

# MBA PIONEER 2024

## QUANTITATIVE APTITUDE

DPP: 2

### Linear Equations - 2

**Q1** Solve the following equation

$$\frac{3x}{5} - x = -1 - \frac{3x}{10}$$

- (A) 10 (B) 11  
(C) 12 (D) 13

**Q2** Solve the simultaneous equations and write the value  $x + y$ .

$$x - (2x + 1) = 8 - (3y + 3), \quad x - (2y + 1) = 8 - (3x + 3)$$

**Q3** Number of solutions  $(x, y)$  of the following system of equations is:

$$3x = 8 + 6y$$

$$x - 2y = 2.$$

- (A) No Solutions  
(B) Exactly one  
(C) Exactly Two  
(D) Infinitely many

**Q4** In the following equation,  $a$  is a constant. Determine the value of  $a$  for which the equation has no solution.

$$-5 + ax = 3x - 9(1 - x)$$

**Q5** In the following system of equations,  $m, n$  are constants. If the system has infinitely many solutions, then find the value of  $m$ .

$$5x - 2y = m$$

$$-15x + ny = -4$$

- (A)  $\frac{5}{2}$   
(B)  $\frac{7}{4}$   
(C)  $\frac{4}{3}$   
(D)  $\frac{10}{7}$

**Q6** The ratio of age of Nipen and Bhupen 10 years back is 2 : 3. After 10 years the ratio becomes 6 : 7. Bhupen had his first child at the age of 24 years, then what will be Nipen's age when Bhupen's son will be as old as Bhupen's present age (in years)?

- (A) 40 (B) 41  
(C) 42 (D) 44

**Q7** Bulbul, Ashwani, Sahev and Sounak who went to a watch a movie Pathan. They found that there were only two tickets available at the counter and they bought them. For purchasing the remaining two tickets, they had to pay Rs 40 more than the actual price for each ticket. At the end, they found that each person, on an average, had spent Rs 100 for the ticket as his/her share. Find the actual price (in Rs) of each ticket.

- (A) 60 (B) 70  
(C) 90 (D) 80

**Q8** If  $a + 2b + 3c + 4b + 5e = 30$ ; where  $a, b, c, d, e$  are distinct natural numbers. Then, find the number of solutions.

- (A) 2 (B) 3  
(C) 1 (D) 0

**Q9** If  $5a + 3b = 18$ , and  $b$  is greater than 4, where  $a$  and  $b$  are natural numbers, then how many solutions does the equation have?

- (A) 0 (B) 1  
(C) 2 (D) 3



- Q10** Rahul, who is Sumit's elder brother, found that the sum of thrice of his age and twice of Sumi's age is a prime number. If both Rahul and Sumit's age are prime numbers and none of them greater than 10 and less than 3 years then find Rahul's age.  
 (A) 5  
 (B) 7  
 (C) Both option A & B are possible  
 (D) None of them
- Q11** The price of 37 pens and 17 pencils and 5 erasers is \$150. If the price of each of the pen, pencil and eraser are positive integers and the price of a pen is more than that of an eraser, then find the combined price of 1 pen, 1 pencil and 1 eraser.  
 (A) 5 (B) 6  
 (C) 2 (D) 10
- Q12** For an India vs Pakistan T20 match tickets are getting distributed from the ticket counter in front of Eden Garden. People started queuing up from 4 AM for the tickets and 100 people joined the queue every minute from 4 AM till 4 PM. After 4 PM no one is allowed to line up in the queue. The counter which distributes tickets opens at 11:30 AM closes by 5:30 PM. In the ticket counter there are some BCCI officials who distribute tickets to the people who are in the line. Each official can distribute 2 tickets per minute. How many BCCI officials need to be stationed to make sure that all the people who are in the line get tickets?  
 (A) 60 (B) 80  
 (C) 100 (D) 120
- Q13** In a casino game, if a player can drop a ball into the desired number slot, he will get \$150, and if fail, he will lost \$300. He dropped 110 balls and earned a total of \$7500. How many times did he fail to drop the ball into the desired slot?  
 (A) 20 (B) 50  
 (C) 70 (D) 90
- Q14** A barrack is currently home to some soldiers and the food supply there will last them for 90 days. After 12 days, a platoon of additional 600 soldiers arrives without any food supplies. Now the food supplies will last for 72 days. How many soldiers were there originally at the barrack?  
 (A) 2400 (B) 7200  
 (C) 3600 (D) 9600
- Q15** The present age of Rani is  $\frac{1}{4}$ th of her father's present age. Rani's father's age will be twice of Smita's age after 8 years. If Smita's tenth birthday was celebrated two years ago, then what is Rani's present age?  
 (A) 6 years (B) 12 years  
 (C) 8 years (D) 9 years
- Q16** 1000 chocolates are to be distributed among the students of a class. It was observed that when some students were given 3 chocolates each and the remaining students were given 4 chocolates each, then 3 chocolates remained. What can be the maximum number of students in the class?  
 (A) 331  
 (B) 332  
 (C) 333  
 (D) Insufficient data
- Q17** Even though the local gems shop owner engaged 4 guards to secure his precious gems, a burglar broke in and robbed several gems. On his way out, the burglar approached each guard one by one. To each, he gave 50% of the gems he had then, and 4 more besides. He ran



away with two valuable gems. How many did he steal originally?

- (A) 32 (B) 72  
(C) 148 (D) 152

**Q18** There are some white balls, red balls, black balls and green balls in a box. If all the green balls are taken out of the box, the number of balls in the box are reduced by half. If half of the red balls is equal to one-third of black balls, twice the number of red and black balls put together is 4 more than three times the black balls, and half of white balls is equal to one-third of green balls then find the number of green balls.

- (A) 100 (B) 60  
(C) 80 (D) 50

**Q19** In an examination, the total number of questions is 50. Albert scored 36 marks in the test. What is the minimum number of questions that he can answer incorrectly if a correct answer, an incorrect and un-attempted question fetches him +1,  $-1/3$  and  $-1/4$  marks respectively?

- (A) 2 (B) 3  
(C) 5 (D) 7

**Q20** How many positive integral pairs of (x, y) satisfy the following equation?

$$\frac{1}{x} + \frac{2}{y} = \frac{1}{6}$$

- (A) 10 (B) 11  
(C) 12 (D) 13

**Q21** In a college, the number of students in the four sections of a class are 42, 48, x and 80. In an examination conducted for them, one-sixth of the boys and one-fourth of the girls failed. If girls and boys have failed in equal numbers and 46 more boys have passed than girls, find the

value of x. Assume all the students wrote the exam.

- (A) 56 (B) 58  
(C) 60 (D) 62

**Q22** Anushka has some coins with her. She wants to distribute these coins amongst her 3 grandchildren. She distributes these coins to her grandchildren on the basis of their respective ages (that is the elder one gets before the younger one). To start, the first one gets 5 more than half of the total number of coins. The second one gets 5 more than half the remaining number of coins. Similarly, the third one gets 5 more than half the remaining number of coins. In the end, Anushka is left with no coins. Find the initial number of coins with Anushka.

- (A) 50 (B) 60  
(C) 70 (D) 80

**Q23** If  $7x + 10y + 13z = 221$ , and  $5x + 9y + 13z = 195$ , then find the value of  $10(x + y + z)$ .

- (A) 210 (B) 220  
(C) 230 (D) 240

**Q24** If  $2x + 5y + 8z = 320$  and  $4x + 17y + 16z = 850$ , then find the value of  $6x + 19y + 24z$ .

- (A) 1024 (B) 1040  
(C) 1072 (D) 1080

**Q25** Five years ago, the ages of the members of a family of four people added up to 128 years. Two years later, one member died at the age of 40 years and a child was born during the same year. After another two years, one more member died at 40, and a child was born during the same year. The current average age of this four-member family is :

- (A) 32 (B) 17  
(C) 34 (D) 16



- Q26**  $x$ ,  $y$  and  $z$  are three coins of different denominations in rupees which satisfy the following three equations:

$$100x + 50y + 25z = 87.5$$

$$80x + 70y + 30z = 105$$

$$90x + 40y + 40z = 82.5$$

Find the value of  $(x + y + z)$  in paise.

- (A) 170 (B) 175  
(C) 130 (D) 180

- Q27** Clint Barton, while preparing for his role in the next Avengers movie, takes part in an archery contest where he shoots 298 arrows. According to the rules of the contest,

- (i) He wins 5 coins every time he hits the Bull's eye.  
(ii) Every time he misses the target completely, he loses 3 coins and  
(iii) If he hits the target but not the Bull's eye, he loses 1 coin.

At the end of the game, it is found that Clint has 202 coins, then the number of times he would have missed the target completely cannot be less than \_\_\_\_\_.

- Q28** In a factory three types of products P, Q and R are manufactured. All workers employed in the factory are equally efficient. In one hour, 100 workers can produce 80 P's, 160 Q's, 120 R's. In two hours, 75 workers can produce 125 P's, 140 Q's and 180 R's. In three hours, 150 workers can produce 150 P's, 'X' Q's and 540 R's. What is the value of 'X'?

- (A) 4920 (B) 79  
(C) 110 (D) 4500

- Q29** Sahev, who has \$19 with him, is planning to watch the movie Pathan with his friend Ashwani. Sahev and Ashwani took a cab and reached the cinema hall where they purchased

2 tickets and 2 packs of popcorn. Sahev also purchased 4 chocolates for his nephew. After all these spendings Sahev has \$0 with him. If the cab fare, price of each ticket, chocolate and price of each popcorn are positive distinct integers then find what will be the total cost that Bulbul will incur who purchased 3 tickets and 3 packs of popcorn and 1 chocolate.

- (A) 15 (B) 16  
(C) 17 (D) 18

- Q30** The average age of Mr. & Mrs. Kim (when they have just married) was 24 years. After their 1st and 2nd children (twins) were born, the average age of the family became  $\frac{9}{16}$  times the average age of their parents while marriage. The average age of the family just after 3rd child was born becomes  $\frac{22}{45}$  times the average age of their parents when they just gave birth of twins. The average age of the family after the 4th child was born becomes 66.67% of the age of their parents when they just got married. The current average age of the family is 19 years. What is the current age of the twins?

- (A) 11 years (B) 12 years  
(C) 14 years (D) 15 years



## Answer Key

Q1 (A)  
Q2 6  
Q3 (A)  
Q4 12  
Q5 (C)  
Q6 (D)  
Q7 (D)  
Q8 (D)  
Q9 (A)  
Q10 (B)  
Q11 (B)  
Q12 (C)  
Q13 (A)  
Q14 (B)  
Q15 (C)

Q16 (B)  
Q17 (D)  
Q18 (B)  
Q19 (B)  
Q20 (C)  
Q21 (C)  
Q22 (C)  
Q23 (C)  
Q24 (D)  
Q25 (B)  
Q26 (B)  
Q27 2  
Q28 (A)  
Q29 (B)  
Q30 (B)



## Hints & Solutions

### Q1 Text Solution:

$$\begin{aligned}\frac{3x}{5} - x &= -1 - \frac{3x}{10} \\ \Rightarrow \frac{3x}{5} + \frac{3x}{10} - x &= -1 \\ \Rightarrow \frac{6x + 3x - 10x}{10} &= -1 \\ \Rightarrow \frac{9x - 10x}{10} &= -1 \\ \Rightarrow -\frac{x}{10} &= -1 \\ \Rightarrow x &= 10\end{aligned}$$

### Q2 Text Solution:

$$x - (2x + 1) = 8 - (3y + 3) \dots\dots (i)$$

$$x - (2y + 1) = 8 - (3x + 3) \dots\dots$$

(ii)

Solving the equation (i) for x, we get

$$x = 3y - 6 \dots\dots (iii)$$

Using (iii) in (ii) we get

$$\begin{aligned}3y - 6 - (2y + 1) &= 8 - \\ &[3(3y - 6) + 3]\end{aligned}$$

$$y - 7 = -9y + 23$$

Further solving for y, we get

$$y = 3$$

Hence, from (iii), we get

$$x = 3$$

$$\text{Hence, } x + y = 3 + 3 = 6.$$

### Q3 Text Solution:

$$3x = 8 + 6y$$

$$\Rightarrow 3x - 6y = 8 \dots\dots (i)$$

$$x - 2y = 2 \dots\dots (ii)$$

Multiply both sides of (ii) by 3 we get

$$3x - 6y = 6 \dots\dots (iii)$$

From equation (i) and (iii) we get

$$8 = 6, \text{ which is a false statement.}$$

Hence, the system has no solution.

Thus, option (A) is correct.

### Q4 Text Solution:

The given equation is

$$-5 + ax = 3x - 9(1 - x)$$

$$-5 + ax = 3x - 9 + 9x$$

$$-5 + ax = 12x - 9$$

$$ax - 5 = 12x - 9$$

$$ax - 12x = -4$$

$$x = \frac{-4}{(a - 12)}$$

at  $a = 12$  the system of equations becomes undefined.

### Q5 Text Solution:

The given equations are

$$5x - 2y = m \dots\dots (i)$$

$$-15x + ny = -4 \dots\dots (ii)$$

Multiply the equation (i) by -3 we get

$$-15x + 6y = -3m$$

$$-15x + ny = -4$$

Since these two equations are equivalent and have the same coefficient of x, the coefficients of y and the constants on the right-hand side must also be the same. Thus,  $n = 6$  and  $-3m = -4$

Therefore, the value of m is  $\frac{4}{3}$ .

Thus, option (C) is the correct answer.

### Q6 Text Solution:

Let us assume that Nipen's age 10 years back is  $2x$ .

So, Bhupen's age 10 years back is  $3x$ .

$$\text{So, } \frac{2x + 20}{3x + 20} = \frac{6}{7}$$

$$\Rightarrow 14x + 140 = 18x + 120$$

$$\Rightarrow 4x = 20$$

$$\Rightarrow x = 5$$

So, Nipen's current age is  $(2x + 10) = (2 \times 5 + 10) = 20$  years

Bhupen's current age is  $(3x + 10) = (3 \times 5 + 10) = 25$  years



Bhupen's child is 24 years younger than Bhupen.  
So, Bhupen's child is  $(24 - 5) = 19$  years younger than Nipen.

So, when Bhupen's child is 25 years old, Nipen's age will be

$(25 + 19)$  Years = 44 Years.

**Q7 Text Solution:**

Let the counter price of each ticket be  $x$

Cost of 2 counter tickets =  $2x$

Cost of 2 extra tickets =  $2(x + 40)$

Total amount =  $4x + 80$

Total money they spent =  $4 \times 100 = 400$

By the problem,

$4x + 80 = 400$

Or,  $x = 80$

Therefore, the actual price of each ticket is Rs 80.

**Q8 Text Solution:**

$a + 2b + 3c + 4b + 5e = 30$ ; where  $a, b, c, d, e$  are distinct natural numbers.

Let us first try to understand what will be the least value that  $(a + 2b + 3c + 4b + 5e)$  can assume. If the minimum value of  $(a + 2b + 3c + 4d + 5e)$  is more than 30 then we can not have any solutions.

In order to find out the minimum value of  $(a + 2b + 3c + 4b + 5e)$  we need to make sure that the least value gets multiplied with the highest coefficient so that the product stays minimum.

So, in the term  $5e$ , we can assume the least value that  $e$  can assume, which is 1.

So,  $e = 1$ .

Similarly,  $d = 2$  as  $e = 1$  and  $d$  can not be the same as  $e$ .

$c = 3; b = 4; a = 5$ .

The minimum value of  
 $a + 2b + 3c + 4b + 5e$   
 $= (1 \times 5) + (2 \times 4) + (3 \times 3) + (4 \times 2)$   
 $+ (5 \times 1)$   
 $= 35$

As the minimum value of  $(a + 2b + 3c + 4b + 5e)$  is more than 30. No solution is possible.

**Q9 Text Solution:**

The given equation is  $5a + 3b = 18$ .

Now, since  $b > 4$ ,  $a$  and  $b$  are natural numbers, then

For  $b = 5, a = \frac{18-3 \times 5}{5} = \frac{3}{5}$ , which is not a natural number.

For  $b = 6, a = \frac{18-3 \times 6}{5} = 0$ , which is not a natural number.

For  $b = 7, a = \frac{18-3 \times 7}{5} = -\frac{3}{5}$ , which is not a natural number.

For  $b = 8, a = \frac{18-3 \times 8}{5} = -\frac{6}{5}$ , which is not a natural number.

i.e., for  $b > 6, a \leq 0$ .

Hence, the given equation has no solution.

**Q10 Text Solution:**

Let us assume that Rahul's age is " $r$ " and that of Sumit's is " $s$ ".

The possible values that Sumit can assume as his age are 3 & 5

The possible values that Rahul can assume as his age are 5 & 7 respectively as Rahul is older than Sumit.

Given that -

Twice of Sumit's age ( $2s$ ) + Thrice of Rahul's age ( $3r$ ) = Prime number

Now let us see if Sumit's age is 3 and Rahul's age is 5;

Then,

$3 \times 5 + 2 \times 3 = 21$  (not a prime number)





Now let us see if Sumit's age is 3 and Rahul's age is 7;

Then,

$$3 \times 7 + 2 \times 3 = 27 \text{ (not a prime number)}$$

Now let us see if Sumit's age is 5 and Rahul's age is 7;

Then,

$$3 \times 7 + 2 \times 5 = 31 \text{ (prime number).}$$

Hence, Rahul's age is 7 years.

#### Q11 Text Solution:

Let the price of a pen is \$x and that of a pencil is \$y and the price of an eraser is \$z.

So,

$$37x + 17y + 5z = 150$$

x can assume the below values as  $37x < 150$

a)  $x = 1$  (Not possible as  $x > z$ )

b)  $x = 2$

c)  $x = 3$

d)  $x = 4$

$x = 4$  is not possible as  $\$37 \times 4 = \$148$  which will give no room for purchasing 17 pencils and 5 erasers.

If  $x = 2$ , then  $17y + 5z = (150 - 74) = 76$

If  $x = 2$  and  $z = 1$  as that is the only possible option.

So,

$$17y = 71$$

This is not possible as y is an integer.

If  $x = 3$ , then  $17y + 5z = (150 - 111) = 39$

If  $x = 3$  and  $z = 1$

$$\text{Then } 17y = 34$$

$$\text{So, } y = 2$$

This is possible

Now let us see another combination-

If  $x = 3$  and  $z = 2$ ,

$$\text{Then } 17y = 29$$

This is not possible as y is an integer.

Hence,  $x = 3$ ,  $y = 2$  and  $z = 1$ .

Therefore, the combined price of 1 pen, 1 pencil and 1 eraser

$$= 3 + 2 + 1$$

$$= 6$$

#### Q12 Text Solution:

Total number of people who are in the line = (Number of new people who lined up in every minute)  $\times$  (Total duration for which the people are allowed to line up in minutes)

$$= (100) \times (4 \text{ PM} - 4 \text{ AM}) \times 60$$

$$= 100 \times 12 \times 60$$

$$= 72000.$$

Let us assume that n number of people are needed to distribute all the tickets so that all these 72000 people get tickets.

So,

$$n \times 2 \times (5:30 \text{ PM} - 11:30 \text{ AM}) \times 60 = 72000$$

$$\Rightarrow n \times 2 \times 6 \times 60 = 72000$$

$$\Rightarrow n \times 720 = 72000$$

$$\Rightarrow n = 100$$

Hence, 100 BCCI officials are needed to distribute tickets.

#### Q13 Text Solution:

Let he dropped a ball into the desired number slot x times.

Then, he misses the target  $(110 - x)$  times.

So, AQT,

$$150x - (110 - x)300 = 7500$$

$$450x - 33000 = 7500$$

$$450x = 40500$$

$$x = 90$$

Hence, he fails  $(110 - 90) = 20$  times.

#### Q14 Text Solution:

Suppose there were 'x' soldiers in the barrack initially.

Let's say one soldier eats 1 unit of food per day.





$$\text{So, } 12x + (x + 600) \times 72 = 90x$$

Solving this, we get  $x = 7200$ .

Hence, option B is correct.

**Q15 Text Solution:**

Let the present age of the father be  $x$  years.

	Rani	Father	Smita
Present Age	$x/4$	$x$	12
8 years later		$x + 8$	20

Now according to the given condition in the question

Father's age after 8 years = 2 × Smita's age after 8 years

$$x + 8 = 2 \times 20$$

$$x = 32 \text{ years.}$$

$$\therefore \text{Rani's present age} = 32/4 = 8 \text{ years}$$

**Q16 Text Solution:**

Let the number of students who received 3 and 4 chocolates be  $m$  and  $n$  respectively.

We need to maximize  $m + n$

$$\text{We have } 3m + 4n + 3 = 1000, 3m + 4n = 997$$

$$3m + 3n + n = 997$$

$$3(m+n) + n = 997$$

If  $n = 1$ , then  $3(m + n)$  will have the maximum possible value (996)

$$\text{So, the maximum possible value of } (m + n) = 996 \div 3 = 332$$

**Q17 Text Solution:**

Let the number of gems the burglar has before he approaches the fourth guard is  $x$ .

$$x - x \times 50\% - 4 = 2$$

$$x - \frac{x}{2} - 4 = 2$$

$$\Rightarrow x = 12$$

Number of gems before met with third guard is,

$$(12 + 4) \times 2 = 32$$

Number of gems before second guard is

$$(32 + 4) \times 2 = 72.$$

Number of gems before first guard is

$$(72 + 4) \times 2 = 152.$$

**Q18 Text Solution:**

Let the number of balls be  $2x$ .

$$\text{White} + \text{Red} + \text{Black} + \text{Green} = 2x \dots\dots (1)$$

$$\text{Green Balls} = x$$

$$\text{Also, } \frac{\text{Red}}{2} = \frac{\text{Black}}{3} \dots\dots (2)$$

$$2(\text{Red} + \text{Black}) = 3(\text{Black}) + 4 \dots\dots (3)$$

$$\frac{\text{White}}{2} = \frac{\text{Green}}{3}$$

$$\text{So, White} = \frac{2x}{3} \dots\dots (4)$$

Solving (2) and (3) we get

$$\text{Red} = 8, \text{Black} = 12.$$

Now, from (1) and (4) we get

$$\frac{2x}{3} + 8 + 12 + x = 2x$$

$$x = 60$$

$$\text{Green balls} = 60.$$

**Q19 Text Solution:**

Let the number of correct, incorrect and unattempted questions be  $x$ ,  $y$  and  $z$  respectively.

$$\text{Thus, } x + y + z = 50 \dots\dots (i)$$

$$x - \frac{y}{3} - \frac{z}{4} = 36 \dots\dots (ii)$$

Equation (i)  $\times 3$  + Equation (ii)  $\times 12$  gives

$$3x + 3y + 3z = 150$$

$$12x - 4y - 3z = 432$$

$$15x - y = 582 \dots\dots (iii)$$

$$y = 15x - 582$$

Now, we need to find the multiple of 15 just above 582 i.e., 585

$$\text{Thus, } y = 3$$

Hence, option B is the correct answer.

**Q20 Text Solution:**

The given equation is  $\frac{1}{x} + \frac{2}{y} = \frac{1}{6}$

$$\text{Or, } \frac{y+2x}{xy} = \frac{1}{6}$$

$$6y + 12x = xy$$

$$xy - 12x - 6y = 0$$



$$x(y - 12) - 6(y - 12) = 72$$

$$(x - 6)(y - 12) = 72$$

So, we have to write 72 as a product of two factors.

Then, 72 can be written as  $72 \times 1$ ,  $36 \times 2$ ,  $24 \times 3$ ,  $18 \times 4$ ,  $12 \times 6$  and  $9 \times 8$ .

So, possible  $(x, y)$  pairs become 12.

Thus, there are 12 positive integral pairs of  $(x, y)$  which are possible.

Hence, option C.

### Q21 Text Solution:

The total number of students in the four sections

$$= 42 + 48 + x + 80$$

$$= 170 + x$$

Let the number of boys and girls in the class be B and G respectively i.e.,  $B + G = 170 + x$ .

Let the number of boys who passed and failed be Bp and Bf respectively and the number of girls who passed and failed be Gp and Gf respectively.

Given,  $Bp - Gp = 46$  Also  $Bf = \frac{1}{6}$  of B and  $Gf = \frac{1}{4}$  of G

$$\text{Given } Bf = Gf, \frac{B}{6} = \frac{G}{4} \rightarrow \frac{B}{G} = \frac{3}{2}$$

$$\frac{B+G}{B-G} = 5 \text{ (componendo and dividendo)}$$

$$\text{But } B - G = (Bp + Bf) - (Gp + Gf) = Bp - Gp$$

$$(\text{Since } Bf = Gf) = 46$$

$$\text{Hence, } \frac{B+G}{46} = 5$$

$$170 + x = 230$$

$$\text{Hence, } x = 60.$$

### Q22 Text Solution:

Let the initial number of coins with Anushka be  $2x$ .

We can tabulate the transactions as:

	Anushka	1 <sup>st</sup> grandchild	2 <sup>nd</sup> grandchild	3 <sup>rd</sup> grandchild	Remaining.
Start	$2x$	$x + 5$			$2x - (x + 5) = x - 5$
Step 1	$x - 5 = 2y$		$y + 5$		$2y - (y + 5) = y - 5$
Step 2	$y - 5 = 2z$			$z + 5$	$2z - (z + 5) = z - 5$

$$\text{Given, } z - 5 = 0$$

$$\text{So, } z = 5$$

$$\text{Thus, } y - 5 = 2z$$

$$\text{Or, } y = 2z + 5$$

$$\text{Or, } y = (2 \times 5) + 5$$

$$\text{Or, } y = 15$$

$$\text{So, } x - 5 = 2y$$

$$\text{Or, } x = 2y + 5$$

$$\text{Or, } x = (2 \times 15) + 5$$

$$\text{Or, } x = 35$$

Thus, the initial number of coins

$$= 2x$$

$$= 2(35)$$

$$= 70$$

Therefore, the initial number of coins with Anushka is 70.

### Q23 Text Solution:

$$7x + 10y + 13z = 221 \dots\dots\dots (i)$$

$$5x + 9y + 13z = 195 \dots\dots\dots (ii)$$

If we observe closely,

7, 10 and 13 increases by 3 each time, and

5, 9 and 13 increases by 4 each time.

So, multiplying (1) by 4 and (2) by 3 we get,

$$28x + 40y + 52z = 4(221) \dots\dots\dots (iii)$$

$$15x + 27y + 39z = 3(195) \dots\dots\dots (iv)$$

Subtracting (iv) from (iii), we get

$$13x + 13y + 13z = 299$$

$$\text{or, } x + y + z = 23$$

$$10(x + y + z) = 10(23) = 230$$

### Q24 Text Solution:

Given that,



$$2x + 5y + 8z = 320 \dots\dots\dots(1)$$

$$4x + 17y + 16z = 850 \dots\dots\dots$$

... (2)

Multiplying equation (1) with 2 and then subtract it from equation (2),

$$(4x + 17y + 16z) - 2(2x + 5y + 8z)$$

$$= 850 - 640$$

$$\Rightarrow 4x + 17y + 16z - 4x - 10y - 16z = 210$$

$$\Rightarrow 7y = 210$$

$$\Rightarrow y = 30$$

Now we need to find the value of,

$$6x + 19y + 24z$$

$$= 6x + 15y + 24z + 4y$$

$$= 3(2x + 5y + 8z) + 4y$$

$$= 3(320) + 4(30)$$

$$= 960 + 120 = 1080$$

#### Q25 Text Solution:

The sum of the ages of the members of the family five years ago

$$= 128$$

$\therefore$  The sum of the ages of the members of the family three years ago

$$= 128 + (4 \times 2) - 40 = 96$$

$\therefore$  The sum of the ages of the members of the family one year ago

$$= 96 + (4 \times 2) - 40 = 64$$

$\therefore$  The sum of the ages of the members of the family now

$$= 64 + (4 \times 1) = 68$$

$$\therefore \text{Required average} = \frac{68}{4} = 17$$

Hence, Option B is correct.

#### Q26 Text Solution:

$$100x + 50y + 25z = 87.5 \dots (i)$$

$$80x + 70y + 30z = 105 \dots (ii)$$

$$90x + 40y + 40z = 82.5 \dots (iii)$$

1) Multiply equation (i) by  $\frac{6}{5}$  & subtracting (ii) from (i)

$$\text{we get, } 40x - 10y = 0$$

$$\text{or } 4x - y = 0 \dots (iv)$$

2) Multiply equation (i) by  $\frac{8}{5}$  & subtracting (iii) from (i)

$$\text{we get, } 70x + 40y = 57.5$$

$$\text{or } 7x + 4y = 5.75 \dots (v)$$

By solving, we get  $x = 0.25$  &  $y = 1$ .

Substituting in (i), we get  $z = 0.5$

so,

$$x + y + z = 0.25 + 1 + 0.5 = 1.75$$

$$= 175$$

paise

Hence, [b] is correct.

#### Q27 Text Solution:

Let, P be no. of times Bull's eye is hit.

Q be no. of times the target is missed.

R be no. of times target is hit but NOT Bull's eye.

Total shots were taken = 298 shots

According to Question:  $P + Q + R = 298$  -----

(i)

Given, Total score = 202 points

According to Question:  $5P - 3Q - R = 202$  -----

(ii)

Adding both (i) & (ii) and Eliminating R:

$$6P - 2Q = 500$$

$$\Rightarrow Q = 3P - 250$$

Note: Neither P nor Q can be negative. Thus.

The minimum value of Q is 2 when P is 84. For

every other value of P, Q is either more than 2 or

is negative. The minimum possible value of Q is

2.

#### Q28 Text Solution:

Let each worker put in 1 unit of work per hour.

Let, it takes p, q and r units of work to produce

one unit of the products P, Q and R respectively.

So,  $100 = 80p + 160q + 120r \dots (i)$

$150 = 125p + 140q + 180r \dots (ii)$



$$450 = 150p + Xq + 540r \dots (iii)$$

Solving for (1.5 (i) - (ii)) gives the relation,

$$p = 20q.$$

Substituting,  $p = 20q$  in (3 (ii) - (iii))

We get,  $X = 4920$ .

### Q29 Text Solution:

Let us assume that the below-

Item	Price/Unit (\$)
Cab	a
Movie Ticket	b
Popcorn	c
Chocolate	d

So,

$$a + 2b + 2c + 4d = 19$$

Here a, b, c, d are all distinct integers.

Let us try to find out the minimum value that  $(a + 2b + 2c + 4d)$  can assume.

Minimum value of a, b, c & d will be 1, 2, 3 & 4 but not in that order.

To minimize  $a + 2b + 2c + 4d$  we need to make sure that lower number gets multiplied with higher coefficient.

So,

$$\begin{aligned} \text{Minimum value of } (a + 2b + 2c + 4d) \\ = a + 2(b + c) + 4d = 4 + 2(2 + 3) + 4 \times 1 \\ = 18 \end{aligned}$$

So,  $a + 2b + 2c + 4d = 19$  is possible where  $a = 5$  and as b, c, and d are integers.

$$\text{So, } (b + c) = 5; d = 1$$

Hence, Bulbul will incur a total cost of  $3(b + c) + d = \$(3 \times 5 + 1) = \$16$

### Q30 Text Solution:

Total age of the parents when they got married  
 $= 24 \times 2 = 48$  years

When the twins were born total age of the family is  $= 4 \times (24 \times \frac{9}{16}) = 54$  years.

So, the twins were born after  $\frac{54 - 48}{2} = 3$  years of their parents' marriage.

When the 3rd child was born the average age of the family

$$= \frac{22}{45} \times (24 + 3) = \frac{66}{5}.$$

The total age of the family when the 3rd child was born  $= (\frac{66}{5} \times 5) = 66$  years

So, the 3rd child was born  $\frac{66 - 54}{4} = 3$  years after the twins were born.

When the fourth child was born the average age of the family

$$= (24 \times \frac{2}{3}) = 16 \text{ years}$$

The total age of the family when the fourth child was born

$$= 16 \times 6 \text{ years} = 96 \text{ years.}$$

Hence, the 4th child was born after  $\frac{96 - 66}{5} = 6$  years after 3rd child.

Now, the average age of the family is 19 years.

So, the age of the 5th child  $= (19 - 16) \text{ years} = 3$  years.

The age of the twins  $= 3 + 6 + 3 = 12$  years.

