A) 183 (B) 181
 (C) 189 (D) 187
- Q9** Present age of 'A' is 50% less than that of ' C ' , C's age in turn is 40% more than the present age of ' B ' . If the average of present ages of 'A' and ' C ' is 1.5 years more than the present age of ' B ' , then find the average present age of 'A', 'B' and 'C'.
 (A) 24 years (B) 25 years
 (C) 31 years (D) 30 years
- Q10** The average number of goals scored per match by a football player in matches where he was in the team of starting 11 is 1.5 and the average number of goals scored by the player in matches where he came on as a substitute is 0.5 . The player scored 390 goals more in matches where he was in the team of starting 11 than in matches in which he came on as a substitute. If he played 388 matches in total, find the average number of goals scored by the player per match?
 (A) 0.571 (B) 1.561
 (C) 0.533 (D) None of these
- Q11** The average number of students in each class of a school of classes up to 1 to 12 was 84 , in the previous year. In the present year, average number of new students who took admission up to class 5 was 18 and average number of students who left school up to class 5 was also 18 . If in this year the average number of students who left the school from class 6 to

class 12 was 12 and the present total number of students in school is 1116 then, find the total number of new students who took admission this year.

- (A) 281 (B) 282
 (C) 284 (D) 285
- Q12** Average salary of 36 employees in a company is Rs. 10,375 . Salary of an officer in the company is 125% more than the salary of a worker in the company. Find the salary of all the workers together, if the number of officers in the company is 40% more than the number of workers in the company.
 (A) Rs 82,000 (B) Rs 86,000
 (C) Rs 90,000 (D) Rs 94,000
- Q13** The average age of a family having five members is 42 years and the age of the oldest member of the family is 76 years. In the same year, a member whose age is 32 years married a girl whose age is 30 years and after marriage, the average age of the family (including the bride) reduced by 2 years. If ratio of the age of the rest of three members (other than the oldest member, member who got married and his bride) is 5 : 14 : 15, respectively then find the difference between the age of the oldest and the age of the youngest member.
 (A) 66 years (B) 51 years
 (C) 56 years (D) 61 years
- Q14** There are two groups of persons, *A* and *B*, and each group has 5 persons. The average age of persons of group *A* is 22 years while the average age of persons of group *B* is 19 years. A person Mohan from group *A* joins group *B* and then average age of group *A* becomes 24 years. Then, Rahim, a person from group *A* joins group *B* and the average age of group *B*



becomes 20 years. Now, a person Ram of group *B* joins group *A* and the average age of group *A* becomes 22 years then find the ratio of age of Ram to the age of Mohan?

- (A) 23 : 14
 (B) 22 : 15
 (C) 14 : 23
 (D) Cannot be determined

Q15 The average number of flights of Indigo, *AI* and Spicejet coming to Delhi airport is 250 . The total number of Indigo and Spicejet planes coming to Delhi airport is 600 . Find the average number of Indigo and AI planes coming to Delhi airport if the number of Spicejet planes coming to Delhi airport is twice the number of Indigo planes coming to Delhi airport.

- (A) 200 (B) 125
 (C) 175 (D) 150

Q16 The average of the income of 'A' in 2019 and 2020 is Rs. 40000 . He saves 25% of his income in 2019 such that his savings in both the years is same. If his expenditure in 2020 was equal to his average income of 2019 and 2020, then find the expenditure of 'A' in 2019.

- (A) Rs. 24000 (B) Rs. 32000
 (C) Rs. 28000 (D) Rs. 30000

Q17 There are 50 students in a class having equal number of girls and boys. 10 new boys and 10 new girls who have each scored equal number of marks are added to the class. The average marks of the boys in the class increases by 20% while the average marks of girls decreases by 20%. What was the ratio of the average marks scored by the boys and girls respectively before new students joined?

- (A) 3 : 17 (B) 5 : 19

- (C) 2 : 13 (D) 7 : 20

Q18 The average age (in years) of a group of people is twice the number of people in the group. A person, *X*, leaves the group and the average age is still twice the number of people in the group. Now another person, *Y*, leaves the group and the average age is still twice the number of people in the group. If the ratio of the ages of *X* and *Y* is 19 : 17, then find the average age of the group, if one more person, *Z*, of age 16 years, leaves the group.

- (A) 8 years (B) 11 years
 (C) 16 years (D) 28 years

Q19 Present ages of A and B are in the ratio 7: 5, respectively. Present ages of C and D are in the ratio 2: 3, respectively. Present average age of A, B and D is 36 years and the present average age of A, C and D is 34 years. Find the difference between the ages of A and D.

- (A) 3 years (B) 6 years
 (C) 9 years (D) 12 years

Q20 Total number of students in three sections 'A', 'B' and 'C' of class *V* is 120 . The average marks obtained by all the students in class *V* is 54.5 . Average marks obtained by students of section 'B' and 'C' taken together is $56\frac{2}{3}$ and average marks obtained by students of section 'A' is 48 . Find the number of students in section 'A'.

- (A) 40 (B) 30
 (C) 50 (D) 20

Q21 'A', 'B', 'C' and 'D' are four friends having distinct ages such that average age of three of them taken together is 43 years, 33 years, 38 years and 42 years. Find the difference between the age of the youngest and the oldest among the four friends.



- (A) 28 years (B) 24 years
(C) 32 years (D) 30 years

Q22 The average cost price of 3 articles 'A', 'B' and 'C' is Rs. 920 and the average cost price of articles 'A' and 'B' is Rs. 960. Cost price of article 'C' is 5% more than that of article 'A'. If articles 'A', 'B' and 'C' are sold at profit of 15%, loss of 10% and profit of Rs. 22, respectively, then find the average of their selling prices.

- (A) Rs 945 (B) Rs 930
(C) Rs 890 (D) Rs 875

Q23 A batsman scored runs with an average of ' $x + 45$ ' in ' $x - 20$ ' matches. In next 5 matches, he scored runs with an average of 60 due to which his overall average decreased by 5, Find the value of ' x '.

- (A) 40
(B) 60
(C) 50
(D) Can't be determined

Q24 The average weight of ' b ' boys in a group is 63kg . A boy whose weight is 147kg joins the group such that the average weight of the group becomes a prime number in between 65 and 91. Find the value of ' $b + 1$ '.

- (A) 14 (B) 25
(C) 18 (D) 21

Q25 MPs from 5 different parties A, B, C, D and E are present in the parliament. The average number of MPs from parties A and C is 100 and that from parties B and E is 90. The number of MPs from party B is 50 more than that of party C. The total number of MPs from parties A and E is 230. The number of MPs of party D is 20 more than that of party B. Find the total number of MPs from parties A, E and D.

- (A) 420 (B) 350

- (C) 280 (D) 400

Q26 A rocket needs a certain number of tests before launching, it is called Launch vehicle system tests. Let some scores be assigned to it after each test. Now, the average score increases by 1 if the first 5 tests are not considered, and decreases by 1 if the last 5 tests are not considered. If the average scores of the rocket for the first 5 and the last 5 tests are 40 and 60, respectively, then the total number of tests, the rocket needs to pass through is:

- (A) 50 (B) 55
(C) 58 (D) 60

Q27 In a hotel, total expenses are partly fixed and partly varying linearly with the number of customers. The average expense per customer is Rs. 1750, when there are 30 customers and Rs. 1450 when there are 55 customers. What is the average expense (in Rs.) per customer when there are 100 customers?

- (A) 1258 (B) 1288
(C) 1358 (D) 1368

Q28 There are 2 classes X and Y in a college. The average weight of the students in class X and class Y combined is 75kg . The average weight of students in class X is 45kg more than the average weight of students in class Y. Which of the following cannot be the ratio of the number of students in classes X and Y, if it is known that the average weights of both the classes are integers?

- (A) 8 : 1 (B) 1 : 2
(C) 1 : 5 (D) 2 : 1

Q29 Age of Smith is $\frac{13}{11}$ of the age of his younger brother Robert and Johnson is 8 years younger to Robert. If the ratio of ages of their father and mother is 10 : 9 and father is 46 years older



than Johnson. What is the average age of the father and mother if the average age of the five-member family is 35.2 years?

- (A) 50 (B) 55
(C) 57 (D) 60

Q30 In a school, the average weight of all the boys is 68 *kg* and that of all the girls is 52*kg*. For the school annual day, each male teacher is asked to coordinate the activities of exactly 13 boys and each female teacher is asked to coordinate the activities of exactly 12 girls such that no student remains uncoordinated. If the ratio of male to female teachers is 4 : 1, find the average weight of the students of the school (in *kg*).

- (A) 60 (B) 62
(C) 65 (D) 68



Answer Key

Q1 (B)
Q2 (B)
Q3 (A)
Q4 (C)
Q5 (A)
Q6 (A)
Q7 (D)
Q8 (A)
Q9 (C)
Q10 (D)
Q11 (B)
Q12 (C)
Q13 (D)
Q14 (A)
Q15 (C)

Q16 (A)
Q17 (A)
Q18 (C)
Q19 (B)
Q20 (B)
Q21 (D)
Q22 (B)
Q23 (D)
Q24 (D)
Q25 (B)
Q26 (B)
Q27 (B)
Q28 (C)
Q29 (C)
Q30 (C)



Hints & Solutions

Q1 Text Solution:

Topic - Averages

$$A : B = 1 : 2$$

$$B : C = 2 : 5$$

$$A : D = 1 : 4$$

$$\text{Thus, } A : B : C : D = 1 : 2 : 5 : 4$$

$$\frac{(x + 2x + 5x + 4x)}{4} = \frac{12x}{4} = 3x = 84$$

Therefore, $x = 28$

Marks in subject $A = 28$

Marks in subject $B = 56$

Marks in subject $C = 140$

Marks in subject $D = 112$

Therefore, the student scored equal to or more than 60 marks in only two subjects.

Hence, option b is correct.

Q2 Text Solution:

Let the average expenditure per student per day be Rs. x .

then total expenditure per day = $45x$ new total

expenditure per day = Rs. $(45x + 30)$ new

average expenditure = $x - 2$

$$\text{given, } \frac{(45x+30)}{50} = x - 2$$

$$\text{thus, } x = 26$$

Now original expenditure of the mess
= $45 \times 26 = \text{Rs. } 1170$

Hence, option b is correct.

Q3 Text Solution:

$$\text{Average salary} = \frac{\text{total salary}}{\text{total strength}}$$

$$\text{No. of class A officers} = \frac{5}{10} \times 40 = 20$$

$$\text{No. of class B officers} = \frac{4}{10} \times 40 = 16$$

No. of class C officers 4

Average salary

$$= \frac{(600 \times 20 + 750 \times 16 + 1000 \times 4)}{40} \\ = \text{Rs. } 700$$

Average monthly salary = $700 \times 30 = \text{Rs. } 21000$

Hence, option a is correct.

Q4 Text Solution:

Let father's present age in case the father did not die be x years

Then 3 years ago, it would have been $(x - 3)$ years & 12 years ago, it would have been $(x - 12)$ years

At the time of death of Arun's father, average age of the family of 6 members was 26 years.

So, total age of the family at that time
 $26 \times 6 = 156$ years 12 years ago, that is 9 years before the death of his father, total age of these 6 members will get reduced by
 $9 \times 6 = 54$

So, total age of the family excluding his father 12 years ago from now = $156 - 54 = 102$

Average age of the family 12 years ago

$$\begin{aligned} & \left(\begin{array}{l} \text{Age of father} \\ + \text{total age of other members} \end{array} \right) \\ &= \frac{\quad}{7} = 28 \end{aligned}$$

So, $\frac{((x-12)+102)}{7} = 28$, on solving this we get,
 $x = 106$ years

This would have been Arun's father present age.

He died three years ago, so at the time of his death, Arun's father's age would have been
 $106 - 3 = 103$ years

Q5 Text Solution:



Total weight of A, B and C is $(65 \times 3) = 195\text{kg}$

Total weight of A, B, C and D is $(68 \times 4) = 272\text{kg}$ Weight of

$D = (272 - 195) = 77\text{kg}$ Weight of

$E = 77 - 4 = 73\text{kg}$

Total weight of B, C, D and

$E = (67 \times 4) = 268\text{kg}$ Total weight of B, C

and $D = 268 - 73 = 195\text{kg}$ Weight of

$A = (272 - 195) = 77\text{kg}$.

Hence, option (a) is correct.

Q6 Text Solution:

Average age of all 40 teachers in 2007 = 35

Average age of all 40 teachers in 2009 = 37

Total age of 40 teachers in 2009 = $37 \times 40 = 1480$

Total age of 10 teachers who left in 2009 = 500

Total age of 30 teachers in 2009 = $1480 - 500 = 980$

Total age of 30 teachers in 2012 = $980 + 30 \times 3$

$$= 1070$$

Total age of 20 new teachers in

2012 = 20×30

$$= 600$$

Total age of 50 teachers in 2012 = $1070 + 600$

$$= 1670$$

Total age of 50 teachers in 2015

$$= 1670 + 50 \times 3 = 1820$$

Hence, option a is correct.

(d)

Q7 Text Solution:

According to the question,

$$x \times (x - 6) + 36 + 40 = (x + 2)(x - 6 + 2)$$

$$\text{Or, } x^2 - 6x + 76 = x^2 + 2x - 4x - 8$$

$$\text{Or, } 76 + 8 = -2x + 6x$$

$$\text{Or, } 4x = 84$$

$$\text{Or, } x = 21$$

Required number of students in class 8 = 21

Therefore, number of students in class 9

$$= x + 35 = 56 \text{ years}$$

Number of girls in class 9 = $0.25 \times 56 = 14$

years Number of boys in class

9 = $56 - 14 = 42$ years Required average

$$= \frac{\{(14 \times 14) + (42 \times 16)\}}{56} = \frac{(196 + 672)}{56}$$

$$= \frac{868}{56}$$

$$= 15.5 \text{ years}$$

Hence, option d is correct.

Q8 Text Solution:

Let highest and lowest scores scored by Virat be 'H' and 'L' respectively.

Total runs scored by Virat in 36 innings

$$= 36 \times 48 = 1728$$

Total runs scored by Virat in 34 innings

$$= 34 \times 44.5 = 1513$$

$$\text{So, } H + L = 1728 - 1513 = 215$$

$$\text{And, } H - L = 151$$

$$\text{So, } H = \frac{(215+151)}{2} = 183$$

Hence, option a is correct.

Q9 Text Solution:

Topic - Averages

Let the present age of 'B' be ' $2x$ ' years.

So, present age of 'C' = $2x \times 1.4 = 2.8x$



years

And, present age of 'A' = $2.8x \div 2 = 1.4x$

years

According to the question ;

$$(2.8x + 1.4x) \div 2 = 2x + 1.5$$

$$\text{Or, } 4 \cdot 2x = 4x + 3$$

$$\text{Or, } 0.2x = 3$$

$$\text{So, } x = 15$$

$$\begin{aligned} \text{Required average} &= (1.4x + 2x + 2.8x) \div 3 \\ &= 6.2x \div 3 \end{aligned}$$

$$= (6.2 \times 15) \div 3 = 31 \text{ years}$$

Hence, option c is correct.

Q10 Text Solution:

Let the number of matches in which the player was in the team of starting 11 be x and the matches in which the player came on as a substitute be y . Thus $x + y = 388$ --- (1)

Number of goals scored in matches in which the player was in the team of starting 11

$$= \text{Average} \times \text{number of matches} = 1.5x$$

Number of goals scored in matches in which he came on as a substitute = $0.5y$

$$\text{Thus, } 1.5x = 0.5y + 390 \text{--- (2)}$$

Solving both equations for x and y , we have $x = 292$ and $y = 96$.

So, the total number of goals scored by the player = $1.5 \times 292 + 0.5 \times 96 = 486$ goals.

Therefore, average number of goals scored per match = $486 \div 388 = 1.253$

Hence option d is correct.

Q11 Text Solution:

Number of students earlier = $12 \times 84 = 1008$

Number of students left the school
= $7 \times 12 + 5 \times 18 = 84 + 90 = 174$

Number of students taken admission in class 1 to 5 = $18 \times 5 = 90$

So, number of students taken admission in class 6 to 12 = $1116 - (1008 + 90 - 174) = 192$

Therefore, total new admission
= $90 + 192 = 282$ Hence, option b is correct.

Q12 Text Solution:

Let the number of workers in the company be ' x '. So, the number of officers in the company

$$\begin{aligned} &= 1.4x = 36 - x \\ 2.4x &= 36 \end{aligned}$$

$$x = 15$$

So, there are 15 workers and 21 officers in the company.

Let the salary of a worker in the company be Rs. ' y '.

So, the salary of an officer in the company = Rs. $2.25y$

According to question: $15y + 2.25y \times 21$

$$\begin{aligned} &= 36 \times 10375 \\ 15y + 47.25y &= 373500 \\ 62.25y &= 373500 \\ y &= 6000 \end{aligned}$$

So, the salary of all the workers in the company together = $15 \times 6000 = \text{Rs. } 90,000$

Hence, option c is correct.

Q13 Text Solution:

Sum of the age of the members before marriage = $42 \times 5 = 210$ years

Sum of the age of the members after marriage
= $40 \times 6 = 240$ years

Let, the age of the rest three members be



$5x$, $14x$, and $15x$, respectively.

Sum of the age of the rest three members
 $= 240 - (76 + 32 + 30) = 102$ years
 So, $34x = 102$

$$x = 3$$

Age of the youngest member $= 5 \times 3 = 15$ years

Required difference $= 76 - 15 = 61$ years

Hence, option d is correct.

Q14 Text Solution:

Sum of total age of 5 persons of group
 $A = 22 \times 5 = 110$ years

Sum of total age of 5 persons of group
 $B = 19 \times 5 = 95$ years

Case 1:-

Mohan joins group B

Resultant total age of persons of group
 $A = 24 \times 4 = 96$ years

Age of Mohan $= 110 - 96 = 14$ years

Case 2:-

Rahim joins group B from group A

Sum of age of persons of group
 $B = 20 \times 7 = 140$

Age of Rahim $= 140 - (95 + 14) = 31$ years

Sum of age of person of group
 $A = 96 - 31 = 65$ years

Case 3:-

Ram joins group A

Sum of total age of person of group
 $A = 22 \times 4 = 88$ years

Age of Ram $= 88 - 65 = 23$ years

Required ratio $= 23 : 14$

Hence, option a is correct.

Q15 Text Solution:

Let the number of Indigo, AI and Spicejet planes be a , b and c , respectively.

According to the question,

$$(a + b + c) = 250 \times 3 = 750$$

$$(a + c) = 600$$

Therefore, $b = 750 - 600 = 150$

Also, $a + 2a = 600$

Or, $3a = 600$

Or, $a = 200$

Therefore, average number of Indigo and AI plane

$$= \frac{(200 + 150)}{2} = 175$$

Hence, option c is correct.

Q16 Text Solution:

Sum of incomes of 'A' in 2019 and 2020
 $= 2 \times 40000 = \text{Rs. } 80000$

Let the income of 'A' in 2019 be Rs. x
 Therefore, his income in 2020 $= \text{Rs. } (80000 - x)$
 Savings of 'A' in given two years $= \text{Rs. } 0.25x$ each According to the question,

$$0.25x = 80000 - x - 40000$$

$$\text{Or, } 0.25x = 40000 - x$$

$$\text{Or, } 1.25x = 40000$$

$$\text{Or, } x = 32000$$

Therefore, expenditure of 'A' in 2019 $= 0.75x = \text{Rs. } 24000$

Hence, option a is correct.

Q17 Text Solution:

Let the average marks scored by the initial 25 boys be a and the average marks scored by the initial 25 girls be b and the average marks scored by the new students be c

$$25a + 10c = 35 \times 1.2a = 42a$$



$$\begin{aligned}\Rightarrow 10c &= 17a \dots\dots\dots (1) \\ 25b + 10c &= 35 \times .8b = 28b \\ \Rightarrow 10c &= 3b \dots\dots\dots (2)\end{aligned}$$

Equating equation (1) and (2), we get $17a = 3b$
 $\frac{a}{b} = \frac{3}{17}$ or $a : b = 3 : 17$
Hence, option a is correct.

Q18 Text Solution:

Let, initial no. of people in the group be ' n '.
Let $19x$ and $17x$ be ages of X and Y respectively, According to the question,

$$2n^2 - 19x = 2(n - 1)^2$$

$$\text{And } 2n^2 - 19x - 17x = 2(n - 2)^2$$

$$2n^2 - 36x = 2(n - 2)^2$$

Solving (i) and (ii),
Hence, option c is correct.

$$x = 2, n = 10$$

Average age of group after Z leaves the group

$$\begin{aligned}&= \frac{2 \times 10^2 - 19 \times 2 - 17 \times 2 - 16}{10 - 3} = \frac{112}{7} \\ &= 16 \text{ years}\end{aligned}$$

Q19 Text Solution:

Let the present ages of A and B are $7x$ years and $5x$ years respectively
Let the present ages of C and D are $2y$ years and $3y$ years respectively
According to question:

$$\begin{aligned}7x + 5x + 3y &= 36 \times 3 \\ 12x + 3y &= 108 \\ 4x + y &= 36\end{aligned}$$

$$\text{Also, } 7x + 2y + 3y = 34 \times 3$$

$$7x + 5y = 102$$

On solving both the equations, we get $X = 6$ and $y = 12$

$$\text{Present age of } A = 7 \times 6 = 42 \text{ years}$$

$$\text{Present age of } D = 3 \times 12 = 36 \text{ years}$$

$$\text{So, the desired difference} = 42 - 36 = 6 \text{ years}$$

Hence, option b is correct.

Q20 Text Solution:

Let total number of students in section ' A ' be ' x '
Number of students in section ' B ' and ' C ' together = $120 - x$

$$\text{So, } 48 \times x + (120 - x) \times \frac{170}{3} = 120 \times 54.5$$

$$\text{Or, } 48x + \frac{20400}{3} - \frac{170x}{3} = 6540$$

$$\text{Or, } \frac{26x}{3} = 260$$

$$\text{Or, } x = 30$$

Hence, option b is correct.

Q21 Text Solution:

Let ages of ' A ', ' B ', ' C ' and ' D ' be ' a ' years, ' b ' years, ' c ' years and ' d ' years, respectively such that $a > b > c > d$ as they all have distinct ages.

Thus we have,

$$a + b + c = 43 \times 3 = 129 \text{ (Equation 1)}$$

$$a + b + d = 42 \times 3 = 126 \text{ (Equation 2)}$$

$$a + c + d = 38 \times 3 = 114 \text{ (Equation 3)}$$

$$b + c + d = 33 \times 3 = 99 \text{ (Equation 4)}$$

$$\text{(Equation 1) - (Equation 4)}$$

$$a - d = 30 \text{ years}$$

Q22 Text Solution:

Sum of cost price of articles ' A ', ' B ' and ' C '

$$= 920 \times 3 = \text{Rs. } 2,760$$



Sum of cost price of articles 'A' and 'B'

$$= 960 \times 2 = \text{Rs. } 1,920$$

So, cost price of article 'C' = $2760 - 1920 = \text{Rs. } 840$

Cost price of article 'A' = $840 \div 1.05 = \text{Rs. } 800$

So, cost price of article 'B' = $1920 - 800$

$$= \text{Rs. } 1,120$$

Selling price of article 'A' = $800 \times 1.15 = \text{Rs. } 920$

Selling price of article 'B' = $1120 \times 0.9 = \text{Rs. } 1008$

Selling price of article 'C' = $840 + 22 = \text{Rs. } 862$

So, average of the selling prices of articles 'A', 'B' and 'C' = $(920 + 1008 + 862) \div 3 = \text{Rs. } 930$

Hence, option b is correct.

Q23 Text Solution:

According to question;

$$\frac{\{(x-20)(x+45) + 60 \times 5\}}{(x-20+5)} = (x+45-5)$$

$$(x-20)(x+45) + 300 = (x+40)(x-15)$$

$$x^2 + 25x - 900 + 300 = x^2 + 25x - 600$$

$$-600 = -600$$

Hence, option d is correct.

Q24 Text Solution:

Sum of the weights of 'b' students = $63b \text{ kg}$

After the new boy joins the group

Sum of the weights of $(b+1)$ boys = $(63b + 147)$

kg

Therefore, new average weight of the group

$$= \frac{(63b + 147)}{(b+1)} = \frac{(63b + 63 + 84)}{(b+1)}$$

$$= \left\{ \frac{63(b+1)}{(b+1)} \right\} + \frac{84}{(b+1)}$$

$$= 63 + \frac{84}{(b+1)}$$

Since, the new average weight is an integer; therefore $(b+1)$ should be factor of 84

Let $b+1 = 2$, then new average weight of the group

$$= 63 + \left(\frac{84}{2} \right) = 105 \text{ (not possible)}$$

Let $b+1 = 4$, then new average weight of the group = $63 + \left(\frac{84}{4} \right) = 84$ (not a prime number)

Let $b+1 = 6$, then new average weight of the group = $63 + \left(\frac{84}{6} \right) = 77$ (not a prime number)

Let $b+1 = 7$, then new average weight of the group = $63 + \left(\frac{84}{7} \right) = 75$ (not a prime number)

Let $b+1 = 12$, then new average weight of the group = $63 + \left(\frac{84}{12} \right) = 70$ (not a prime number)

Let $b+1 = 14$, then new average weight of the group = $63 + \left(\frac{84}{14} \right) = 69$ (not a prime number)

Let $b+1 = 21$, then new average weight of the group = $63 + \left(\frac{84}{21} \right) = 67$ (possible)

Let $b+1 = 42$, then new average weight of the group = $63 + \left(\frac{84}{42} \right) = 65$ (not possible)

Next all factors will give average less than 70

Therefore, only possible number of students = $b+1 = 21$

Hence, option d is correct.

Q25 Text Solution:



Let there are a , b , c , d , and e number of MPs are there from A, B, C, D and E respectively.

According to the question,

$$\frac{(a+c)}{2} = 100$$

$$\text{Or, } a+c = 200$$

$$\frac{(b+e)}{2} = 90$$

$$\text{Or, } b+e = 180$$

Adding equation (1) and (2)

$$a+c+b+e = 380$$

$$b-c = 50$$

Adding equation (3) and (4), we get

$$a+2b+e = 430$$

$$\text{Or, } 2b = 430 - 230 \text{ (Since, } a+e = 230)$$

$$\text{Or, } 2b = 200$$

$$\text{Or, } b = 100$$

$$c = 100 - 50 = 50$$

$$a = 200 - 50 = 150$$

$$e = 180 - 100 = 80$$

$$d = b + 20 = 120$$

Total number of MPs from A, E and D
 $= 150 + 80$

$$+120 = 350$$

Hence, option b is correct.

Q26 Text Solution:

Let there be ' n ' tests and the overall Average score be k .

$$\text{Average } (n) = k \Rightarrow \text{Total scores} = nk$$

So, when we ignore the first 5 tests,

$$\text{Average } (n-5) = k+1$$

Similarly, if we ignore the last 5 tests,

$$\text{Average (first } (n-5)) = k-1$$

It is given that when the first 5 tests are not considered, the overall average increases by 1 (Each test carries 40 points)

$$kn - 200 = (k+1)(n-5)$$

Similarly, If the last 5 tests are not considered, the overall average decreases by 1 (Each test carries 60 points)

$$kn - 300 = (k-1)(n-5)$$

Solving (1) and (2), we get

$$kn - 200 = (k+1)(n-5)$$

$$(-)$$

$$kn - 300 = (k-1)(n-5)$$

$$100 = 2(n-5)$$

$$50 = n-5$$

$$n = 55 \text{ tests}$$

Q27 Text Solution:

Let's assume that Fixed expenses = x

Variable expenses = y

$$\text{Then, } x + 30y = 1750 \times 30$$

$$x + 30y = 52500$$

$$x + 55y = 1450 \times 55$$

$$x + 55y = 79750 \dots$$

Subtracting equation (i) from equation (ii)

$$25 \times y = 27250$$

$$y = 1090$$

putting the value of y in equation (i)

$$30 \times 1090 + x = 52500$$

$$x = 52500 - 32700 = 19,800$$

According to the question;

$$\text{Total expenses of 100 customers} = x + 100y$$

$$\text{Therefore, average expenses} = \frac{(x+100y)}{100}$$

$$\Rightarrow \frac{(x+100y)}{100} = \frac{[(19800+(100 \times 1090))]}{100} = 1288$$

Q28 Text Solution:



Let the number of students in class X and class Y be a and b respectively.

We know that the average weight of both the classes combined is 75kg .

Total weight of the 2 classes combined
 $= 75(a + b) = 75a + 75b$

The average weight of class X is 45kg more than the average weight of class Y.

Let the average weight of class Y be ' x '.

Total weight of the 2 classes combined

$$= (x + 45)a + xb$$

Combining (1) and (2), we get,

$$75a + 75b = (x + 45)a + xb$$

$$75a + 75b = xa + 45a + xb$$

$$75a - 45a - xa = xb - 75b$$

$$30a - xa = xb - 75b$$

$$a(30 - x) = b(x - 75)$$

$$\frac{a}{b} = \frac{(x - 75)}{(30 - x)}$$

It has been given that x is an integer.

Option A:

$$\frac{(x - 75)}{(30 - x)} = \frac{8}{1}$$

$$x - 75 = 240 - 8x$$

$$9x = 315$$

$$x = 35$$

Option B:

$$\frac{(x - 75)}{(30 - x)} = \frac{1}{2}$$

$$2x - 150 = 30 - x$$

$$3x = 180$$

$$x = 60$$

Option D:

$$\frac{(x - 75)}{(30 - x)} = \frac{2}{1}$$

$$x - 75 = 60 - 2x$$

$$3x = 135$$

$$x = 45$$

Option C:

$$\frac{(x - 75)}{(30 - x)} = \frac{1}{5}$$

$$5x - 375 = 30 - x$$

$$6x = 405$$

$$x = 67.5$$

Q29 Text Solution:

Let the age of Smith and Robert is $13x$ and $11x$ respectively.

Age of Johnson = $(11x - 8)$

Age of their father

$$= 11x - 8 + 46 = (11x + 38)$$

Age of their mother

$$= (11x + 38) \times \left(\frac{9}{10}\right) = (9.9x + 34.2)$$

Average age of the family

$$\frac{[(13x) + (11x) + (11x - 8) + (11x + 38) + (9.8x + 34.2)]}{5}$$

$$= 35.2$$

$$\Rightarrow 55.9x = 111.8$$

$$\Rightarrow x = 2$$

Required average



$$\begin{aligned}
 &= \frac{[(11x + 38) + (9.9x + 34.2)]}{2} \\
 &= \frac{[(20.9 \times 2) + 72.2]}{2} = \frac{114}{2} \\
 &= 57 \text{ years}
 \end{aligned}$$

Q30 Text Solution:

In the given school, the average weight of the boys = 68 kg and the average weight of the girls = 52 kg

To find the average weight of all the students, we need to know the ratio of girls to boys.

Since 13 boys are coordinated by 1 male teacher and 12 girls by one female teacher. Also the ratio of male to female teachers = 4 : 1

Thus the ratio of boys to girls = $(4 \times 13) : (1 \times 12)$
 $= 13 : 3$

Hence the average weight of the students

$$= \frac{68 \times 13 + 52 \times 3}{13 + 3}$$

= 65 kg, the required answer.



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