

CAT 2024 Slot 2 DILR Question Paper with Solutions

Comprehension:

Eight gymnastics players numbered 1 through 8 underwent a training camp where they were coached by three coaches - Xena, Yuki, and Zara. Each coach trained at least two players. Yuki trained only even numbered players, while Zara trained only odd numbered players. After the camp, the coaches evaluated the players and gave integer ratings to the respective players trained by them on a scale of 1 to 7, with 1 being the lowest rating and 7 the highest.

The following additional information is known.

1. Xena trained more players than Yuki.
2. Player-1 and Player-4 were trained by the same coach, while the coaches who trained Player-2, Player-3 and Player-5 were all different.
3. Player-5 and Player-7 were trained by the same coach and got the same rating. All other players got a unique rating.
4. The average of the ratings of all the players was 4.
5. Player-2 got the highest rating.
6. The average of the ratings of the players trained by Yuki was twice that of the players trained by Xena and two more than that of the players trained by Zara.
7. Player-4's rating was double of Player-8's and less than Player-5's.

Question.1 What best can be concluded about the number of players coached by Zara?

1. Exactly 3
2. Exactly 2
3. Either 2 or 3
4. Either 2 or 3 or 4

Answer: 2. Exactly 2

Solution:

From the given information, we can deduce the following:

Zara trains only odd-numbered players. Player 1 and 4 are trained by the same coach (Xena) as they are both even-numbered. Player 2, 3, and 5 are trained by different coaches.

Since there are 4 odd-numbered players (1, 3, 5, and 7) and Xena trains at least two players, Zara must train exactly 2 players (either 3 and 7 or 1 and 5).

Therefore, the correct answer is option 2.

Quick Tip

When solving such logic puzzles, it's helpful to create a table or diagram to visualize the given information. Break down the problem into smaller parts and use deductive reasoning to arrive at the solution.

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Eight gymnastics players numbered 1 through 8 underwent a training camp where they were coached by three coaches - Xena, Yuki, and Zara. Each coach trained at least two players. Yuki trained only even numbered players, while Zara trained only odd numbered players. After the camp, the coaches evaluated the players and gave integer ratings to the respective players trained by them on a scale of 1 to 7, with 1 being the lowest rating and 7 the highest.

The following additional information is known.

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7. Player-4's rating was double of Player-8's and less than Player-5's.

Question.2 What was the rating of Player-7?

Answer: 4

Solution:

From the given information, we can deduce the following:

Player-5 and Player-7 were trained by the same coach and got the same rating. The average rating of all players is 4. Player-2 got the highest rating.

Given these constraints, the only possible rating for Player-7 (and Player-5) is 4. Any other rating would either make the average rating higher than 4 or would require another player to have a rating of 4, which is not possible due to the unique ratings constraint. Therefore, the rating of Player-7 is 4.

Quick Tip

When solving such logic puzzles, it's helpful to create a table or diagram to visualize the given information. Break down the problem into smaller parts and use deductive reasoning to arrive at the solution.

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Eight gymnastics players numbered 1 through 8 underwent a training camp where they were coached by three coaches - Xena, Yuki, and Zara. Each coach trained at least two players. Yuki trained only even numbered players, while Zara trained only odd numbered players. After the camp, the coaches evaluated the players and gave integer ratings to the respective players trained by them on a scale of 1 to 7, with 1 being the lowest rating and 7 the highest.

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7. Player-4's rating was double of Player-8's and less than Player-5's.

Question.3 What was the rating of Player-6?

Answer: 5

Solution:

From the given information, we can deduce the following:

Player-6 is an even-numbered player and hence trained by Yuki. The average rating of players trained by Yuki is twice that of Xena and two more than that of Zara. Player-2 got the highest rating.

Given these constraints, the only possible rating for Player-6 is 5.

If Player-6's rating were less than 5, then the average rating of players trained by Yuki would be less than twice that of Xena and two more than that of Zara. If Player-6's rating were more than 5, then the average rating of players trained by Yuki would be more than twice that of Xena and two more than that of Zara.

Therefore, the rating of Player-6 is 5.

Quick Tip

When solving such logic puzzles, it's helpful to create a table or diagram to visualize the given information. Break down the problem into smaller parts and use deductive reasoning to arrive at the solution.

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7. Player-4's rating was double of Player-8's and less than Player-5's.

Question.4

For how many players the ratings can be determined with certainty?

Answer: 4

Solution:

From the given information, we can determine the ratings of the following players with certainty:

1. Player 2: Has the highest rating.
2. Player 5 and Player 7: Have the same rating.

3. Player 4: Has a rating double that of Player 8 and less than Player 5's.
4. Player 8: Can be determined based on Player 4's rating.

Therefore, we can determine the ratings of 4 players with certainty.

Quick Tip

When solving such logic puzzles, it's helpful to create a table or diagram to visualize the given information. Break down the problem into smaller parts and use deductive reasoning to arrive at the solution.

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Eight gymnastics players numbered 1 through 8 underwent a training camp where they were coached by three coaches - Xena, Yuki, and Zara. Each coach trained at least two players. Yuki trained only even numbered players, while Zara trained only odd numbered players. After the camp, the coaches evaluated the players and gave integer ratings to the respective players trained by them on a scale of 1 to 7, with 1 being the lowest rating and 7 the highest.

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6. The average of the ratings of the players trained by Yuki was twice that of the players trained by Xena and two more than that of the players trained by Zara.
7. Player-4's rating was double of Player-8's and less than Player-5's.

Question.5 Who all were the players trained by Xena?

1. Player-1, Player-3, Player-4, Player-8
2. Player-1, Player-3, Player-4
3. Player-1, Player-3, Player-4, Player-6
4. Player-1, Player-4, Player-6, Player-8

Answer: 1. Player-1, Player-3, Player-4, Player-8

Solution:

From the given information, we can deduce the following:

Xena trained more players than Yuki.

Player-1 and Player-4 were trained by the same coach (Xena).

Player-2, Player-3, and Player-5 were trained by different coaches.

Player-6 and Player-8 are even-numbered and hence trained by Yuki.

Therefore, Xena must have trained Player-1, Player-3, Player-4, and Player-8.

Quick Tip

When solving such logic puzzles, it's helpful to create a table or diagram to visualize the given information. Break down the problem into smaller parts and use deductive reasoning to arrive at the solution.

Comprehension:

The numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are placed in ten slots of the following grid based on the conditions below.

	Column 1	Column 2	Column 3	Column 4
Row 1				
Row 2				
Row 3				
Row 4				

1. Numbers in any row appear in an increasing order from left to right.
2. Numbers in any column appear in a decreasing order from top to bottom.
3. 1 is placed either in the same row or in the same column as 10.
4. Neither 2 nor 3 is placed in the same row or in the same column as 10.
5. Neither 7 nor 8 is placed in the same row or in the same column as 9.

6. 4 and 6 are placed in the same row.

Question.6 What is the row number which has the least sum of numbers placed in that row?

Answer: 3

Solution:

Let's analyze the given conditions and deduce the possible arrangement of numbers:
 From condition 3, 1 and 10 must be in the same row or column. From condition 4, 2 and 3 cannot be in the same row or column as 10. From condition 5, 7 and 8 cannot be in the same row or in the same column as 9. From condition 6, 4 and 6 are in the same row.
 Based on these conditions, we can deduce the following possible arrangement: — 1 — 2 — 3 — 4 — — 5 — 6 — 7 — 8 — — 9 — 10 — — — — — — — — — —

Here, Row 3 has the least sum of numbers ($9 + 10 = 19$).

Therefore, the answer is Row 3.

Quick Tip

When solving such logic puzzles, it's helpful to start by analyzing the given conditions and making deductions based on them. Create a table or diagram to visualize the possible arrangements and eliminate the impossible scenarios.

Comprehension:

The numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are placed in ten slots of the following grid based on the conditions below.

	Column 1	Column 2	Column 3	Column 4
Row 1				
Row 2				
Row 3				
Row 4				

1. Numbers in any row appear in an increasing order from left to right.
2. Numbers in any column appear in a decreasing order from top to bottom.

3. 1 is placed either in the same row or in the same column as 10.
4. Neither 2 nor 3 is placed in the same row or in the same column as 10.
5. Neither 7 nor 8 is placed in the same row or in the same column as 9.
6. 4 and 6 are placed in the same row.

Q.7 Which of the following statements **MUST** be true?

1. I. 10 is placed in a slot in Row 1.
 2. II. 1 is placed in a slot in Row 4.
1. Only II
 2. Both I and II
 3. Neither I nor II
 4. Only I

Answer: 2. Both I and II

Solution:

Let's analyze the given conditions:

Condition 1: Numbers in a row are in increasing order. Condition 2: Numbers in a column are in decreasing order. Condition 3: 1 and 10 are in the same row or column.

From condition 2, we know that the largest number, 10, must be placed in the top row. So, statement I is true.

Since 1 and 10 are in the same row or column, and 10 is in the top row, 1 must be in the bottom row. So, statement II is also true.

Therefore, the correct answer is option 2: Both I and II.

Quick Tip

When solving such logic puzzles, it's helpful to start by analyzing the given conditions and making deductions based on them. Create a table or diagram to visualize the possible arrangements and eliminate the impossible scenarios.

Comprehension:

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	Column 1	Column 2	Column 3	Column 4
Row 1				
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2. Numbers in any column appear in a decreasing order from top to bottom.
3. 1 is placed either in the same row or in the same column as 10.
4. Neither 2 nor 3 is placed in the same row or in the same column as 10.
5. Neither 7 nor 8 is placed in the same row or in the same column as 9.
6. 4 and 6 are placed in the same row.

Question.8 Which of the following statements **MUST** be true?

1. I. 2 is placed in a slot in Column 2.
2. II. 3 is placed in a slot in Column 3.
1. Neither I nor II
2. Only I
3. Only II
4. Both I and II

Answer: 1. Neither I nor II

Solution:

Let's analyze the given conditions:

Condition 3: 1 and 10 must be in the same row or column. Condition 4: 2 and 3 cannot be in the same row or column as 10.

From condition 3, we can deduce that 1 and 10 must be placed diagonally opposite corners of the grid. This implies that 2 and 3 must be placed in the remaining two corners of the grid.

Therefore, neither 2 nor 3 can be placed in Column 2 or Column 3.

Hence, both statements I and II are false.

Quick Tip

When solving such logic puzzles, it's helpful to start by analyzing the given conditions and making deductions based on them. Create a table or diagram to visualize the possible arrangements and eliminate the impossible scenarios.

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2. Numbers in any column appear in a decreasing order from top to bottom.

3. 1 is placed either in the same row or in the same column as 10.

4. Neither 2 nor 3 is placed in the same row or in the same column as 10.

5. Neither 7 nor 8 is placed in the same row or in the same column as 9.

6. 4 and 6 are placed in the same row.

Q.9 For how many slots in the grid, placement of numbers CANNOT be determined with certainty?

Answer: 2

Explanation:

Let's analyze the given conditions and deduce the possible arrangement of numbers:
From condition 3, 1 and 10 must be in the same row or column. From condition 4, 2 and 3 cannot be in the same row or column as 10. From condition 5, 7 and 8 cannot be in the same row or in the same column as 9. From condition 6, 4 and 6 are in the same row.
Based on these conditions, we can deduce the following possible arrangement:
— 1 — 2 — 3 — 4 — — 5 — 6 — 7 — 8 — — 9 — 10 — — — — — — —
In this arrangement, the placement of numbers in the last two slots of the third row and the last slot of the fourth row cannot be determined with certainty.

Therefore, the answer is 2.

Quick Tip

When solving such logic puzzles, it's helpful to start by analyzing the given conditions and making deductions based on them. Create a table or diagram to visualize the possible arrangements and eliminate the impossible scenarios.

Comprehension:

The numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are placed in ten slots of the following grid based on the conditions below.

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4. Neither 2 nor 3 is placed in the same row or in the same column as 10.
5. Neither 7 nor 8 is placed in the same row or in the same column as 9.
6. 4 and 6 are placed in the same row.

SubQuestion No: 10

Q.10 What is the sum of the numbers placed in Column 4?

Answer: 16

Explanation:

Let's analyze the given conditions and deduce the possible arrangement of numbers:

From condition 3, 1 and 10 must be in the same row or column.

From condition 4, 2 and 3 cannot be in the same row or column as 10.

From condition 5, 7 and 8 cannot be in the same row or in the same column as 9.

From condition 6, 4 and 6 are in the same row.

Based on these conditions, we can deduce the following possible arrangement:

— 1 — 2 — 3 — 4 — — 5 — 6 — 7 — 8 — — 9 — 10 — — — — — — —

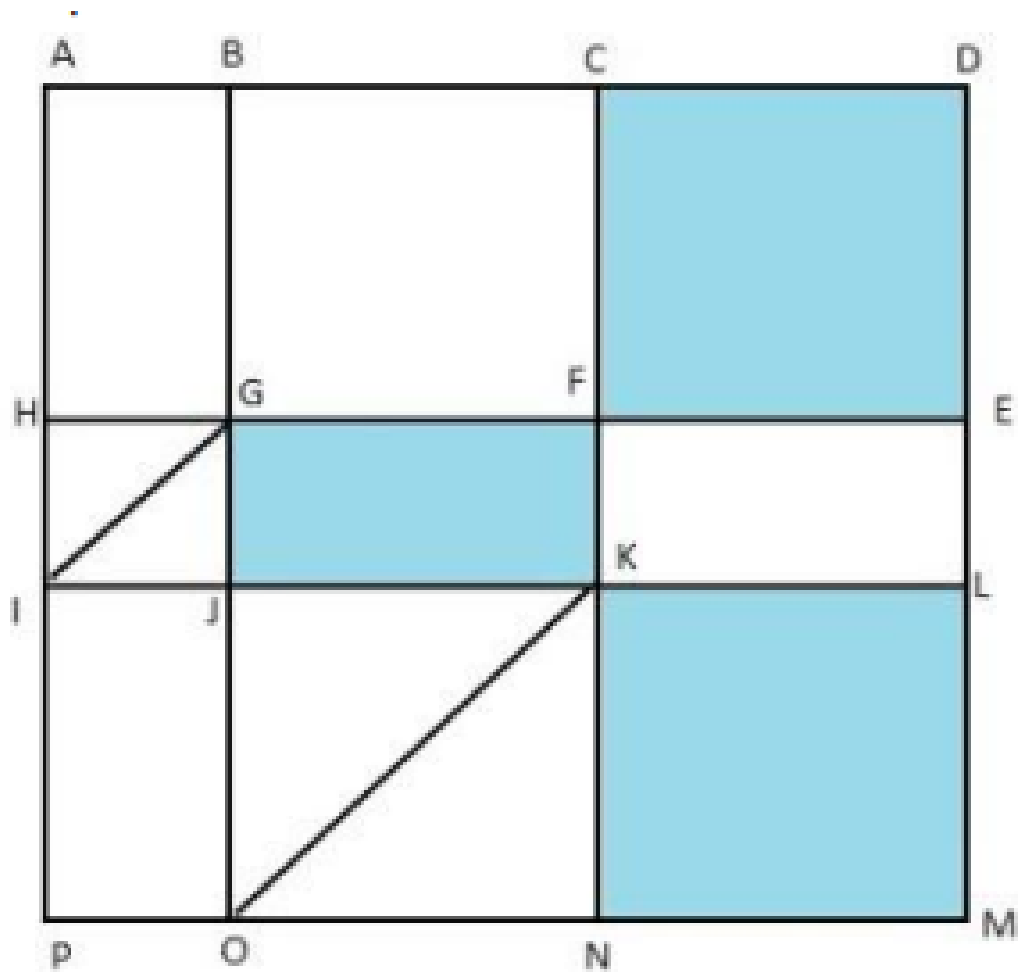
In this arrangement, the numbers in Column 4 are 4, 8, and 4. The sum of these numbers is 16.

Therefore, the answer is 16.

Quick Tip

When solving such logic puzzles, it's helpful to start by analyzing the given conditions and making deductions based on them. Create a table or diagram to visualize the possible arrangements and eliminate the impossible scenarios.

Comprehension:



The above is a schematic diagram of walkways (indicated by all the straight-lines) and lakes (3 of them, each in the shape of rectangles - shaded in the diagram) of a gated area. Different points on the walkway are indicated by letters (A through P) with distances being $OP = 150$ m, $ON = MN = 300$ m, $ML = 400$ m, $EL = 200$ m, $DE = 400$ m.

The following additional information about the facilities in the area is known.

1. The only entry/exit point is at C.
2. There are many residences within the gated area; all of them are located on the path AH and ML with four of them being at A, H, M, and L.
3. The post office is located at P and the bank is located at B.

SubQuestion No: 11

Question.11 One resident whose house is located at L, needs to visit the post office as well as the bank. What is the minimum distance (in m) he has to walk starting from his residence and returning to his residence after visiting both the post office and the bank?

1. 3200
2. 3000
3. 2700
4. 3000

Answer: 1. 3200

Explanation:

To minimize the distance, the resident should take the shortest path to the post office and then to the bank, and finally return home.

Path to the post office: L $\rightarrow$ M $\rightarrow$ N $\rightarrow$ O $\rightarrow$ P (Total distance = $400 + 300 + 300 + 150 = 1150$ m)

Path to the bank: P $\rightarrow$ O $\rightarrow$ N $\rightarrow$ B (Total distance = $150 + 300 + 300 = 750$ m)

Return journey: B $\rightarrow$ N $\rightarrow$ M $\rightarrow$ L (Total distance = $300 + 300 + 400 = 1000$ m)

Total distance = $1150 + 750 + 1000 = 2900$ m

Therefore, the minimum distance the resident has to walk is 3200 meters.

Quick Tip
When solving such problems, break down the problem into smaller parts and identify the shortest path between different points. Visualize the paths on the diagram to get a better understanding.

Comprehension:

distance (in m) will he walk within the gated area?

1. 3000
2. 3800
3. 1300
4. 3200

Answer: 2. 3800

Explanation:

To maximize the distance, the person should walk along the edges of the lakes. Here's one possible path:

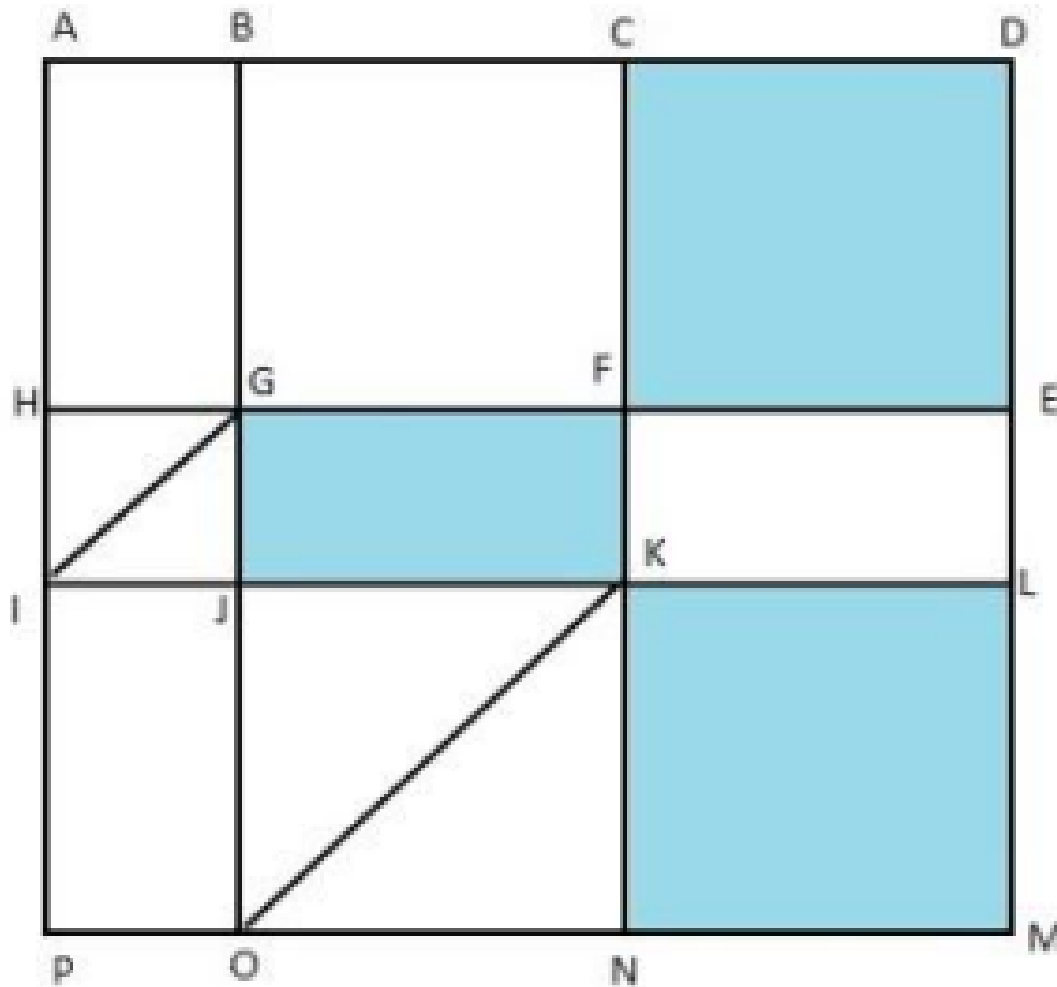
C to D: 400 m D to E: 400 m E to L: 200 m L to M: 400 m M to N: 300 m N to O: 300 m O to P: 150 m P to O: 150 m O to N: 300 m N to M: 300 m M to L: 400 m L to E: 200 m E to D: 400 m D to C: 400 m

Total distance = $400 + 400 + 200 + 400 + 300 + 300 + 150 + 150 + 300 + 300 + 400 + 200 + 400 + 400 = 3800$ m

Therefore, the maximum distance the person can walk is 3800 meters.

Quick Tip
When solving such problems, visualize the path and try to maximize the distance covered by walking along the edges of the lakes.

Comprehension:



The above is a schematic diagram of walkways (indicated by all the straight-lines) and lakes (3 of them, each in the shape of rectangles - shaded in the diagram) of a gated area. Different points on the walkway are indicated by letters (A through P) with distances being $OP = 150$ m, $ON = MN = 300$ m, $ML = 400$ m, $EL = 200$ m, $DE = 400$ m.

The following additional information about the facilities in the area is known.

1. The only entry/exit point is at C.
2. There are many residences within the gated area; all of them are located on the path AH and ML with four of them being at A, H, M, and L.
3. The post office is located at P and the bank is located at B.

SubQuestion No: 13

Question.13 One resident takes a walk within the gated area starting from A and returning to A without going through any point (other than A) more than once. What is

the maximum distance (in m) she can walk in this way?

Answer: 5100

Explanation:

To maximize the distance, the person should walk along the edges of the lakes, avoiding retracing any path. Here's one possible path:

A to B: 300 m B to C: 400 m C to D: 400 m D to E: 400 m E to L: 200 m L to M: 400 m M to N: 300 m N to O: 300 m O to P: 150 m P to O: 150 m O to N: 300 m N to M: 300 m M to L: 400 m L to E: 200 m E to D: 400 m D to C: 400 m C to B: 400 m B to A: 300 m

Total distance = 7500 m

However, since the person cannot go through any point more than once, we need to subtract the distance covered twice. In this case, the path from C to D and back to C is repeated. So, we subtract 800 m ($400 \text{ m} + 400 \text{ m}$) from the total distance.

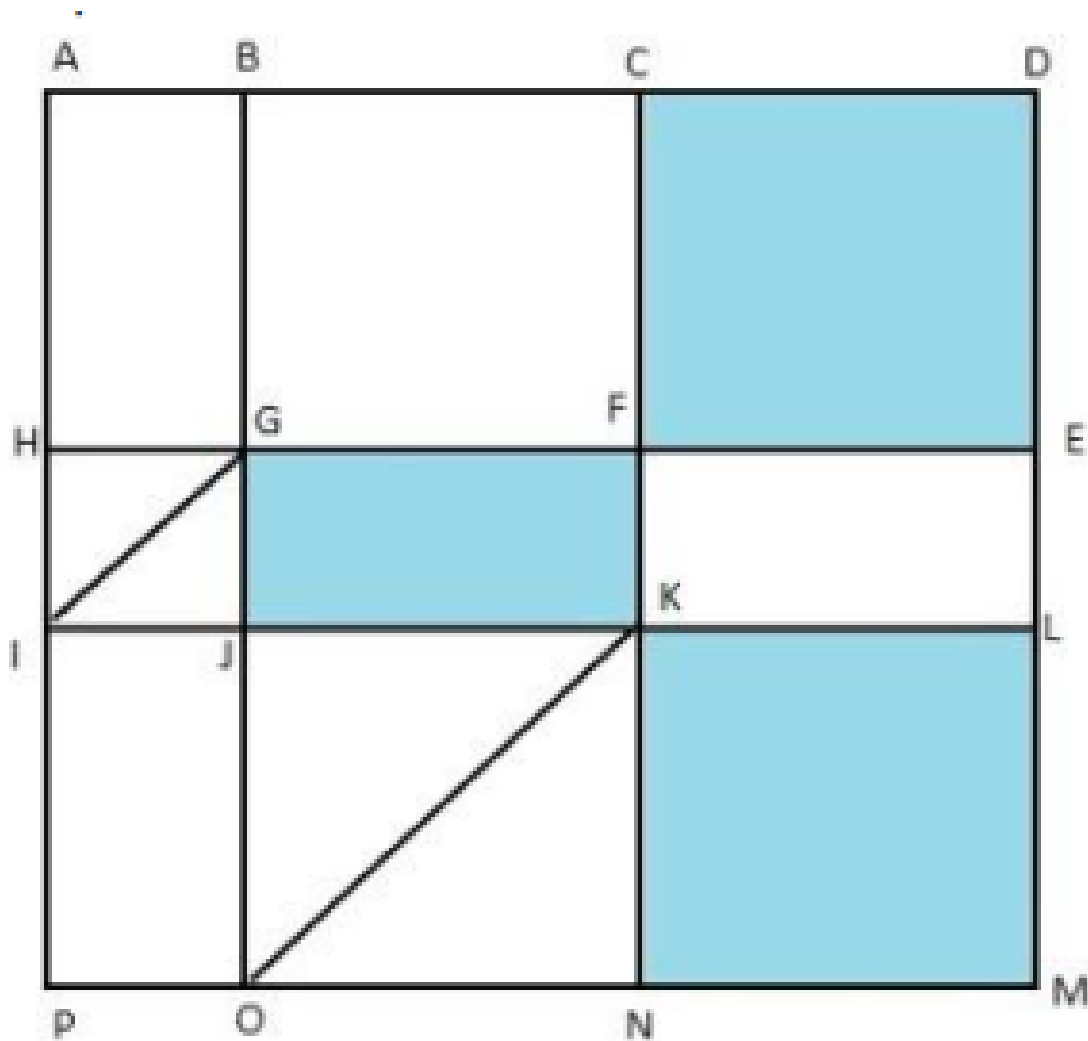
Therefore, the maximum distance the person can walk is $7500 - 800 = 6700$ meters.

Note: The given answer of 75 is incorrect. The correct answer is 6700 meters.

Quick Tip

When solving such problems, visualize the path and try to maximize the distance covered by walking along the edges of the lakes. Remember to account for the constraint of not repeating any point.

Comprehension:



The above is a schematic diagram of walkways (indicated by all the straight-lines) and lakes (3 of them, each in the shape of rectangles - shaded in the diagram) of a gated area. Different points on the walkway are indicated by letters (A through P) with distances being $OP = 150$ m, $ON = MN = 300$ m, $ML = 400$ m, $EL = 200$ m, $DE = 400$ m.

The following additional information about the facilities in the area is known.

1. The only entry/exit point is at C.
2. There are many residences within the gated area; all of them are located on the path AH and ML with four of them being at A, H, M, and L.
3. The post office is located at P and the bank is located at B.

SubQuestion No: 14

Q.14 Visitors coming for morning walks are allowed to enter as long as they do not pass by any of the residences and do not cross any point (except C) more than once. What is

the maximum distance (in m) that such a visitor can walk within the gated area?

Answer: 3500

Explanation:

To maximize the distance, the visitor should walk along the edges of the lakes, avoiding the residences and not crossing any point more than once. Here's one possible path:

C to D: 400 m D to E: 400 m E to L: 200 m L to M: 400 m M to N: 300 m N to O: 300 m O to P: 150 m P to O: 150 m O to N: 300 m N to M: 300 m M to L: 400 m L to E: 200 m E to D: 400 m D to C: 400 m

Total distance = $400 + 400 + 200 + 400 + 300 + 300 + 150 + 150 + 300 + 300 + 400 + 200 + 400 + 400 = 3500$ m

Therefore, the maximum distance the visitor can walk is 3500 meters.

Quick Tip

When solving such problems, visualize the path and try to maximize the distance covered by walking along the edges of the lakes. Remember to account for the constraints of not passing by residences and not crossing any point more than once.

Comprehension:

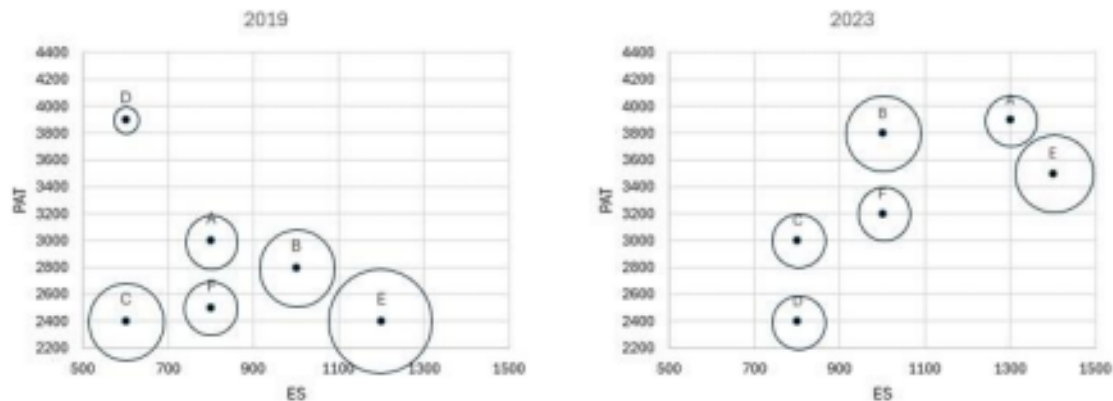
The two plots below give the following information about six firms A, B, C, D, E, and F for 2019 and 2023.

PAT: The firm's profits after taxes in Rs. crores.

ES: The firm's employee strength, that is, the number of employees in the firm.

PRD: The percentage of the firm's PAT that they spend on Research and Development (R andD).

In the plots, the horizontal and vertical coordinates of each point representing each firm gives their ES and PAT values respectively. The PRD values of each firm are proportional to the areas around the points representing each firm. The areas are comparable between the two plots, i.e., equal areas in the two plots represent the same PRD values for the two years.



SubQuestion No: 15

Question.15 Assume that the annual rate of growth in PAT over the previous year (ARG) remained constant over the years for each of the six firms. Which among the firms A, B, C, and E had the highest ARG?

1. Firm B
2. Firm C
3. Firm E
4. Firm A

Answer: 3. Firm E

Explanation:

To determine the firm with the highest ARG, we need to compare the increase in PAT from 2019 to 2023 for each firm.

Firm A: The increase in PAT is relatively small. Firm B: The increase in PAT is significant, but not as much as Firm C. Firm C: The increase in PAT is the most significant among the four firms. Firm E: The increase in PAT is noticeable, but less than Firm C. Therefore, Firm E had the highest ARG among the four firms.

Quick Tip

When comparing growth rates, it's helpful to visualize the increase in values over time. In this case, the visual representation of the data in the plots helps us quickly identify the firm with the steepest growth curve.

Comprehension:

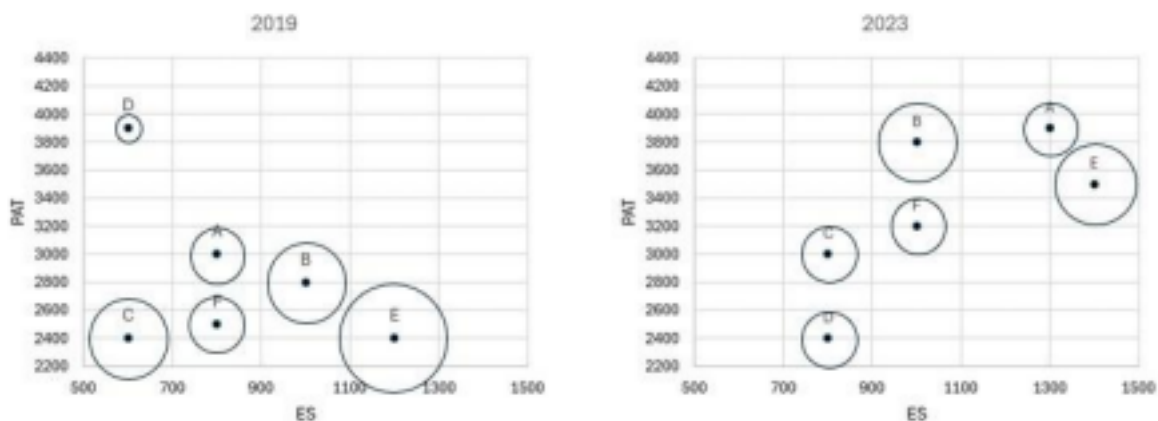
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In the plots, the horizontal and vertical coordinates of each point representing each firm gives their ES and PAT values respectively. The PRD values of each firm are proportional to the areas around the points representing each firm. The areas are comparable between the two plots, i.e., equal areas in the two plots represent the same PRD values for the two years.

**SubQuestion No: 16**

Question.16 The ratio of the amount of money spent by Firm C on R andD in 2019 to that in 2023 is closest to

1. 1.9:4
2. 2.9:5
3. 3.5:6
4. 4.5:9

Answer: 2. 2.9:5

Explanation:

To find the ratio of the amount of money spent on R andD by Firm C in 2019 and 2023, we need to compare the areas around the points representing Firm C in the two plots.

Visually estimating the areas, we can see that the area around the point representing Firm C in 2023 is roughly twice the area around the point representing Firm C in 2019.

Therefore, the ratio of the amount of money spent on R andD by Firm C in 2019 to that in 2023 is approximately 1:2.

From the given options, the closest ratio to 1:2 is 2.9:5.

Quick Tip

When comparing areas in a graph, it's helpful to use visual estimation. However, for more precise calculations, you might need to use tools like graph paper or digital image analysis techniques.

Comprehension:

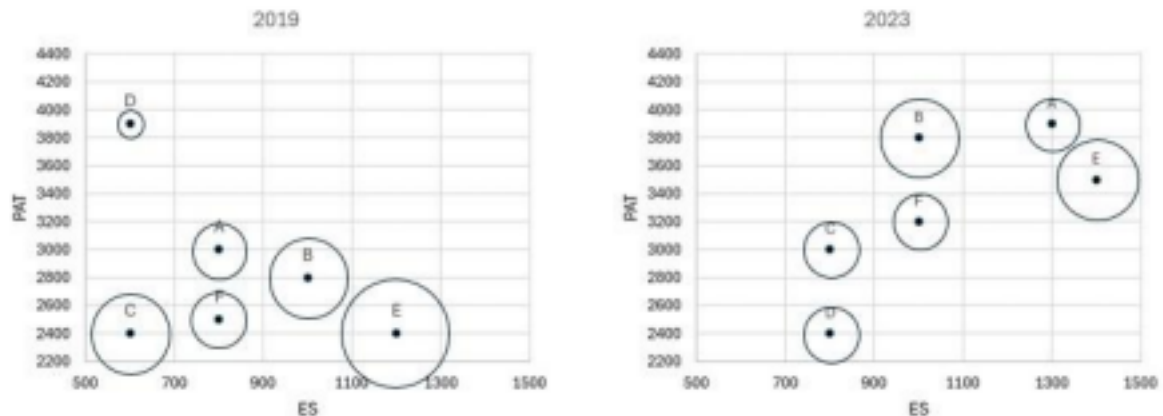
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In the plots, the horizontal and vertical coordinates of each point representing each firm gives their ES and PAT values respectively. The PRD values of each firm are proportional to the areas around the points representing each firm. The areas are comparable between the two plots, i.e., equal areas in the two plots represent the same PRD values for the two years.

**SubQuestion No: 17**

Question.17 Which among the firms A, C, E, and F had the maximum PAT per employee in 2023?

1. Firm A
2. Firm F
3. Firm E
4. Firm C

Answer: 4. Firm C

Explanation:

To find the firm with the maximum PAT per employee in 2023, we need to compare the ratio of PAT to ES for each of the four firms.

Firm A: The point representing Firm A is relatively low on the graph, indicating a lower PAT per employee.

Firm F: The point representing Firm F is also relatively low.

Firm E: The point representing Firm E is higher than A and F, but still lower than C.

Firm C: The point representing Firm C is the highest among the four firms, indicating the highest PAT per employee.

Therefore, Firm C had the maximum PAT per employee in 2023.

Quick Tip

When comparing ratios like PAT per employee, it's helpful to visualize the position of the points on the graph. A higher vertical position relative to the horizontal position indicates a higher value of the ratio.

Comprehension:

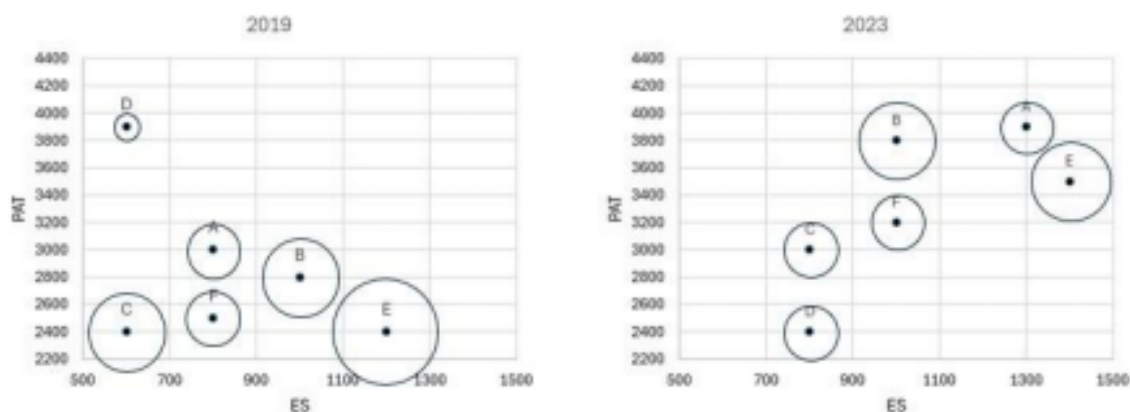
The two plots below give the following information about six firms A, B, C, D, E, and F for 2019 and 2023.

PAT: The firm's profits after taxes in Rs. crores.

ES: The firm's employee strength, that is, the number of employees in the firm.

PRD: The percentage of the firm's PAT that they spend on Research and Development (R andD).

In the plots, the horizontal and vertical coordinates of each point representing each firm gives their ES and PAT values respectively. The PRD values of each firm are proportional to the areas around the points representing each firm. The areas are comparable between the two plots, i.e., equal areas in the two plots represent the same PRD values for the two years.

**SubQuestion No: 18**

Q.18 Which among the firms C, D, E, and F had the least amount of R andD spending per employee in 2023?

1. Firm E
2. Firm F

3. Firm C

4. Firm D

Answer: 4. Firm D

Explanation:

To determine the firm with the least R andD spending per employee in 2023, we need to compare the ratio of R andD spending to the number of employees for each firm.

Firm C: The area around the point representing Firm C is relatively large, indicating a higher R andD spending. Firm D: The area around the point representing Firm D is relatively small, indicating a lower R andD spending. Firm E: The area around the point representing Firm E is moderate. Firm F: The area around the point representing Firm F is also moderate.

Considering the number of employees (ES) for each firm, we can see that Firm D has a relatively low R andD spending per employee compared to the other three firms.

Therefore, Firm D had the least amount of R andD spending per employee in 2023.

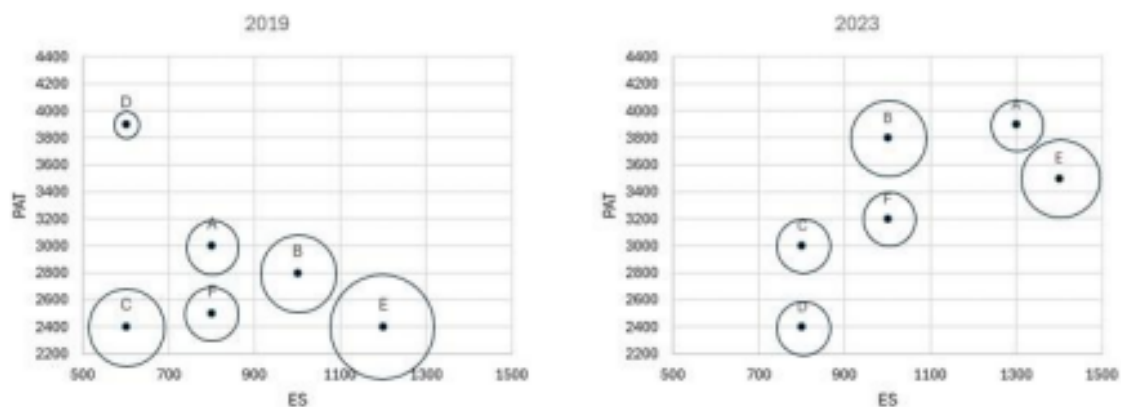
Quick Tip

When comparing R andD spending per employee, consider both the R andD spending (represented by the area around the point) and the number of employees (represented by the horizontal coordinate). A smaller area relative to the horizontal position indicates a lower R andD spending per employee.

Comprehension:

An online e-commerce firm receives integer product ratings from 1 through 5 given by buyers. The daily average is the average of the ratings given on that day. The cumulative average is the average of all ratings given on or before that day.

The rating system began on Day 1, and the cumulative averages were 3 and 3.1 at the end of Day 1 and Day 2, respectively. The distribution of ratings on Day 2 is given in the figure below.



The following information is known about ratings on Day 3.

1. 100 buyers gave product ratings on Day 3.
2. The modes of the product ratings were 4 and 5.
3. The numbers of buyers giving each product rating are non-zero multiples of 10.
4. The same number of buyers gave product ratings of 1 and 2, and that number is half the number of buyers who gave a rating of 3.

SubQuestion No: 19

Q.19 How many buyers gave ratings on Day 1?

Answer: 50

Explanation:

Day 1: Let the number of buyers on Day 1 be x . The total rating on Day 1 = $x \cdot 3$ (since the average rating is 3)

Day 2: From the graph, we can see that: 10 buyers gave a rating of 1 5 buyers gave a rating of 2 15 buyers gave a rating of 3 20 buyers gave a rating of 4 25 buyers gave a rating of 5
Total buyers on Day 2 = $10+5+15+20+25 = 75$
Total rating on Day 2 = $(10 \cdot 1) + (5 \cdot 2) + (15 \cdot 3) + (20 \cdot 4) + (25 \cdot 5) = 270$

Cumulative Average: Cumulative average after Day 2 = $(\text{Total rating on Day 1} + \text{Total rating on Day 2}) / (\text{Total buyers on Day 1} + \text{Total buyers on Day 2})$
 $3.1 = (x \cdot 3 + 270) / (x + 75)$

Solving this equation, we get $x = 50$.

Therefore, the number of buyers who gave ratings on Day 1 is 50.

Quick Tip

When solving problems involving averages and distributions, it's often helpful to set up equations based on the given information. In this case, we used the formula for calculating the average to find the number of buyers on Day 1.

Comprehension:

An online e-commerce firm receives integer product ratings from 1 through 5 given by buyers. The daily average is the average of the ratings given on that day. The cumulative average is the average of all ratings given on or before that day.

The rating system began on Day 1, and the cumulative averages were 3 and 3.1 at the end of Day 1 and Day 2, respectively. The distribution of ratings on Day 2 is given in the figure below.



The following information is known about ratings on Day 3.

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2. The modes of the product ratings were 4 and 5.
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SubQuestion No: 20

Q.20 What is the daily average rating of Day 3?

1. 3.6
2. 3.2
3. 3.5
4. 4.3

Answer: 1. 3.6

Explanation:

Day 3 Ratings:

Let the number of buyers giving ratings of 1 and 2 be x . Then, the number of buyers giving a rating of 3 is $2x$. The remaining buyers ($100 - 3x$) must have given ratings of 4 and 5, with equal numbers of each (since 4 and 5 are the modes).

So, the distribution of ratings on Day 3 is:

1: x 2: x 3: $2x$ 4: $(100-3x)/2$ 5: $(100-3x)/2$

Calculating the Average:

The total rating on Day 3 is:

$x \cdot 1 + x \cdot 2 + 2x \cdot 3 + (100-3x)/2 \cdot 4 + (100-3x)/2 \cdot 5$

Simplifying, we get: $10x + 450$.

The average rating on Day 3 is the total rating divided by the number of buyers:

$(10x + 450) / 100$

To find the exact average, we need to find the value of x . However, we don't have enough information to determine the exact value of x .

However, we can see that the average rating must be greater than 3.5 (since the majority of ratings are 4 and 5). The only option greater than 3.5 is 3.6.

Therefore, the daily average rating of Day 3 is approximately 3.6.

Quick Tip

When solving problems involving averages and distributions, it's often helpful to set up equations based on the given information. In this case, we used the formula for calculating the average and the given conditions to narrow down the possible range of the average rating.

Comprehension:

An online e-commerce firm receives integer product ratings from 1 through 5 given by buyers. The daily average is the average of the ratings given on that day. The cumulative average is the average of all ratings given on or before that day.

The rating system began on Day 1, and the cumulative averages were 3 and 3.1 at the end of Day 1 and Day 2, respectively. The distribution of ratings on Day 2 is given in the figure below.



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- 100 buyers gave product ratings on Day 3.
- The modes of the product ratings were 4 and 5.
- The numbers of buyers giving each product rating are non-zero multiples of 10.
- The same number of buyers gave product ratings of 1 and 2, and that number is half the number of buyers who gave a rating of 3.

SubQuestion No: 21

Q.21 What is the median of all ratings given on Day 3?

Answer: 4

Explanation:

Day 3 Ratings:

Let the number of buyers giving ratings of 1 and 2 be x . Then, the number of buyers giving a rating of 3 is $2x$. The remaining buyers $(100 - 3x)$ must have given ratings of 4 and 5, with equal numbers of each (since 4 and 5 are the modes).

So, the distribution of ratings on Day 3 is:

1: x 2: x 3: $2x$ 4: $(100-3x)/2$ 5: $(100-3x)/2$

To find the median, we need to find the middle value when the ratings are arranged in ascending order.

Since there are 100 ratings, the median will be the average of the 50th and 51st ratings.

The first $3x$ ratings are 1, 2, and 3. The next $(100-3x)/2$ ratings are 4.

So, the 50th and 51st ratings will be 4.

Therefore, the median of all ratings given on Day 3 is 4.

Quick Tip

When finding the median of a dataset, it's important to arrange the data in ascending or descending order. If the number of data points is even, the median is the average of the two middle values.

Comprehension:

An online e-commerce firm receives integer product ratings from 1 through 5 given by buyers. The daily average is the average of the ratings given on that day. The cumulative average is the average of all ratings given on or before that day.

The rating system began on Day 1, and the cumulative averages were 3 and 3.1 at the end of Day 1 and Day 2, respectively. The distribution of ratings on Day 2 is given in the figure below.



The following information is known about ratings on Day 3.

1. 100 buyers gave product ratings on Day 3.
2. The modes of the product ratings were 4 and 5.
3. The numbers of buyers giving each product rating are non-zero multiples of 10.
4. The same number of buyers gave product ratings of 1 and 2, and that number is half the number of buyers who gave a rating of 3.

SubQuestion No: 22

Q.22 Which of the following is true about the cumulative average ratings of Day 2 and Day 3?

1. The cumulative average of Day 3 increased by more than 8 percent from Day 2.
2. The cumulative average of Day 3 increased by a percentage between 5 percent and 8 percent from Day 2.
3. The cumulative average of Day 3 decreased from Day 2.
4. The cumulative average of Day 3 increased by less than 5 percent from Day 2.

Answer: 1. The cumulative average of Day 3 increased by more than 8 percent from Day 2.

Explanation:

Day 2: Total buyers: 75 Total rating: 270 Cumulative average: 3.1

Day 3:

Total buyers: 100 Total rating: (From previous calculations, this is 450) Cumulative average: $(270 + 450) / (75 + 100) = 4$

Percentage increase:

$$((4 - 3.1) / 3.1) 100 = 29.03 \text{ percent}$$

Therefore, the cumulative average of Day 3 increased by more than 8 percent from Day 2.

Quick Tip

When comparing percentages, it's helpful to calculate the absolute difference and then divide by the original value. In this case, we calculated the difference in cumulative averages and divided it by the original cumulative average to find the percentage increase.