CAT 2025 DILR Slot 3 Question Paper with Solutions

Time Allowed :120 Minutes	Maximum Marks :204	Total Questions :68

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The total duration of the test is **120 Minutes**, with **40 minutes** allotted per section.
2. The question paper is divided into **three sections**:
   - **Section 1:** Verbal Ability and Reading Comprehension (VARC) – 24 questions
   - **Section 2:** Data Interpretation and Logical Reasoning (DILR) – 22 questions
   - **Section 3:** Quantitative Aptitude (QA) – 22 questions
3. Each correct answer carries **+3 marks**.
4. For multiple-choice questions (MCQs), **−1 mark** will be deducted for each wrong answer.
5. There is **no negative marking** for Type-in-the-Answer (TITA) questions.

1 Introduction

Anu, Bijay, Chetan, Deepak, Eshan, and Faruq are six friends. Each of them uses a mobile number from exactly one of the two mobile operators - Xitel and Yocel. During the last month, the six friends made several calls to each other. Each call was made by one of these six friends to another. The table below summarizes the number of minutes of calls that each of the six made to (outgoing minutes) and received from (incoming minutes) these friends, grouped by the operators. Some of the entries are missing.

Friend	Operator	Outgoing minutes to		Incoming minutes from	
		Operator Xitel	Operator Yocel	Operator Xitel	Operator Yocel
Anu	Xitel	100		50	225
Bijay	Xitel		200		125
Chetan	Yocel	50	175	250	150
Deepak	Yocel	100	150	275	100
Eshan	Yocel		100	100	375
Faruq	Yocel	0		100	150

It is known that the duration of calls from Faruq to Eshan was 200 minutes. Also, there were no calls from:
i. Bijay to Eshan,
ii. Chetan to Anu and Chetan to Deepak,
iii. Deepak to Bijay and Deepak to Faruq,

iv. Eshan to Chetan and Eshan to Deepak.

01. What was the duration of calls (in minutes) from Bijay to Anu?

Correct Answer: 50

Solution:

Step 1: Understanding the Concept:
The problem involves a network of calls between friends divided into two groups based on their operators:
Operator Xitel: {Anu, Bijay}
Operator Yocel: {Chetan, Deepak, Eshan, Faruq}
We need to use the totals for outgoing and incoming calls to determine specific values between individuals.

Step 2: Key Formula or Approach:
For any individual A, the "Incoming minutes from Operator Xitel" is the sum of minutes called by all other people in the Xitel group to A.

Step 3: Detailed Explanation:
Looking at Anu's data from the table:
Anu uses Operator Xitel.
Her "Incoming minutes from Operator Xitel" is 50.
The friends using Operator Xitel are Anu and Bijay.
Since a person does not make a call to themselves (as per the context of the problem), the 50 minutes must have come from the only other person in the Xitel group.
Therefore, Call duration from Bijay to Anu = 50 minutes.

Step 4: Final Answer:
The duration of calls from Bijay to Anu is 50 minutes.

Quick Tip

When a group (operator) has only two members, the "Incoming from" value for one member is equal to the "Outgoing to" value of the other member within that same group.

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02. What was the total duration of calls (in minutes) made by Anu to friends having mobile numbers from Operator Yocel?

Correct Answer: 525

Solution:

Step 1: Understanding the Concept:
The total outgoing minutes from all friends in Operator Xitel to Operator Yocel must exactly match the total incoming minutes received by all friends in Operator Yocel from Operator Xitel.

Step 2: Key Formula or Approach:

$$\sum \text{Outgoing from Xitel to Yocel} = \sum \text{Incoming to Yocel from Xitel}$$

Step 3: Detailed Explanation:
First, calculate the total incoming minutes for all friends in the Yocel group from the Xitel group:
- Chetan: 250 minutes
- Deepak: 275 minutes
- Eshan: 100 minutes
- Faruq: 100 minutes

Total Incoming from Xitel $= 250 + 275 + 100 + 100 = 725$ minutes.

Now, calculate the total outgoing minutes from the Xitel group to the Yocel group:
The Xitel group consists of Anu and Bijay.
Total Outgoing = (Outgoing from Anu to Yocel) + (Outgoing from Bijay to Yocel).
From the table, Bijay's Outgoing to Yocel = 200 minutes.

Using the balance equation:

$$725 = \text{Outgoing from Anu to Yocel} + 200$$

$$\text{Outgoing from Anu to Yocel} = 725 - 200 = 525 \text{ minutes.}$$

Step 4: Final Answer:
The total duration of calls made by Anu to friends in Operator Yocel is 525 minutes.

Quick Tip

In cross-operator call problems, the "sum of outgoing from A to B" must always equal the "sum of incoming to B from A". Calculating one total helps solve for any missing values in the other.

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03. What was the total duration of calls (in minutes) made by Faruq to friends having mobile numbers from Operator Yocel?

Correct Answer: 350

Solution:

Step 1: Understanding the Concept:
Faruq belongs to the Yocel group. To find his total outgoing calls to Yocel users, we need to find the specific values for Faruq to Chetan, Faruq to Deepak, and Faruq to Eshan.

Step 2: Detailed Explanation:
1. **Eshan's Outgoing to Yocel:** Eshan's total outgoing to Yocel is 100.
The friends are Chetan, Deepak, and Faruq.
Given: Eshan to Chetan = 0 and Eshan to Deepak = 0.
Therefore, Eshan to Faruq = 100.

2. **Faruq's Incoming from Yocel:** Faruq's total incoming from Yocel is 150.
The friends are Chetan, Deepak, and Eshan.
Given: Deepak to Faruq = 0. We found Eshan to Faruq = 100.
So, Chetan to Faruq = $150 - 100 - 0 = 50$.

3. **Chetan's Outgoing to Yocel:** Chetan's total outgoing to Yocel is 175.
The friends are Deepak, Eshan, and Faruq.
Given: Chetan to Deepak = 0. We found Chetan to Faruq = 50.
So, Chetan to Eshan = $175 - 50 = 125$.

4. **Eshan's Incoming from Yocel:** Eshan's total incoming from Yocel is 375.
The friends are Chetan, Deepak, and Faruq.
Given: Faruq to Eshan = 200. We found Chetan to Eshan = 125.
So, Deepak to Eshan = $375 - 200 - 125 = 50$.

5. **Deepak's Outgoing to Yocel:** Deepak's total outgoing to Yocel is 150.
The friends are Chetan, Eshan, and Faruq.
Given: Deepak to Faruq = 0. We found Deepak to Eshan = 50.
So, Deepak to Chetan = $150 - 50 = 100$.

6. **Chetan's Incoming from Yocel:** Chetan's total incoming from Yocel is 150.
Given: Eshan to Chetan = 0. We found Deepak to Chetan = 100.
So, Faruq to Chetan = $150 - 100 = 50$.

7. **Deepak's Incoming from Yocel:** Deepak's total incoming from Yocel is 100.
Given: Chetan to Deepak = 0 and Eshan to Deepak = 0.
So, Faruq to Deepak = 100.

8. **Faruq's Total Outgoing to Yocel:**

= Faruq to Chetan + Faruq to Deepak + Faruq to Eshan
$= 50 + 100 + 200 = 350$.

Step 3: Final Answer:
The total duration of calls made by Faruq to friends from Operator Yocel is 350 minutes.

Quick Tip

Solve internal group relationships by creating a "Who calls Whom" matrix. Start with the person who has the most "Zero" constraints to reduce variables quickly.

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04. What was the duration of calls (in minutes) from Deepak to Chetan?

(A) 0
(B) 125
(C) 100
(D) 50

Correct Answer: (C) 100

Solution:

Step 1: Understanding the Concept:
We need to determine the specific call duration between two friends using Operator Yocel (Deepak and Chetan).

Step 2: Detailed Explanation:
From the exhaustive derivation performed in Question 03, we can extract the specific value for Deepak to Chetan.

Deepak's total outgoing minutes to the Yocel group = 150.
This total is the sum: $C(D \to C) + C(D \to E) + C(D \to F)$.

We were given the following constraints:
1. $C(D \to F) = 0$ (from constraint iii).
2. Eshan's incoming from Yocel = 375. This is $C(C \to E) + C(D \to E) + C(F \to E)$.
- From Faruq's total: $C(F \to E) = 200$.
- From Chetan's outgoing: $C(C \to E) = 125$ (since $C(C \to D) = 0$ and $C(C \to F) = 50$).
- Therefore, $375 = 125 + C(D \to E) + 200 \implies C(D \to E) = 50$.

Substituting these into Deepak's equation:

$$150 = C(D \to C) + 50 + 0$$

$$C(D \to C) = 100$$

Step 3: Final Answer:
The duration of calls from Deepak to Chetan is 100 minutes, which corresponds to option (C).

Quick Tip

When solving multiple questions based on the same dataset, keep your intermediate derived values in a rough table; they often provide direct answers to subsequent questions.

Aurevia, Brelosia, Cyrenia and Zerathania are four countries with their currencies being Aurels, Brins, Crowns, and Zentars, respectively. The currencies have different exchange values. Crown's currency exchange rate with Zentars = 0.5, i.e., 1 Crown is worth 0.5 Zentars.

Three travelers, Jano, Kira, and Lian set out from Zerathania visiting exactly two of the countries. Each country is visited by exactly two travelers. Each traveler has a unique Flight Cost, which represents the total cost of airfare in traveling to both the countries and back to Zerathania. The Flight Cost of Jano was 4000 Zentars, while that of the other two travelers were 5000 and 6000 Zentars, not necessarily in that order.

When visiting a country, a traveler spent either 1000, 2000 or 3000 in the country's local currency. Each traveler had different spends (in the country's local currency) in the two countries he/she visited. Across all the visits, there were exactly two spends of 1000 and exactly one spend of 3000 (in the country's local currency).

The total "Travel Cost" for a traveler is the sum of his/her Flight Cost and the money spent in the countries visited.

The citizens of the four countries with knowledge of these travels made a few observations, with spends measured in their respective local currencies:
i. Aurevia citizen: Jano and Kira visited our country, and their Travel Costs were 3500 and 8000, respectively.
ii. Brelosia citizen: Kira and Lian visited our country, spending 2000 and 3000, respectively. Kira's Travel Cost was 4000.
iii. Cyrenia citizen: Lian visited our country and her Travel Cost was 36000.

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05. What is the sum of Travel Costs for all travelers in Zentars?

Correct Answer: 41000

Solution:

Step 1: Understanding the Concept:
We need to determine the exchange rates and individual spends for all travelers to calculate their total Travel Costs in a common currency (Zentars).
The total visits are 6 (3 travelers $\times$ 2 countries). Since each of the 3 countries (Aurevia, Brelosia, Cyrenia) is visited by 2 people, the pairings must be:
- Aurevia (A): Jano and Kira
- Brelosia (B): Kira and Lian
- Cyrenia (C): Jano and Lian

Step 2: Key Formula or Approach:
Travel Cost (T) = Flight Cost (F) + Sum of Spends in local currencies converted to Zentars ($S \cdot E$).
Let E_A, E_B, E_C be the values of local currencies in Zentars.
Given: $E_C = 0.5$ Zentars.

Step 3: Detailed Explanation:
1. **Analyzing Spends:**
Total 6 visits. Spends $\in \{1000, 2000, 3000\}$.
Constraints: Two 1000s, one 3000, and thus three 2000s (since $6 - 3 = 3$).
From Clue (ii): $S_{KB} = 2000$ (Kira in Brelosia) and $S_{LB} = 3000$ (Lian in Brelosia).
Since 3000 is used once, all other spends are 1000 or 2000.
Each traveler has different spends in their two countries.
Kira visits A and B. $S_{KB} = 2000 \implies S_{KA} = 1000$.
Lian visits B and C. $S_{LB} = 3000 \implies S_{LC} = 2000$ (since 1000 is limited and Jano needs different spends).
Jano visits A and C. He must take the remaining 1000 and 2000. Thus $S_{JA} = 1000$ and $S_{JC} = 2000$ (or vice versa, to be checked).

2. **Calculating Exchange Rates:**
From Clue (ii): Brelosia citizen sees Kira's $T_K = 4000$ Brins $\implies T_K = 4000E_B$ Zentars.
$T_K = F_K + 1000E_A + 2000E_B = 4000E_B \implies F_K + 1000E_A = 2000E_B$.
From Clue (i): Aurevia citizen sees Kira's $T_K = 8000$ Aurels $\implies T_K = 8000E_A$ Zentars.
$8000E_A = 4000E_B + 4000E_B \implies 8000E_A = 2(2000E_B)$.
Also $8000E_A = F_K + 1000E_A + 2000E_B$. Using $2000E_B = F_K + 1000E_A$:
$8000E_A = 2(F_K + 1000E_A) \implies 4000E_A = F_K + 1000E_A \implies F_K = 3000E_A$.
If $F_K = 6000$, then $E_A = 2$. If $E_A = 2$, $F_K = 6000$. Then $2000E_B = 6000 + 1000(2) = 8000 \implies E_B = 4$.

3. **Verifying with Jano and Lian:**
Jano: $T_J = 3500E_A = 3500(2) = 7000$ Zentars.
$T_J = 4000 + 1000(2) + 2000(0.5) = 4000 + 2000 + 1000 = 7000$. (Matches!)

Lian: $T_L = 36000E_C = 36000(0.5) = 18000$ Zentars.
F_L must be 5000. $T_L = 5000 + 3000(4) + 2000(0.5) = 5000 + 12000 + 1000 = 18000$. (Matches!)

4. **Total Travel Costs in Zentars:**
$T_J = 7000$
$T_K = 16000$ (8000×2)
$T_L = 18000$
Sum $= 7000 + 16000 + 18000 = 41000$.

Step 4: Final Answer:
The sum of Travel Costs for all travelers in Zentars is 41000.

Quick Tip

Start by identifying the visit matrix (who went where) and the spend distribution. Using common units (Zentars) for all comparisons prevents conversion errors.

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06. How many Zentars did Lian spend in the two countries he visited?

Correct Answer: 13000

Solution:

Step 1: Understanding the Concept:
We need to calculate the sum of Lian's spends in local currencies, converted into Zentars.

Step 2: Key Formula or Approach:
Total Spending in Zentars = $\sum$(Spend in Local Currency $\times$ Exchange Rate in Zentars).

Step 3: Detailed Explanation:
From the derivation in Question 05:
1. Lian visited Brelosia and Cyrenia.
2. Lian's spend in Brelosia (S_{LB}) = 3000 Brins (Given).
3. Lian's spend in Cyrenia (S_{LC}) = 2000 Crowns.
4. Exchange Rates: 1 Brin = 4 Zentars ($E_B = 4$), 1 Crown = 0.5 Zentars ($E_C = 0.5$).
Calculation:

$$\text{Spend in Brelosia} = 3000 \times 4 = 12000 \text{ Zentars.}$$

$$\text{Spend in Cyrenia} = 2000 \times 0.5 = 1000 \text{ Zentars.}$$

$$\text{Total Zentars Spent} = 12000 + 1000 = 13000 \text{ Zentars.}$$

Step 4: Final Answer:
Lian spent a total of 13000 Zentars in the two countries he visited.

Quick Tip

In multi-currency problems, always maintain a list of exchange rates relative to a base currency (like Zentars) to simplify calculations for specific individuals.

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07. What was Jano's total spend in the two countries he visited, in Aurels?

Correct Answer: 1500

Solution:

Step 1: Understanding the Concept:
We need to find Jano's total spending in Zentars first and then convert that total amount into Aurels using the derived exchange rate.

Step 2: Detailed Explanation:
From the derivation in Question 05:
1. Jano visited Aurevia and Cyrenia.
2. Jano's spend in Aurevia (S_{JA}) = 1000 Aurels.
3. Jano's spend in Cyrenia (S_{JC}) = 2000 Crowns.
4. Conversion to Zentars:
- Spend in Aurevia = $1000 \times E_A = 1000 \times 2 = 2000$ Zentars.
- Spend in Cyrenia = $2000 \times E_C = 2000 \times 0.5 = 1000$ Zentars.
5. Total spending in Zentars = $2000 + 1000 = 3000$ Zentars.
6. Convert 3000 Zentars to Aurels:
Since 1 Aurel = 2 Zentars ($E_A = 2$):

$$\text{Total Spend in Aurels} = \frac{3000 \text{ Zentars}}{2 \text{ Zentars/Aurel}} = 1500 \text{ Aurels}.$$

Step 3: Final Answer:
Jano's total spend in the two countries was 1500 Aurels.

Quick Tip

Be careful with the units in the final step. The question asks for the spend in "Aurels", not Zentars. Always check the required unit before finalizing.

08. One Brin is equivalent to how many Crowns?

(A) 4
(B) 0.5
(C) 8
(D) 0.125

Correct Answer: (C) 8

Solution:

Step 1: Understanding the Concept:
We need to find the relative exchange rate between the currency of Brelosia (Brins) and Cyrenia (Crowns) using Zentars as the intermediary.

Step 2: Detailed Explanation:
From our previously derived exchange rates:
1 Brin (E_B) = 4 Zentars.
1 Crown (E_C) = 0.5 Zentars.
To find how many Crowns are in one Brin, we divide the value of a Brin by the value of a Crown:

$$\text{Exchange Rate} = \frac{\text{1 Brin (in Zentars)}}{\text{1 Crown (in Zentars)}}$$

$$\text{Exchange Rate} = \frac{4}{0.5} = 8$$

Thus, 1 Brin = 8 Crowns.

Step 3: Final Answer:
One Brin is equivalent to 8 Crowns. Correct option is (C).

Quick Tip

To find the ratio between two currencies X and Y, use the formula Rate = $\frac{\text{Value of X in Base}}{\text{Value of Y in Base}}$.

09. Which of the following statements is NOT true about money spent in the local currency?

(A) Kira spent 1000 in Aurevia
(B) Jano spent 2000 in Aurevia

(C) Jano spent 2000 in Cyrenia
(D) Lian spent 2000 in Cyrenia

Correct Answer: (B) Jano spent 2000 in Aurevia

Solution:

Step 1: Understanding the Concept:
We evaluate each statement against the spend matrix derived in the first question to identify the false statement.

Step 2: Detailed Explanation:
Based on our verified spend distribution:
- **Kira:** Visited Aurevia and Brelosia. Spends were 1000 Aurels and 2000 Brins.
- **Lian:** Visited Brelosia and Cyrenia. Spends were 3000 Brins and 2000 Crowns.
- **Jano:** Visited Aurevia and Cyrenia. Spends were 1000 Aurels and 2000 Crowns.

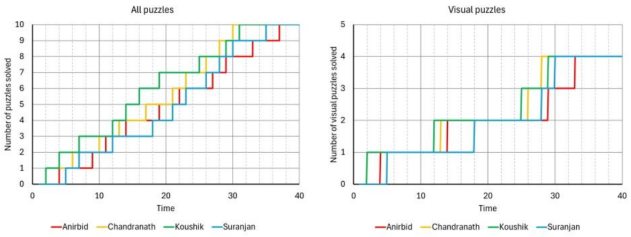
Evaluating the options:
(A) Kira spent 1000 in Aurevia: **True**.
(B) Jano spent 2000 in Aurevia: **False** (Jano spent 1000 in Aurevia).
(C) Jano spent 2000 in Cyrenia: **True**.
(D) Lian spent 2000 in Cyrenia: **True**.

Step 3: Final Answer:
Statement (B) is false.

Quick Tip

When a question asks for "NOT true", verify every statement. If you find the error early, double-check your initial logic to ensure no alternative distribution of variables exists.

Anirbid, Chandranath, Koushik, and Suranjan participated in a puzzle solving competition. The competition comprised 10 puzzles that had to be solved in the same sequence, i.e., a competitor got access to a puzzle as soon as they solved the previous puzzle. Some of the puzzles were visual puzzles and the others were number-based puzzles. The winner of the competition was the one who solved all puzzles in the least time. The following charts describe their progress in the competition. The chart on the left shows the number of puzzles solved by each competitor at a given time (in minutes) after the start of the competition. The chart on the right shows the number of visual puzzles solved by each competitor at a given time (in minutes) after the start of the competition.



10. Who had solved the largest number of puzzles by the 20-th minute from the start of the competition?

(A) Chandranath
(B) Koushik
(C) Anirbid
(D) Suranjan

Correct Answer: (D) Suranjan

Solution:

Step 1: Understanding the Concept:
To find who solved the largest number of puzzles by the 20-th minute, we need to observe the "All puzzles" chart at the time mark $t = 20$ minutes on the x-axis.

Step 2: Key Formula or Approach:
Identify the y-value (number of puzzles solved) for each participant at $x = 20$.

Step 3: Detailed Explanation:
From the "All puzzles" chart (left graph):
1. **Anirbid (red line):** At $t = 20$, the line makes a jump from 3 to 4. This means he finished his 4th puzzle exactly at the 20-th minute.
2. **Chandranath (yellow line):** At $t = 20$, the line makes a jump from 3 to 4. He also finished 4 puzzles.
3. **Koushik (green line):** At $t = 20$, his line is already at level 5 (having jumped at $t \approx 19$). He has finished 5 puzzles.
4. **Suranjan (blue line):** At $t = 20$, his line makes a jump from 5 to 6. This means he has just finished his 6th puzzle.

Comparing the values:
Suranjan (6) > Koushik (5) > Anirbid (4) = Chandranath (4).

Step 4: Final Answer:
Suranjan solved the largest number of puzzles (6) by the 20-th minute.

Quick Tip

In a step-graph, the height of the step at a specific time indicates the cumulative count of tasks completed. Always check if the time coincides with a jump; if it does, the higher value is usually counted as completed by that time.

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11. How many minutes did Suranjan take to solve the third visual puzzle in the competition?

Correct Answer: 3

Solution:

Step 1: Understanding the Concept:
We first need to identify which puzzle number in the sequence (1 to 10) corresponds to the "third visual puzzle" and then find the time Suranjan spent on it.

Step 2: Key Formula or Approach:
Identify the time interval for the 3rd jump in the "Visual puzzles" chart for Suranjan.

Step 3: Detailed Explanation:
1. **Identify the 3rd visual puzzle:**
Looking at Suranjan's (blue line) progress in the "Visual puzzles" chart:
- Jump 1 (1st visual) occurs at $t = 7$.
- Jump 2 (2nd visual) occurs at $t = 13$.
- Jump 3 (3rd visual) occurs at $t = 20$.
2. **Locate these puzzles in the "All puzzles" sequence:**
- Suranjan finishes Puzzle 5 at $t = 17$ (from the left chart).
- Suranjan finishes Puzzle 6 at $t = 20$.
Since the visual count jumps to 3 exactly when Puzzle 6 is finished, the 3rd visual puzzle is Puzzle 6.
3. **Calculate the time taken:**
Suranjan starts Puzzle 6 immediately after finishing Puzzle 5.

$$\text{Time Taken} = \text{Finish time of P6} - \text{Finish time of P5}$$

$$\text{Time Taken} = 20 - 17 = 3 \text{ minutes.}$$

Step 4: Final Answer:
Suranjan took 3 minutes to solve the third visual puzzle.

Quick Tip

To find the time taken for a specific task in a sequence, subtract the completion time of the previous task from the completion time of the current task.

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12. At what number in the sequence was the fourth number-based puzzle?

Correct Answer: 7

Solution:

Step 1: Understanding the Concept:
Since all competitors solve puzzles in the same sequence, we can map the puzzle types (Visual vs Number-based) by comparing the completion times in the two charts for any one person.

Step 2: Detailed Explanation:
Let's analyze Anirbid (red line) to determine the puzzle types:
- **Puzzle 1:** Finished at $t \approx 5$. Visual count is 0. $\rightarrow$ Number-based.
- **Puzzle 2:** Finished at $t \approx 12$. Visual count jumps to 1. $\rightarrow$ Visual.
- **Puzzle 3:** Finished at $t \approx 15$. Visual count remains at 1. $\rightarrow$ Number-based.
- **Puzzle 4:** Finished at $t \approx 20$. Visual count jumps to 2. $\rightarrow$ Visual.
- **Puzzle 5:** Finished at $t \approx 23$. Visual count remains at 2. $\rightarrow$ Number-based.
- **Puzzle 6:** Finished at $t \approx 27$. Visual count jumps to 3. $\rightarrow$ Visual.
- **Puzzle 7:** Finished at $t \approx 30$. Visual count remains at 3. $\rightarrow$ Number-based.

The sequence of Number-based (N) puzzles is: 1st (P1), 2nd (P3), 3rd (P5), and 4th (P7).

Step 4: Final Answer:
The fourth number-based puzzle was at number 7 in the sequence.

Quick Tip

Cross-referencing two charts is the fastest way to identify the category of an item in a sequence. If the "special" count (Visual) doesn't increase when a puzzle is solved, it belongs to the other category (Number-based).

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13. Which of the following is the closest to the average time taken by Anirbid to solve the number-based puzzles in the competition?

(A) 3.3 minutes
(B) 2.5 minutes

(C) 4.0 minutes
(D) 3.8 minutes

Correct Answer: (A) 3.3 minutes

Solution:

Step 1: Understanding the Concept:
We need to find the total time Anirbid spent on all number-based puzzles and divide it by the number of such puzzles.

Step 2: Key Formula or Approach:

$$\text{Average Time} = \frac{\sum(\text{Time taken for each Number-based puzzle})}{\text{Total number of Number-based puzzles}}$$

Step 3: Detailed Explanation:
From previous analysis, the sequence of puzzles is: N, V, N, V, N, V, N, N, V, N.
The number-based puzzles are P1, P3, P5, P7, P8, and P10. There are 6 in total.
Anirbid's (red line) completion times:
- P1: 0 to 5 $\rightarrow$ 5 mins.
- P2 (Visual): 5 to 12.
- P3: 12 to 15 $\rightarrow$ 3 mins.
- P4 (Visual): 15 to 20.
- P5: 20 to 23 $\rightarrow$ 3 mins.
- P6 (Visual): 23 to 27.
- P7: 27 to 30 $\rightarrow$ 3 mins.
- P8: 30 to 33 $\rightarrow$ 3 mins.
- P9 (Visual): 33 to 37.
- P10: 37 to 40 $\rightarrow$ 3 mins.

Total time for N-based puzzles $= 5 + 3 + 3 + 3 + 3 + 3 = 20$ minutes.
Average time $= 20/6 \approx 3.333$ minutes.

Step 4: Final Answer:
The closest value is 3.3 minutes.

Quick Tip

When calculating averages from a graph, be careful with the starting time of each task. A task starts exactly when the previous task ends, even if the graph types are different.

Seven children, Aarav, Bina, Chirag, Diya, Eshan, Farhan, and Gaurav, are sitting in a circle facing inside (not necessarily in the same order) and playing a game of

'Passing the Buck'.

The game is played over 10 rounds. In each round, the child holding the Buck must pass it directly to a child sitting in one of the following positions:
- Immediately to the left;
- Immediate to the right;
- Second to the left; or
- Second to the right.

The game starts with Bina passing the Buck and ends with Chirag receiving the Buck. The table below provides some information about the pass types and the child receiving the Buck. Some information is missing and labelled as '?'.

Round	Position	Name
1	Immediately to the left	Aarav
2	Second to the right	?
3	Immediately to the right	Diya
4	?	?
5	?	Aarav
6	Second to the left	?
7	Immediately to the left	Gaurav
8	Immediately to the left	?
9	?	Farhan
10	?	Chirag

14. Who is sitting immediately to the right of Bina?

(A) Chirag
(B) Aarav
(C) Farhan
(D) Eshan

Correct Answer: (D) Eshan

Solution:

Step 1: Understanding the Concept:
This problem involves a circular arrangement combined with a sequence of movements.
With seven children in a circle facing inward, "Immediately to the left" corresponds to moving one position clockwise, and "Immediately to the right" corresponds to moving one position anti-clockwise.
Let the positions be numbered 0 to 6 in a clockwise direction, with Bina at position 0.

Step 2: Key Formula or Approach:
Movement definitions based on position p:
- Immediately to the left (L1): $(p+1) \pmod 7$
- Immediately to the right (R1): $(p-1) \pmod 7$
- Second to the left (L2): $(p+2) \pmod 7$
- Second to the right (R2): $(p-2) \pmod 7$

Step 3: Detailed Explanation:
1. **Round 1:** Bina (0) passes L1 to Aarav. Aarav is at position 1.
2. **Round 2:** Aarav (1) passes R2 to Receiver1. Receiver1 is at $(1-2) \equiv 6$.
3. **Round 3:** Receiver1 (6) passes R1 to Diya. Diya is at $(6-1) = 5$.
4. **Round 6:** Aarav (1) passes L2 to Receiver2. Receiver2 is at $(1+2) = 3$.
5. **Round 7:** Receiver2 (3) passes L1 to Gaurav. Gaurav is at $(3+1) = 4$.
6. **Round 8:** Gaurav (4) passes L1 to Receiver3. Receiver3 is at $(4+1) = 5$, which is Diya.
7. **Round 9:** Diya (5) passes to Farhan. Farhan must be at position $0, 3, 4$, or 6 based on possible moves. Since $0, 4$, and 5 are taken by Bina, Gaurav, and Diya, Farhan is at 3 or 6.
8. **Round 10:** Farhan passes to Chirag. Chirag is the remaining child.
- If Farhan is at 6, moves from 6 land on $0, 5, 1, 4$, which are all occupied.
- If Farhan is at 3, move R1 lands on position 2, which is empty. Thus, Farhan is at 3 and Chirag is at 2.
9. **Final Layout:** Bina(0), Aarav(1), Chirag(2), Farhan(3), Gaurav(4), Diya(5), Eshan(6).

Step 3: Final Answer:
Immediately to the right of Bina (0) is position 6.
The child at position 6 is Eshan.

Quick Tip

When tracing paths in a circle, modular arithmetic ((mod 7)) is the most reliable method to track positions relative to a fixed starting point.

---

15. Who is sitting third to the left of Eshan?

(A) Aarav
(B) Chirag
(C) Gaurav
(D) Diya

Correct Answer: (B) Chirag

Solution:

Step 1: Understanding the Concept:
We use the seating arrangement determined in the previous question to find the relative position.

Step 2: Detailed Explanation:
The positions identified are:
Bina (0), Aarav (1), Chirag (2), Farhan (3), Gaurav (4), Diya (5), Eshan (6).
Eshan is at position 6.
"Third to the left" means moving 3 positions in the clockwise direction.
Calculation: $6 + 3 = 9$.
Applying modulo 7 for a circle of 7: $9 \pmod 7 = 2$.
The child at position 2 is Chirag.

Step 3: Final Answer:
Chirag is sitting third to the left of Eshan.

Quick Tip

Always ensure that the direction of "left" or "right" is consistent with whether the subjects are facing inside or outside the circle.

---

16. For which of the following pass types can the total number of occurrences be uniquely determined?

(A) Second to the right
(B) Second to the left
(C) Immediately to the left
(D) Immediately to the right

Correct Answer: (D) Immediately to the right

Solution:

Step 1: Understanding the Concept:
We evaluate the moves for all 10 rounds. Rounds 4 and 5 are not explicitly given, so we must check all logical possibilities for the intermediate receiver Y.

Step 2: Detailed Explanation:
Confirmed moves:
Round 1: L1, Round 2: R2, Round 3: R1, Round 6: L2, Round 7: L1, Round 8: L1, Round 9: R2 (5 to 3), Round 10: R1 (3 to 2).
Known counts so far: L1 (3), L2 (1), R1 (2), R2 (2).
The buck goes from Diya (5) $\rightarrow Y \rightarrow$ Aarav (1) in Rounds 4 and 5.
Valid paths from 5 to 1 in two steps:
1. $5 \xrightarrow{L2} 0 \xrightarrow{L1} 1 \implies Y =$ Bina. (Additional moves: L2, L1). Total: L1(4), L2(2), R1(2), R2(2).
2. $5 \xrightarrow{L1} 6 \xrightarrow{L2} 1 \implies Y =$ Eshan. (Additional moves: L1, L2). Total: L1(4), L2(2), R1(2), R2(2).

3. $5 \xrightarrow{R2} 3 \xrightarrow{R2} 1 \implies Y = \text{Farhan}$. (Additional moves: R2, R2). Total: L1(3), L2(1), R1(2), R2(4).

In every valid scenario, the count for "Immediately to the right" (R1) remains exactly 2. The counts for other types change depending on which path is taken.

Step 3: Final Answer:
The total number of occurrences of "Immediately to the right" is uniquely determined as 2.

Quick Tip

When a variable is unknown (like child Y), check the result for every possible value of that variable to find a common property.

---

17. For which of the following children is it possible to determine how many times they received the Buck?

(A) Bina
(B) Gaurav
(C) Farhan
(D) Eshan

Correct Answer: (B) Gaurav

Solution:

Step 1: Understanding the Concept:
A child "receives" the buck at the end of a round. We list all receivers for the 10 rounds and identify those whose frequency does not change across different possible paths for Round 4.

Step 2: Detailed Explanation:
The receivers for each round are:
- R1: Aarav, R2: Eshan, R3: Diya, R4: Y, R5: Aarav, R6: Farhan, R7: Gaurav, R8: Diya, R9: Farhan, R10: Chirag.
Receiving counts:
- Aarav: 2 (R1, R5)
- Diya: 2 (R3, R8)
- Chirag: 1 (R10)
- Gaurav: 1 (R7)
- Eshan: 1 (R2), plus 1 if $Y = \text{Eshan}$
- Bina: 0, plus 1 if $Y = \text{Bina}$
- Farhan: 2 (R6, R9), plus 1 if $Y = \text{Farhan}$

Since Y can be Bina, Eshan, or Farhan, their counts are not uniquely determined. Gaurav,

Aarav, Diya, and Chirag have fixed counts. Among the given options, only Gaurav is uniquely determinable.

Step 3: Final Answer:
It is possible to uniquely determine that Gaurav received the Buck exactly once.

Quick Tip

A constant receiver is a "safe" answer in sequence puzzles where intermediate steps involve ambiguity.

Three countries — Pumpland (P), Xiland (X) and Cheeseland (C) — trade among themselves and with the (other countries in) Rest of World (ROW). All trade volumes are given in IC (international currency). The following terminology is used:
• Trade balance = Exports - Imports
• Total trade = Exports + Imports
• Normalized trade balance = Trade balance / Total trade, expressed in percentage terms

The following information is known:
1. The normalized trade balances of P, X and C are 0%, 10%, and -20%, respectively.
2. 40% of exports of X are to P; 22% of imports of P are from X.
3. 90% of exports of C are to P; 4% are to ROW.
4. 12% of exports of ROW are to X, 40% are to P.
5. The export volumes of P, in IC, to X and C are 600 and 1200, respectively. P is the only country that exports to C.

---

18. How much is exported from C to X, in IC?

Correct Answer: 48

Solution:

Step 1: Understanding the Concept:
The question requires determining the trade flow from Cheeseland (C) to Xiland (X). We need to calculate the total exports of C and then use the percentage distribution provided in the constraints.

Step 2: Key Formula or Approach:
1. Use the Normalized Trade Balance (NTB) formula to relate Exports (E) and Imports (I):

$$NTB = \frac{E - I}{E + I} \times 100\%$$

2. Identify imports of C from the given constraints: P is the only exporter to C.

Step 3: Detailed Explanation:
From Point 5, we know $E_{PC} = 1200$. Since P is the only country exporting to C, the total imports of C (I_C) must be 1200 IC.
The normalized trade balance of C is -20%. Let E_C be the exports of C:

$$\frac{E_C - 1200}{E_C + 1200} = -0.2$$

$$E_C - 1200 = -0.2(E_C + 1200)$$

$$E_C - 1200 = -0.2E_C - 240$$

$$1.2E_C = 960 \implies E_C = 800$$

According to Point 3, 90% of C's exports go to P and 4% go to ROW. The remaining $100\% - 90\% - 4\% = 6\%$ must go to X:

$$\text{Export from C to X} = 0.06 \times 800 = 48 \text{ IC}.$$

Step 4: Final Answer:
The amount exported from C to X is 48 IC.

Quick Tip

When one country is the sole exporter to another, that country's outgoing volume to the target equals the target's total imports. This provides a solid anchor to solve the remaining variables.

---

19. How much is exported from P to ROW, in IC?

Correct Answer: 200

Solution:

Step 1: Understanding the Concept:
We need to find the trade flow from Pumpland (P) to the Rest of the World (ROW). This involves finding P's total exports and subtracting its exports to X and C.

Step 2: Key Formula or Approach:
Use the trade balance of P and the inter-country trade relations (Point 2 and Point 4).

Step 3: Detailed Explanation:
Let I_P be the total imports of P and E_P be the total exports of P.
Since $NTB_P = 0\%$, we have $E_P = I_P$.
From the previous question, $E_C = 800$. Thus, $E_{CP} = 0.9 \times 800 = 720$.
From Point 2, $E_{XP} = 0.22I_P$ and $E_{XP} = 0.4E_X$. Thus, $E_X = \frac{0.22I_P}{0.4} = 0.55I_P$.
Using $NTB_X = 10\%$:

$$\frac{E_X - I_X}{E_X + I_X} = 0.1 \implies E_X = \frac{1.1}{0.9}I_X \implies I_X = \frac{9}{11}E_X = \frac{9}{11} \times 0.55I_P = 0.45I_P$$

Now, calculate I_X using flows from other countries:

$$I_X = E_{PX} + E_{CX} + E_{ROW,X} = 600 + 48 + 0.12E_{ROW}$$

Calculate I_P using flows from other countries:

$$I_P = E_{XP} + E_{CP} + E_{ROW,P} = 0.22I_P + 720 + 0.4E_{ROW}$$

$$0.78I_P = 720 + 0.4E_{ROW} \implies E_{ROW} = 1.95I_P - 1800$$

Substitute E_{ROW} into the I_X equation:

$$0.45I_P = 648 + 0.12(1.95I_P - 1800)$$

$$0.45I_P = 648 + 0.234I_P - 216$$

$$0.216I_P = 432 \implies I_P = 2000$$

Since $E_P = I_P = 2000$, and $E_P = E_{PX} + E_{PC} + E_{P,ROW}$:

$$2000 = 600 + 1200 + E_{P,ROW} \implies E_{P,ROW} = 200 \text{ IC}.$$

Step 4: Final Answer:
The amount exported from P to ROW is 200 IC.

Quick Tip

An NTB of 0% implies a Trade Balance of zero, meaning total exports equal total imports. This simplifies the net flow calculations significantly.

---

20. How much is exported from ROW to ROW, in IC?

Correct Answer: 1008

Solution:

Step 1: Understanding the Concept:
ROW represents other countries. Trade "from ROW to ROW" refers to the internal trade within the Rest of World countries that does not go to P, X, or C.

Step 2: Detailed Explanation:
From Question 19, we found $I_P = 2000$.
Using the relation $E_{ROW} = 1.95I_P - 1800$:

$$E_{ROW} = 1.95(2000) - 1800 = 3900 - 1800 = 2100 \text{ IC}.$$

Total exports of ROW (E_{ROW}) are distributed to X, P, C, and ROW itself.
From Point 4:
- Export to X = 12% of 2100 = 252
- Export to P = 40% of 2100 = 840
- Export to C = 0 (Since Point 5 says P is the only exporter to C)

$$\text{Internal ROW to ROW export} = 2100 - (252 + 840 + 0) = 1008 \text{ IC}.$$

Step 3: Final Answer:
The internal export within ROW is 1008 IC.

Quick Tip

"Rest of World" is treated as an aggregate. If its specific trade flows to known entities (P, X, C) don't sum to its total export volume, the difference is attributed to internal trade within that aggregate.

21. What is the trade balance of ROW?

(A) 200
(B) 100
(C) 0
(D) -200

Correct Answer: (A) 200

Solution:

Step 1: Understanding the Concept:
In a closed trade system involving P, X, C, and ROW, the sum of all trade balances must be zero.

Step 2: Key Formula or Approach:

$$TB_P + TB_X + TB_C + TB_{ROW} = 0$$

Step 3: Detailed Explanation:
Calculate individual trade balances:
1. **Pumpland (P):** $E_P = 2000, I_P = 2000 \implies TB_P = 0$.
2. **Xiland (X):** $I_X = 0.45I_P = 900$. $E_X = 1.1/0.9 \times 900 = 1100$.

$$TB_X = 1100 - 900 = 200.$$

3. **Cheeseland (C):** $E_C = 800, I_C = 1200$.

$$TB_C = 800 - 1200 = -400.$$

Now, using the zero-sum principle:

$$0 + 200 + (-400) + TB_{ROW} = 0$$

$$-200 + TB_{ROW} = 0 \implies TB_{ROW} = 200.$$

Step 4: Final Answer:
The trade balance of ROW is 200 IC.

Quick Tip

For any group of trading entities where every export is someone else's import, the global trade balance is always zero. This is a powerful shortcut for multi-entity DI sets.

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22. Which among the countries P, X, and C has/have the least total trade?

(A) Both X and C
(B) Only X
(C) Only C
(D) Only P

Correct Answer: (A) Both X and C

Solution:

Step 1: Understanding the Concept:
Total trade is defined as the sum of exports and imports $(E + I)$. We compare this value for P, X, and C.

Step 2: Detailed Explanation:
From previously derived values:
1. **Pumpland (P):** $E_P = 2000, I_P = 2000 \implies \text{Total Trade}_P = 4000$.
2. **Xiland (X):** $E_X = 1100, I_X = 900 \implies \text{Total Trade}_X = 2000$.
3. **Cheeseland (C):** $E_C = 800, I_C = 1200 \implies \text{Total Trade}_C = 2000$.

Comparing the values: $2000 = 2000 < 4000$.
Both Xiland and Cheeseland have the same least total trade of 2000 IC.

Step 3: Final Answer:
Both X and C have the least total trade. Correct option is (A).

Quick Tip

Total Trade $(E + I)$ and Trade Balance $(E - I)$ are the two fundamental metrics in DI trade puzzles. Ensure you don't confuse them during calculation.
