MBA Fastrack 2025 (CAT + OMETs)

QUANTITATIVE APTITUDE

DPP: 1

Equation - 1

Q1 The solution of the below system of equations is (x, y, z). Then, find the value of $\left(\frac{x}{y}+\frac{y}{z}-\frac{z}{x}\right)$.

$\frac{1}{x}-\frac{1}{y}=0$

$\frac{3}{x}+\frac{2}{y}-\frac{5}{z}=\frac{1}{6}$

$\frac{1}{y}+\frac{1}{z}=\frac{1}{6}$

(A) $\frac{19}{6}$
(B) $\frac{7}{6}$
(C) $\frac{5}{6}$
(D) $\frac{1}{6}$

Q2 Find the value of (b + ac) by using the following system of equations.

$ab+bc+ca=3$

$a+b+c=10$

$a+6b+c=0$

Q3 Nine years ago, the age of a Banyan tree was three times that of a Baobab tree. Twelve years from now, the age of the Banyan tree will be twice the age of the Baobab tree. After how many years from now will their combined age be 126 years?

Q4 Solve the simultaneous equations and write the value $\mathbf{x}+\mathbf{y}$.

$\mathbf{x}-(2\mathbf{x}+1)=8-(3\mathbf{y}+3)$,

$\mathbf{x}-(2\mathbf{y}+1)=8-(3\mathbf{x}+3)$

Q5 Ramesh went to a shop to buy a ceiling fan. The shopkeeper showed him a few samples of two varieties. Variety A had three blades each, and Variety B had four blades each. The number of samples of Variety A was three more than twice the number of samples of Variety B. If there were 89 blades in total, then how many samples did the shopkeeper show him?

Q6 Each of the four parties – P, Q, R and S, contested in all the seats in an election. Each seat was won by exactly one of the four parties. Party P lost on 20 seats, Party Q lost on 12 seats, Party R lost on 11 seats and Party S lost on 17 seats. What was the total number of seats being contested in the election?

(A) 57
(B) 38
(C) 20
(D) 26

Q7 For the below system of equations, find the respective values of x and y:

$\frac{6}{x+y}-\frac{1}{x-y}=12$

$\frac{3}{x+y}-\frac{2}{x-y}=-12$

(A) $\frac{1}{3}, \frac{1}{6}$
(B) $\frac{1}{3}, -\frac{1}{12}$
(C) $\frac{1}{6}, \frac{1}{12}$
(D) $\frac{1}{12}, -\frac{3}{4}$

Q8 Two teams, X and Y, have 37 players each consisting of males and females. If eight female players from team X move to team Y, then the number of female players in both teams would interchange. Instead, if two female players move from team Y to team X, then the number of female players in team X would be twice the original number of female players in team Y. What is the total number of male players combining two teams?

Q9 In four hours, the printing machine A produces six booklets more than what machine B produces in two hours. In seven hours, machine A produces seven booklets less than what machine B produces in six hours. How many booklets can machine A produce in ten hours?

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

Q10 Marty went to a betting club with some money. In each round that he played, he first tripled the amount he had at that time by withdrawing additional funds from his bank account and then ended up giving ₹p to his opponent at the end of each round. After four rounds, Marty had no money left. If the amount he gave to his opponent in each round was ₹30.75 more than what he initially started with, then with how much money (in ₹) in hand Marty went to the betting club.

(A) 25 (B) 30
(C) 35 (D) 40

Q11 Benny, Rinny, and Miny are planning to buy some apples, oranges, and bananas from a fruit shop. They decide to buy these fruits together from the same shop but in different quantities. Benny buys 2 apples, 3 oranges, and 1 banana, which costs him ₹35. Rinny buys 7 apples, 1 orange, and 5 bananas, which costs her ₹62. Miny buys 3 apples, 2 oranges, and 2 bananas, which costs him ₹37. Find the combined price of 4 apples and 3 bananas (in ₹).

(A) 24 (B) 32
(C) 84 (D) 96

Q12 If 7x - 7y - 4z = 62 and 42x - 7y - 24z = 127, then find the value of y.

(A) - 3 (B) - 5
(C) - 7 (D) - 11

Q13 If 4x - 3y + 7z = 31 and 3x + 7y - 3z = - 62, then find the value of 25x - 28y + 52z.

Q14 In the following system of equations, k is a non-zero constant. Find the value of $\frac{6x+8y+8z}{8y}$.

$$6x + 8y + 8z = k$$
$$9x + 4y + 12z = \frac{4k}{3}$$

(A) 12 (B) 8
(C) 6 (D) 4

Q15 Using the following system of equations, find the value of c.

4a - 2b + c - 2d = 19
b + c + d + f - 1 = 0
2a + c + f = 8

Q16 If Mayank buys 3 burgers, 2 pizzas, and 4 sandwiches, his total expenditure is ₹260. If he buys 7 burgers, 4 pizzas, and 2 sandwiches, his total expenditure is ₹390. How much will Mayank pay in total (in ₹) if he wants to buy 5 burgers, 3 pizzas, and 3 sandwiches?

(A) 375 (B) 350
(C) 325 (D) 300

Q17 The cost of 4 pairs of socks and 7 scarves is ₹304, the cost of 9 hats and 2 scarves is ₹199, and the cost of 9 gloves and 5 pairs of socks is ₹190. Find the total cost (in ₹) of 1 scarf, 1 pair of socks, 1 hat, and 1 glove.

(A) 78 (B) 77
(C) 76 (D) 75

Q18 A barrack is currently home to some soldiers and the food supply there will last 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 more days. How many soldiers were there originally at the barrack?

(A) 2400 (B) 7200
(C) 3600 (D) 9600

Q19 If the solution (x, y) to the equation 7x + 9y = 126 are positive integers, then find the value of $x + y^2 + x^3$.

(A) 787 (B) 777
(C) 767 (D) 757

Q20 In a hardware store, the cost of three screws, seven nails, and eleven bolts is ₹67. The cost of seven screws, ten nails, and thirteen bolts is ₹93. What is the total cost of one screw, one nail, and one bolt (in ₹)?

Q21 Ramen went to a bakery to buy a total of 40 items consisting of only cupcakes, cookies, and pastries. He bought at most 15 of each. If the price of each cupcake is ₹3, each cookie is ₹5, and each pastry is ₹7, find the maximum amount (in ₹) that Ramen could have spent at the bakery.

Q22 If $\mathrm{a} + 2\mathrm{b} + 3\mathrm{c} + 4\mathrm{d} + 5\mathrm{e} = 30$; where $\mathrm{a}, \mathrm{b}, \mathrm{c}, \mathrm{d}, \mathrm{e}$ are distinct natural numbers. Then, find the number of solutions to the given equation

Q23 If $5\mathrm{a} + 3\mathrm{b} = 18$, where a and b are non-negative integers, then how many solutions does the equation have?

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

Q24 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?

Q25 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 $+1, -\frac{1}{3}$ and $-\frac{1}{4}$ marks respectively?

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

Q26 If $2\mathrm{x} + 5\mathrm{y} + 8\mathrm{z} = 320$ and $4\mathrm{x} + 17\mathrm{y} + 16\mathrm{z} = 850$, then find the value of $6\mathrm{x} + 19\mathrm{y} + 24\mathrm{z}$.

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

Q27 Sahev, who has USD 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 movie tickets and 2 packets of popcorn. Sahev also purchased 4 chocolates for his nephew. After all these spendings, Sahev had USD 0 with him. If the cab fare, price of each movie ticket, each chocolate and each packet of popcorn are distinct positive integers, then find the total cost (in USD) that Bulbul will incur who purchased 3 movie tickets, 3 packets of popcorn and 1 chocolate.

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

Q28 Find the number of possible positive integer pairs of (x, y) that satisfy the equation $\frac{1}{x} + \frac{1}{y} = \frac{1}{20}, \left(x > y\right)$.

(A) 15 (B) 14
(C) 7 (D) 8

Q29 Three friends—Amit, Rahul, and Sunil—had some marbles. Amit gives one-third of his marbles to Rahul, who then gives one-third of what he now has to Sunil. Sunil gives one-third of what he now has to Amit, who now has exactly the same number of marbles he started with. If $\frac{1}{9}$ times Amit's initial number of marbles is 1 more than $\frac{1}{8}$ times Sunil's initial number of marbles, how many marbles did Rahul start with?

(A) 12 (B) 17
(C) 24 (D) 34

Q30 A three-digit number is 9 times the two-digit number formed by placing the hundreds and units digits of the three-digit number in the tens and units places, respectively, of the two-digit number. If the sum of the tens digit and the hundreds digit of the three-digit number is 4, then what is the digit in its units place?

Answer Key

Q1	D
Q2	25
Q3	12
Q4	6
Q5	27
Q6	C
Q7	C
Q8	46
Q9	D
Q10	B
Q11	B
Q12	C
Q13	279
Q14	C
Q15	5
Q16	C
Q17	B
Q18	B
Q19	A
Q20	9
Q21	210
Q22	0
Q23	C
Q24	332
Q25	B
Q26	D
Q27	B
Q28	C
Q29	C
Q30	5

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

The given system of equations is:

$\frac{1}{x}-\frac{1}{y}=0\ldots(i)$

$\frac{3}{x}+\frac{2}{y}-\frac{5}{z}=\frac{1}{6}\ldots(ii)$

$\frac{1}{y}+\frac{1}{z}=\frac{1}{6}\ldots(iii)$

From (i), we get

$\frac{1}{x}=\frac{1}{y}\Rightarrow x=y$

So, from (ii), we get

$\frac{3}{x}+\frac{2}{y}-\frac{5}{z}=\frac{1}{6}$

$\frac{3}{y}+\frac{2}{y}-\frac{5}{z}=\frac{1}{6}$

$\frac{5}{y}-\frac{5}{z}=\frac{1}{6}\ldots(iv)$

Now, let's use the Elimination method to solve equations (iii) and (iv). Multiply equation (iii) by 5 and add with (iv).

$\frac{5}{y}+\frac{5}{z}=\frac{5}{6}$

$\frac{5}{y}-\frac{5}{z}=\frac{1}{6}$

$\Rightarrow\frac{10}{y}=1$

$\Rightarrow y=10$

i.e., x = y = 10.

Substitute y = 10 into equation (iii) and solve for z.

$\frac{1}{10}+\frac{1}{z}=\frac{1}{6}$

$\frac{1}{z}=\frac{1}{6}-\frac{1}{10}$

$\frac{1}{z}=\frac{5-3}{30}=\frac{2}{30}=\frac{1}{15}$

$\Rightarrow z=15$

Thus,

$\left(\frac{x}{y}+\frac{y}{z}-\frac{z}{x}\right)=\frac{10}{10}+\frac{10}{15}-\frac{15}{10}=1+\frac{2}{3}-\frac{3}{2}=\frac{6+4-9}{6}=\frac{1}{6}$

Video Solution:

Q2 Text Solution:

The given system of equations is:

$ab+bc+ca=3\ldots(i)$

$a+b+c=10\ldots(ii)$

$a+6b+c=0\ldots(iii)$

Rewriting equation (iii), we get

$a+6b+c=0$

$\Rightarrow a+c=-6b\ldots(iv)$

Using equation (iv) and (ii), we get

$-6b+b=10$

$-5b=10$

$b=\frac{10}{-5}=-2\ldots(v)$

So, using (iv) and (v), we get

$a+c=12$ ...(vi)

Using equations (i), (v) and (vi) we get

$ab+bc+ca=3$

$b(a+c)+ca=3$

$(-2)(12)+ca=3$

$ca=27\ldots(vii)$

So, the value of (b + ac) = - 2 + 27 = 25

Video Solution:

Q3 Text Solution:

Let the nine years ago, the ages of the Banyan tree and the Baobab tree were x and y years respectively.

Nine years ago, the age of a Banyan tree was three times that of a Baobab tree.
So, x = 3y ...(i)
Therefore, the present ages of the Banyan tree and the Baobab tree are (x + 9) and (y + 9) years respectively.
Now, twelve years from now, the age of the Banyan tree will be two times the age of the Baobab tree.
Therefore, x + 9 + 12 = 2(y + 9 + 12)
i.e., x + 21 = 2y + 42
i.e., x - 2y = 21 ...(ii)
Using (i) and (ii), we have
3y - 2y = 21
i.e., y = 21
Therefore, from (i), x = 3(21) = 63 years
So, the present age of the Banyan tree = 63 + 9 = 72 years and the present age of Baobab tree = 21 + 9 = 30 years.
Now, let after m years from the present, their combined age will be 126 years.
So, we have
(72 + m) + (30 + m) = 126
102 + 2m = 126
2m = 24
m = 12 years.

Video Solution:

Q4 Text Solution:

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

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

Solving the equation (i) for x, we get

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

Using (iii) in (ii) we get

$3y - 6 - (2y + 1) = 8 - [3(3y - 6) + 3]$

$y - 7 = -9y + 23$

Further solving for y, we get

$y = 3$

Hence, from (iii), we get

$x = 3$

Hence, $x + y = 3 + 3 = 6.$

Video Solution:

Q5 Text Solution:

Let the number of samples of Variety A be x, and that of Variety B be y.
Then, x = 2y + 3 .... (i)
As Variety A has three blades each and Variety B has four blades each, the total number of blades should be 3x + 4y.
So, 3x + 4y = 89 .... (ii)
Solving (i) and (ii), Substituting the value of x, we get, 3(2y + 3) + 4y = 89
Or, 6y + 9 + 4y = 89
Or, 10y = 80
Or, y = 8
Placing y = 8 in (i), we get
x = 2(8) + 3 = 19
Hence, the shopkeeper showed him 8 + 19 = 27 samples.

Video Solution:

Q6 Text Solution:

Let the total number of seats be x.

The number of seats won by party

$\mathrm{P} = \mathrm{x} - 20$

The number of seats won by party

$\mathrm{Q} = \mathrm{x} - 12$

The number of seats won by party

$\mathrm{R} = \mathrm{x} - 11$

The number of seats won by party

$\mathrm{S} = \mathrm{x} - 17$

$\therefore \mathrm{x} - 20 + \mathrm{x} - 12 + \mathrm{x} - 11 + \mathrm{x} - 17 = \mathrm{x}$

$\Rightarrow 4\mathrm{x} - \mathrm{x} = 60$

$\Rightarrow 3\mathrm{x} = 60$

$\Rightarrow \mathrm{x} = 20$

Video Solution:

Q7 Text Solution:

The given set of equations are:

$\frac{6}{x+y} - \frac{1}{x-y} = 12 \ldots \left(i\right)$

$\frac{3}{x+y} - \frac{2}{x-y} = -12 \ldots \left(ii\right)$

Adding equation (i) and (ii), we get

$\frac{9}{x+y} - \frac{3}{x-y} = 0$

$\frac{9}{x+y} = \frac{3}{x-y}$

$9x - 9y = 3x + 3y$

$6x = 12y$

$x = 2y \ldots \left(iii\right)$

Now, using (i) and (iii), we get

$\frac{6}{2y+y} - \frac{1}{2y-y} = 12$

$\frac{6}{3y} - \frac{1}{y} = 12$

$\frac{1}{y} = 12$

$\Rightarrow y = \frac{1}{12}$

Now, substituting the value of y into the equation (iii), we get

$x = \frac{2}{12} = \frac{1}{6}$

So, the required solution is: $x = \frac{1}{6},\ y = \frac{1}{12}$

Video Solution:

Q8 Text Solution:

Let F_1 be the initial number of females in team X and F_2 be the initial number of females in team Y.

If eight females shift from team X to Y, the number of females in the teams would interchange:

$F_1 - 8 = F_2$

i.e., $F_1 = F_2 + 8$ ...(i)

If two females shift from team Y to X, the number of females in team X would be twice the original number of females in team Y:

$F_1 + 2 = 2F_2$

i.e., $F_1 - 2F_2 = -2$ ...(ii)

$F_2 + 8 - 2F_2 = -2$ [Using equation (i)]

$F_2 = 10$

Substitute $F_2 = 10$ into the equation (i):

$F_1 = F_2 + 8 = 10 + 8$

$F_1 = 18$

The total number of players on each team is 37. Therefore, the number of males in Team X (M_1) and Team Y (M_2) are:

$M_1 = 37 - F_1 = 37 - 18 = 19$

$M_2 = 37 - F_2 = 37 - 10 = 27$

So, the total number of male players combining two teams = 19 + 27 = 46.

Video Solution:

Q9 Text Solution:

Let us assume that,

In 1 hour machine A produces x booklets and machine B produces y booklets.

Therefore, in 4 hours, machine A produces 4x booklets and in 2 hours, machine B produces 2y booklets.

Also, in 7 hours, machine A produces 7x booklets and in 6 hours, machine B produces 6y booklets.

Now, according to the given condition, we have

4x = 2y + 6

i.e., 4x - 2y = 6 ...(i)

And, 7x = 6y - 7

i.e., 7x - 6y = - 7 ...(ii)

Let's solve equations (i) and (ii) by using the Elimination Method. So, multiply equation (i) by - 3 and add to equation (ii).

- 12x + 6y = - 18

  7x - 6y = - 7

- 5x = - 25

So, x = 5

Therefore, machine A produces 10x = 10(5) = 50 booklets in 10 hours.

Video Solution:

Q10 Text Solution:

Let Marty went to the betting club with ₹x in hand.

In the first round, he had left with ₹(3x - p) in hand.

In the second round, he had left with ₹[3(3x - p) - p] in hand.

In the third round, he had left with ₹[3{3(3x - p) - p} - p] in hand.

In the fourth round, he had left with ₹3[3{3(3x - p) - p} - p] - p in hand, which is given as ₹0.

i.e., 3[3{3(3x - p) - p} - p] - p = 0

81x - 27p - 9p - 3p - p = 0

81x - 40p = 0 ...(i)

Also, given that,

p = x + 30.75 ...(ii)

Substituting the value of p from (ii) into equation (i) and solve for x.

81x - 40(x + 30.75) = 0

81x - 40x - 1230 = 0

41x = 1230

$x = \frac{1230}{41} = 30$

So, Marty went to the betting club with ₹30 in hand.

Video Solution:

Q11 Text Solution:

Let the price of each apple, orange and banana be ₹x, ₹y and ₹z respectively.

Therefore, according to the given condition,

2x + 3y + z = 35 ...(i)

7x + y + 5z = 62 ...(ii)

3x + 2y + 2z = 37 ...(iii)

Let's solve this system of linear equations by the Elimination Method. Multiply equation (ii) by - 2 and add to equation (iii) to eliminate y.

- 14x - 2y - 10z = - 124

  3x + 2y + 2z = 37

- 11x - 8z = - 87

i.e., 11x + 8z = 87 ...(iv)

Again, multiply equation (ii) by - 3 and add to equation (i) to eliminate y.

2x + 3y + z = 35

- 21x - 3y - 15z = - 186

- 19x - 14z = - 151

i.e., 19x + 14z = 151 ...(v)

Now, subtracting equation (iv) from (v), we get

8x + 6z = 64

4x + 3z = 32

So, the combined price for 4 apples and 3 bananas is ₹32.

Video Solution:

Q12 Text Solution:

The given system of equations is:

7x - 7y - 4z = 62 ...(i)

42x - 7y - 24z = 127 ...(ii)

Since there are three variables and two equations, so the system cannot be solved directly using the ordinary Elimination or Separation method.

So, rewriting equation (i), we get

7x - 4z = 62 + 7y ...(iii)

From equation (ii), we get

42x - 24z - 7y = 127

6(7x - 4z) - 7y = 127

6(62 + 7y) - 7y = 127 [Substituting the value of (7x - 4z) from (iii).]

372 + 42y - 7y = 127

35y = 127 - 372

35y = - 245

$y = \frac{-245}{35} = -7$

Video Solution:

Q13 Text Solution:

The given system of equations is:

4x - 3y + 7z = 31 ...(i)

3x + 7y - 3z = - 62 ...(ii)

Multiplying equation (i) by 7 and (ii) by 1 and then subtracting equation (ii) from (i), we get

7(4x - 3y + 7z) - (3x + 7y - 3z) = 7(31) - (- 62)

i.e., 28x - 21y + 49z - 3x - 7y + 3z = 217 + 62

i.e., 25x - 28y + 52z = 279

Video Solution:

Q14 Text Solution:

The given system of equations is:

$6x + 8y + 8z = k \ldots (i)$

$9x + 4y + 12z = \frac{4k}{3} \ldots (ii)$

Here we need to find the value of the expression $\frac{6x + 8y + 8z}{8y}$

The value of 6x + 8y + 8z is already given to us as 'k',

To find the value of '8y', we will multiply (i) with $\frac{3}{2}$ and then subtract (ii) from the equation obtained

9x + 12y + 12z = $\frac{3k}{2}$

9x + 4y + 12z = $\frac{4k}{3}$

8y = $\frac{k}{6}$

Thus, the value of the given expression will be

$\frac{k}{\frac{k}{6}}$ = 6

Video Solution:

Q15 Text Solution:

Rewriting the given system of equations is:

4a - 2b + c - 2d = 19 ...(i)

b + c + d + f = 1 ...(ii)

2a + c + f = 8 ...(iii)

Subtracting equation (ii) from (iii), we get

2a - b - d = 7 ...(iv)

Now, from equation (i), we have

2(2a - b - d) + c = 19

2(7) + c = 19 [Using equation (iv)]

c = 19 - 14 = 5

Video Solution:

Q16 Text Solution:

Let the price of each burger, each pizza and each sandwich be ₹x, ₹y and ₹z respectively.

Therefore, according to the given conditions we have,

3x + 2y + 4z = 260 ...(i)

7x + 4y + 2z = 390 ...(ii)

Observe that, we need to find out the value of (5x + 3y + 3z), the total cost of 5 burgers, 3 pizzas, and 3 sandwiches.

Also, observe that,

$5x + 3y + 3z = \frac{10x+6y+6z}{2}$

Again, if we add the two given equations (i) and (ii), we get

10x + 6y + 6z = 650

So, 5x + 3y + 3z = $\frac{650}{2} = 325$

Hence, the total cost of 5 burgers, 3 pizzas, and 3 sandwiches is ₹325.

Video Solution:

Q17 Text Solution:

Let the price of each pair of socks, each scarf, each hat and each glove be ₹w, ₹x, ₹y and ₹z respectively.

Therefore, according to the given conditions, we have

4w + 7x = 304 ...**(i)**

9y + 2x = 199 ...**(ii)**

9z + 5w = 190 ...**(iii)**

Adding all the three equations, we get

4w + 7x + 9y + 2x + 9z + 5w = 693

i.e., 9w + 9x + 9y + 9z = 693

i.e., w + x + y + z = $\frac{693}{9} = 77$

Therefore, the total cost of 1 scarf, 1 pair of socks, 1 hat, and 1 glove is ₹77.

Video Solution:

Q18 Text Solution:

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

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

So, 12x + (x + 600) × 72 = 90x

Solving this, we get x = 7200.

Hence, option B is correct.

Video Solution:

Q19 Text Solution:

The given equation can be written as:

$7x + 9y = 126$

$7x = 126 - 9y$

$x = \frac{126-9y}{7}$

$x = \frac{126}{7} - \frac{9y}{7}$

$x = 18 - \frac{9y}{7} \ldots (i)$

Now, since, x and y both are positive integers, so here y must be a multiple of 7 and $18 - \frac{9y}{7} > 0.$

So, the value of y can only be 7.

Therefore, x = $18 - \frac{9 \times 7}{7} = 9$

Thus,

$x + y^2 + x^3 = 9 + 7^2 + 9^3 = 9 + 49 + 729 = 787$

Video Solution:

Q20 Text Solution:

Let the cost of each screw, nail and bolt be ₹x, ₹y and ₹z.

Then, according to the given condition,

3x + 7y + 11z = 67 ...(i)

7x + 10y + 13z = 93 ...(ii)

[Now, to solve this type of question, the **Trick** is:

First, calculate the difference between the coefficients of two consecutive terms of an equation. Here, in the first equation, 7 - 3 = 4, 11 - 7 = 4.

Now, repeat the same rule for the second equation. In the second equation, 10 - 7 = 3, 13 - 10 = 3.

Then, check whether the ratio of the difference between the coefficients of the first two terms of the first equation to the difference between the coefficients of the first two terms of the second equation and the ratio of the difference between the coefficients of the next two terms of the first equation to the difference between the coefficients of the next two terms of the second equation is equal or not.

Here, for the given system, we can see that, $\frac{7-3}{10-7} = \frac{11-7}{13-10} = \frac{4}{3}$, which means, we can find the value of (x + y + z), otherwise, the value cannot be determined. Lastly, we need to multiply each equation with the opposite common difference and then subtract the equations.]

So, multiply equation (i) by 3 and (ii) by 4 and then subtract equation (i) from (ii).

28x + 40y + 52z = 372

9x + 21y + 33z = 201

19x + 19y + 19z = 171

So, $x + y + z = \frac{171}{19} = 9$

Thus, the total cost of one screw, one nail, and one bolt is ₹9.

Video Solution:

Q21 Text Solution:

Let Ramen buy x cupcakes, y cookies and z pastries from the bakery.

Then, according to the given conditions,
x + y + z = 40 ...(i)
Also, he bought 15 of each at most.
So, x ≤ 15, y ≤ 15 and z ≤ 15 ...(ii)
Now, the expenditure of Ramen = 3x + 5y + 7z.
Here, it will be maximum if y and z have their maximum values as they are the ones with greater coefficients and hence will result in a larger number.
So, the best possible pair will be (10, 15, 15).
Hence, the maximum expenditure of Ramen = 3(10) + 5(15) + 7(15) = ₹210

Video Solution:

Q22 Text Solution:

$a + 2b + 3c + 4d + 5e = 30$; where a, b, c, d, e are distinct natural numbers.
Let us first try to understand what will be the least value that
$(a + 2b + 3c + 4d + 5e)$ can assume.
In order to find out the minimum value of
$(a + 2b + 3c + 4d + 5e)$ 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
$a + 2b + 3c + 4d + 5e$
$= (1 \times 5) + (2 \times 4) + (3 \times 3) + (4 \times 2) + (5 \times 1)$
$= 35$
As the minimum value of
$(a + 2b + 3c + 4d + 5e)$ is more than 30. Hence, no solution is possible.

Video Solution:

Q23 Text Solution:

The given equation is $5a + 3b = 18.$
By hit and trial, we can see that one of the solutions will be
a = 0 and b = 6
Now given that 'a' and 'b' are non-negative integers, therefore 'a' needs to be increased.
So the next value of 'a' will be 0 + 3 = 3, and the corresponding value of 'b' will be 6 - 5 = 1
Now, 'a' can be increased further upto infinity, but if we further decrease 'b' by 5, then it will be a negative integer.
Therefore, the number of solutions will be 2.

Video Solution:

Q24 Text Solution:

Let the number of students who received 3 and 4 chocolates be m and n respectively.
We need to maximize m + n
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)
So, the maximum possible value of (m + n) = 996 ÷ 3 = 332

Video Solution:

Q25 Text Solution:

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

Thus, $\mathrm{x} + \mathrm{y} + \mathrm{z} = 50 \ldots . (\mathrm{i})$

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

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

$3\mathrm{x} + 3\mathrm{y} + 3\mathrm{z} = 150$

$12\mathrm{x} - 4\mathrm{y} - 3\mathrm{z} = 432$

$15\mathrm{x} - \mathrm{y} = 582 \ldots (\mathrm{iii})$

$\mathrm{y} = 15\mathrm{x} - 582$

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

Thus, $\mathrm{y} = 3$

Hence, option B is the correct answer.

Video Solution:

Q26 Text Solution:

Topic - Linear Equations

Given that,

$2\mathrm{x} + 5\mathrm{y} + 8\mathrm{z} = 320 \ldots \ldots \ldots \ldots \ldots (1)$

$4\mathrm{x} + 17\mathrm{y} + 16\mathrm{z} = 850 \ldots \ldots \ldots \ldots \ldots (2)$

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

$(4\mathrm{x} + 17\mathrm{y} + 16\mathrm{z}) - 2(2\mathrm{x} + 5\mathrm{y} + 8\mathrm{z}) = 850 - 640$

$=> 4\mathrm{x} + 17\mathrm{y} + 16\mathrm{z} - 4\mathrm{x} - 10\mathrm{y} - 16\mathrm{z} = 210$

$=> 7\mathrm{y} = 210$

$=> \mathrm{y} = 30$

Now we need to find the value of,

$6\mathrm{x} + 19\mathrm{y} + 24\mathrm{z}$

$= 6\mathrm{x} + 15\mathrm{y} + 24\mathrm{z} + 4\mathrm{y}$

$= 3(2\mathrm{x} + 5\mathrm{y} + 8\mathrm{z}) + 4\mathrm{y}$

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

$= 960 + 120 = 1080$

Video Solution:

Q27 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,

Minimum value of $(a + 2b + 2c + 4d)$

$= a + 2(b + c) + 4d = 4 + 2(2 + 3) + 4 \times 1 = 18$

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

So, $(b + c) = 5; d = 1$

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

Video Solution:

Q28 Text Solution:

The given equation can be written as:

$\frac{1}{x} + \frac{1}{y} = \frac{1}{20}$

$20x + 20y = xy$

$xy - 20x - 20y + 400 = 400$

$\left[\text{Adding } 400 \text{ on each side}\right]$

$x\left(y - 20\right) - 20\left(y - 20\right) = 400$

$\left(x - 20\right)\left(y - 20\right) = 400 \ldots \left(i\right)$

Given that, x > y

So, (x - 20) > (y - 20) ...(ii)

Therefore, (x - 20) × (y - 20) can be: 400 × 1, 200 × 2, 100 × 4, 80 × 5, 50 × 8, 40 × 10, and **25 × 16**.

Thus, 7 positive integer pairs of (x, y) are possible.

Video Solution:

Q29 Text Solution:

Let the number of marbles Amit, Rahul and Sunil initially have A, R and S respectively.

According to the problem,

Finally, Rahul has =

$\left(1 - \frac{1}{3}\right)\left(R + \frac{A}{3}\right) = \frac{2}{3}\left(R + \frac{A}{3}\right)$ marbles

[Since, Amit gives one-third of his marbles to Rahul, who then gives one-third of his current quantity to Sunil.]

Finally, Sunil has = $\frac{2}{3}\left[S + \frac{1}{3}\left(R + \frac{A}{3}\right)\right]$ marbles

So, finally, Amit has =

$\left(A - \frac{A}{3}\right) + \frac{1}{3}\left[S + \frac{1}{3}\left(R + \frac{A}{3}\right)\right]$ marbles

But, according to the question, the final quantity of marble Amit has is equal to the initial amount he had.

Therefore, we have

$\left(A - \frac{A}{3}\right) + \frac{1}{3}\left[S + \frac{1}{3}\left(R + \frac{A}{3}\right)\right] = A$

$\frac{S}{3} + \frac{R}{9} = \frac{A}{3} - \frac{A}{27}$

$\frac{S}{3} + \frac{R}{9} - \frac{8A}{27} = 0$

$9S + 3R - 8A = 0 \ldots \left(i\right)$

Also, by the given condition,

$\frac{A}{9} = 1 + \frac{S}{8}$

$\Rightarrow \frac{A}{9} - \frac{S}{8} = 1$

$\Rightarrow 8A - 9S = 72 \ldots \left(ii\right)$

Using (i) and (ii), we get

3R = 8A - 9S = 72

$\Rightarrow R = \frac{72}{3} = 24$

Video Solution:

Q30 Text Solution:

Let in the given three-digit number, the hundreds digit, tens digit and the units digit are x, y and z respectively.

Then, the three-digit number becomes 100x + 10y + z.

Now, a two-digit number is formed by placing the hundreds and units digits of the three-digit number in the tens and units places, respectively, of the two-digit number.

Therefore, the two-digit number becomes 10x + z.

So, according to the given condition, we have

$100x + 10y + z = 9(10x + z)$

$10x + 10y - 8z = 0$

$8z = 10(x + y)$

$4z = 5(x + y)$ ...(i)

Also, given that, the sum of the tens digit and the hundreds digit of the three-digit number is 4. Therefore,

$x + y = 4$ ...(ii)

So, using (i) and (ii), we get

$4z = 5(4) = 20$

$z = \frac{20}{4} = 5$

i.e., the digit in the units place is 5.

Video Solution: