Computational Thinking

Class 5

Student Handbook

CENTRAL BOARD OF SECONDARY EDUCATION

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PREFACE

The National Education Policy (NEP) aims to position India as a leader in emerging knowledge fields by integrating technologies like AI, Machine Learning, Big Data, and Computational Thinking into school education. It promotes technology-enabled, interactive and gamified learning using tools such as Augmented Reality (AR), Virtual Reality (VR), and virtual labs to foster creativity, problem-solving and interdisciplinary exploration. NCF-SE 23 carries this recommendation further into implementation.

While Artificial Intelligence (AI) is an important requirement, Computational Thinking (CT) should be a broader skill, developing a foundation for learning AI. It can cover various aspects like Cybersecurity, basic network, etc. Hence, CBSE approaches this by Integrating Computational Thinking with AI and other technological advancements, without dependence on any platform.

The book challenges learners with problems involving multi-step deduction, hidden information, condition-based reasoning and transformations of numbers, shapes and arrangements. Students engage with tasks that require interpreting constraints, breaking complex situations into manageable parts and applying sequential logic to arrive at justified solutions. The document also provides pedagogy, learning resources, assessment support and classroom implementation guidelines to support structured, competency-based learning in alignment with NEP 2020.

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Introduction

Computational Thinking (CT) is a problem-solving approach that comprises Decomposition, Pattern Recognition, Abstraction, Algorithm Design, Data Analysis and Troubleshooting. Computational Thinking Skills involve solving complex problems that promote thinking skills such as critical & creative thinking, abstraction and pattern recognition, as well as algorithmic thinking. Problem identification and problem solving necessitate the application of multidisciplinary understanding for creating effective solutions.

Artificial intelligence (AI) is a cutting-edge technology that empowers machines and computers to perform tasks that usually require mimicking human intelligence. These machines can perform complex thinking processes such as data analysis, pattern recognition, prediction of trends, solving problems and decision making. Thus, AI involves simulating cognitive processes associated with human intelligence and is widely applicable in various sectors such as banking, healthcare, defence, education, entertainment, agriculture and others for processing information, solving intricate problems and for planning.

The National Education Policy (NEP) aims for India to emerge as a global leader in new emerging knowledge domains such as artificial intelligence, machine learning, data analytics, 3-D machining etc. To realise this goal, the policy suggests teaching students Mathematics and Computational Thinking, along with new subjects like Artificial Intelligence, Machine Learning, and Data Science during their school education. The policy also focuses on technology-enabled learning and classrooms by using tools like artificial intelligence, machine learning, and adaptive testing to create knowledge.

The National Curriculum for School Education draws from this policy aspiration and emphasizes the need to introduce these emerging domains of study and technologies in the school curriculum. It recommends inclusion of subjects such as design thinking, augmented reality, virtual reality, artificial intelligence, and computational thinking. Additionally, it promotes the use of gamified content, interactive content, and immersive experiences (such as AR, VR, or virtual labs) to enhance student learning. In a variety of subjects, including design, music, art, and sciences, these resources support students in knowledge creation and exploration, and development of capacities such as problem-solving, critical and creative thinking.

CBSE, under the aegis of the Department of School Education and Literacy, Ministry of Education, Govt. of India, is implementing a Curriculum on Computational Thinking and Artificial Intelligence (CT & AI) to inculcate AI-readiness in school students. This curriculum will be implemented from classes 3rd to 8th, in the session 2026-27, and aims to develop AI-Ready learners, by focusing on Computational Thinking Skills. The AI-readiness, so inculcated through CT Skills, will help develop the capacities of learners to use computational thinking, such as logical thinking, problem solving, pattern recognition, and so on, and understand the role and use of Artificial Intelligence in daily life. The Curriculum aims to build strong foundations in computational thinking, digital literacy, and responsible use of technology, along with nurturing innovation, critical thinking, and ethical decision-making capacities.

1. **Relevance: Importance of introducing Computational Thinking (CT) and Artificial Intelligence (AI)**

Introducing CT and AI in Grade 5 is critical for building a foundation for the technology-enabled society envisioned by national policies.

- **Foundation for AI:** CT is the intellectual backbone and cognitive framework required to understand how intelligent systems operate. Skills like breaking problems into parts and spotting patterns are the same reasoning processes that power AI and Machine Learning.
- **AI-Readiness:** The curriculum aims to develop AI-ready learners by building capacities in logical thinking and problem-solving, helping them understand the role of AI in daily life.
- **Holistic Development:** Beyond technical skills, CT contributes to creative problem-solving, critical thinking, and ethical decision-making, which are essential for individual flourishing and responsible digital citizenship.
- **Interdisciplinary Connection:** It helps students see that knowledge is not compartmentalised by connecting disciplines like Mathematics, Science, and Humanities.

2. **Objectives (Curricular Goals)**

For Grade 5 (the final year of the Preparatory Stage), the curriculum targets three primary goals:

- **CG-1:** Develop basic problem-solving skills with procedural fluency to solve daily-life problems as a step toward formal computational thinking.
- **CG-2:** Develop basic capacities of analytical thinking, verbal, and visual reasoning.
- **CG-3:** Demonstrate understanding of basic concepts of computers and knowledge of hardware and software.

3. **Learning Outcomes:**

ABSTRACT THINKING -

Students will be able to solve complex problems with multi-layered hidden cues, using:

- Different viewpoints of 3D objects.
- Changes in shapes after flips, turns, cuts/folds, or rotations, and changes in order and directions (clockwise or counter clockwise).
- Hidden or missing parts in incomplete shapes or patterns.
- Mirror/Water images and identical halves based on symmetry.

PATTERN RECOGNITION -

Students will be able to identify progressive patterns involving multiple changes in consecutive terms, formed using:

- Numbers
- Shapes or images
- Letters
- Or a mix of the above

DECOMPOSITION -

Students will be able to break down higher-order problems involving interconnected clues, using information from:

- Number clues (place values, sum/difference/product)
- 3D objects and their parts (faces, edges, corners)
- Step-by-step exchanges or transfers (money, objects, digits, quantities)
- Tables or charts with multiple pieces of information

- Conditions for counting/grouping/sorting items
- Pictures or visuals that represent certain numerical values

ALGORITHMIC THINKING

Students will be able to follow multi-layered rules to solve advanced problems involving:

- Number sequences formed using simple operations
- Movements on grids or direction-based paths
- Values that increase or decrease across steps
- Multi-step instructions involving moves, changes, transfers, swaps
- People/Events arranged in an order using attributes or chronological clues
- Simple counting instructions

4. Mapped with NEP and NCF 2023:

The curriculum is built upon the vision of the National Education Policy (NEP) 2020 and is directly aligned with the National Curriculum Framework for School Education (NCF-SE) 2023.

- **NEP 2020 Vision:** It fulfils the goal of making India a global leader in emerging domains like AI and machine learning by integrating them into school education.
- **NCF-SE 2023 Alignment:** The learning standards (Goals, Competencies, Outcomes) are derived from the framework suggested in the National Curriculum Framework for School Education 2023
- **Global Leadership:** It fulfils the NEP goal of positioning India as a global leader in emerging domains like AI and Machine Learning by integrating these topics early in school education.

5. Time Allocation

- **Annual Hours:** A total of 50 hours annually is suggested for the Preparatory Stage (Classes 3-5).
- **Integrated Model:** To ensure balance without overburdening students, this time is not added as an extra subject but is integrated into Mathematics and "The World Around Us" (TWAU) periods.

6. Approach / Pedagogy

The pedagogical approach for Grade 5 is designed to be experiential and activity-based:

- **Hands-on Learning:** Use of games, puzzles and interactive worksheets to teach systematic problem-solving.
- **Collaborative Tasks:** Learning involves peer discussions and group work, allowing students to solve problems collectively using structured resources.
- **Systematic Decomposition:** Teachers guide students to break larger, complex problems into smaller, manageable parts.

7. Assessment:

Assessment at this stage shifts from rote memorisation to formative and competency-based evaluation:

- **Varied Methods:** Evaluation tools include:
  - Written tests specifically involving CT-focused puzzles
  - Interactive group
  - Qualitative tracking through a Teacher Observation Journal
- **Creative Focus:** The primary goal is to assess a student's ability to apply knowledge and demonstrate creativity in finding solutions

How to Use This Book?

This book is designed as a companion to the Mathematics textbook and is intended to be used alongside regular classroom teaching. Since it follows the same chapter sequence, the Mathematics teacher can seamlessly integrate it into daily instruction. As concepts are introduced in class, the corresponding questions from this book can be used to deepen understanding and encourage application.

Before beginning a chapter, the teacher is encouraged to go through the content of this book, identify the underlying concepts required for each question, and plan how to align them with classroom teaching. As these concepts are taught, the teacher can introduce the related thinking questions to students.

It is important to note that the questions in this book are thinking-based and designed to promote analysis, reasoning, and problem-solving. Teachers should adopt a facilitative approach, guiding students through prompts and discussions rather than directly providing solutions. Students should be given time to think and attempt independently, followed by classroom discussions where different approaches are shared and explored.

Some chapters also include activities that build intuition and engagement. These should be conducted before attempting the questions, as they help students approach the problems with better understanding.

Teachers should approach this book with the mindset that the process of thinking is more important than arriving at the correct answer. Creating a safe and encouraging environment where students feel comfortable making mistakes, exploring multiple strategies, and expressing their reasoning is essential. The goal is to nurture confident, independent thinkers rather than focus solely on correctness.

Chapter 1: We the Travellers - I

1. **Which of the following CAN be implied if the given statement is true?**
   Statement: A 5-digit number is formed using single-digit whole numbers such that the units digit is even and all the remaining digits are odd.
   a) The number definitely lies between 11111 and 99999
   b) The number formed CAN be a multiple of 100
   c) The sum of the digits of the largest such number is 44
   d) The sum of the digits is NOT divisible by 2

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2. **Rohan revealed his 5-digit phone password in a code word to Rajesh where all the digits are NATURAL NUMBERS. Which of the following statements are <u>SUFFICIENT</u> to crack the code?**
   Statement 1: One of these digits is 1, and 2 appears thrice in the password
   Statement 2: The first digit is smaller than all other digits and the 2nd digit is smaller than the 3rd
   Statement 3: The largest digit in the password is 3 and it appears only once
   a) Statements 1 and 2
   b) Statements 2 and 3
   c) All the statements are required
   d) Cannot be determined even after using all the statements

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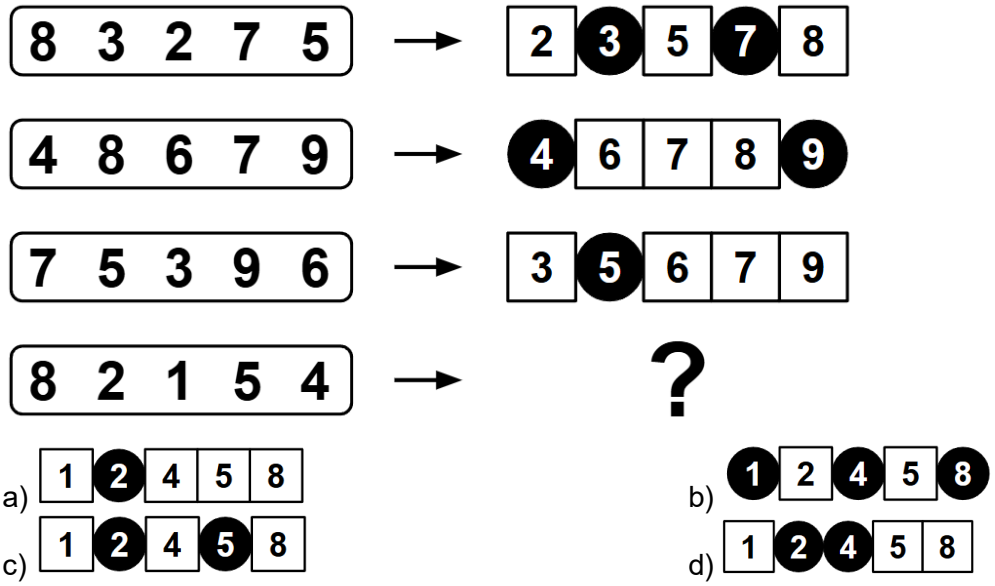
3. **What will come in place of "?"**



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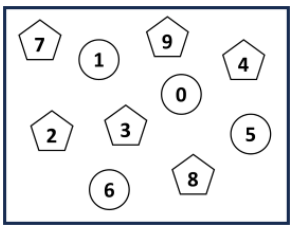
4. **A 5-digit number is formed such that all the digits are different and the sum of all the digits is 10. What is the highest digit this number can have?**
   a) 3 b) 4 c) 5 d) 6

5. **Using the instructions given below, form two numbers.**
Instruction 1: Form the largest 5-digit number using the digits in the 5-sided figures, without repeating any digit.
Instruction 2: Form the smallest 3-digit number using the digits in the circles, without repeating any digit.
What is the sum of the two numbers formed?



a) 99394 b) 93394 c) 98743 d) 98848

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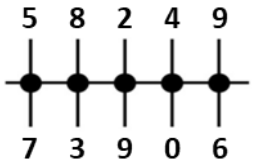
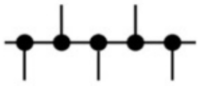
6. **Using the digits at the ends of the vertical lines, form numbers by reading the digits from left to right without rearranging them. Which option represents the greatest even number that can be formed?**



a)  b)  c)  d) 

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7. **A string of digits is given below. At MINIMUM, how many pairs of digits (may or may not be adjacent to each other) must be interchanged such that the second largest 5-digit number is formed from left to right?**
Note: *A digit can change its position any number of times*

Left **0 7 3 6 5** **Right**

a) 2 b) 3 c) 4 d) 5

---

8. **There is a 7-digit number X in which all the digits are different. Using the digits of X, two 5-digit numbers Y and Z are formed, such that no digit is repeated within Y or within Z. What is the MINIMUM number of digits that Y and Z must have in common?**

a) 1 b) 2 c) 3 d) 4

---

9. **A 5-digit number has the property that the number formed by its first three digits is the same as the number formed by its last three digits (without changing the order of digits). What is the minimum number of times any digit can appear in this number?**

a) 3 b) 1 c) 2 d) 5

---

10. **Which digit appears in the tens place of the second largest 5-digit number formed using 1, 5, and 7, where each digit is used at least once?**

a) 5 b) 7 c) 1 d) Either a or c

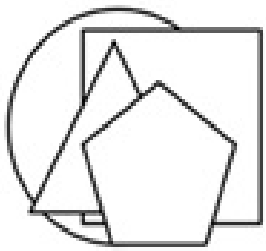
The Thinking Spot

P, Q, R, and S each has a different shape - Circle, Pentagon, Square, and Triangle (not necessarily in the same order). They arranged the shapes as shown below, where the Circle is placed at the bottom-most position.

• S placed his shape immediately above P's shape

• There are exactly 2 shapes placed above R's shape

Which of the following is Q's shape?



(a) Circle (b) Square (c) Pentagon (d) Triangle

Chapter 2: Fractions

1. **Sam has some chocolates. He gave 1 more than half the chocolates to A and 1 less than half the chocolates (of the original number of chocolates) to B. What is the difference between the number of chocolates given to A and B?**

   a) 0
   b) 1
   c) 2
   d) Cannot be determined

---

2. **Three groups of people - A, B, and C - each have the same number of members. They take part in three activities: 1, 2, and 3.**
   - **Each person within a group can only be part of one activity**
   - **Half of Group A does Activity 1, which is also done by all members of Group B**
   - **Half of Group C does Activity 3, which is also done by the remaining members of Group A**
   - **All remaining people do Activity 2**

   Which activity is done by the least number of people?

   a) Activity 1
   b) Activity 2
   c) Activity 3
   d) Both options a and b

---

3. **If $ = 12, @ = half of 12, and # = quarter of 12, then find the value of:**

   $ x @ – #

   a) 68
   b) 69
   c) 59
   d) 36

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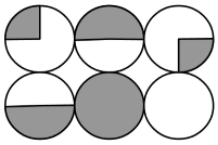
4. **What fraction of the total area of all the circles is shaded grey?**



   a) 10/24
   b) 5/6
   c) 5/24
   d) 14/24

---

5. **A piece of land is distributed between Raj and Rahul. Raj receives 1/2 of the total land, and Rahul receives land equal to 1/2 of what Raj receives. What fraction of the land remains undistributed?**

   a) 1/2
   b) 1/8
   c) 1/4
   d) The land is distributed completely

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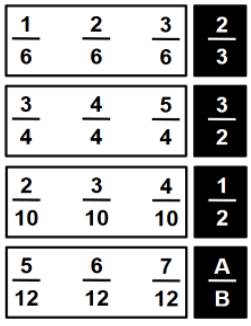
6. **If each row follows the same theme, what will come in place of A and B?**



   a) A = 8, B = 12
   b) A = 2, B = 3
   c) A = 3, B = 2
   d) A = 1, B = 6

7. **Which of these options can we conclude from the following statement?**
   Statement: Three quarters of total coins that Kiran has are of denomination five rupees.

   a) All coins that Kiran has are of more than 2 rupees
   b) All coins that Kiran has are of less than 10 rupees
   c) Only one-fourth of the coins with Kiran are not of five rupees
   d) Kiran has 30 coins of denomination five rupees

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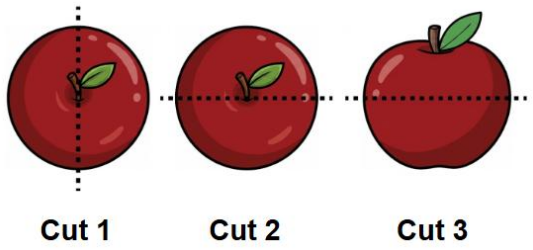
8. **Sam makes three cuts on the same apple, as shown by the dotted lines in the image below. Altogether, how many pieces of apple will he have?**



   a) 6 b) 7 c) 8 d) 9

---

9. **If you take 6 times of me, you will get a whole and a half. If you take me out of a whole, you are left with three times of me. Who am I?**

   a) Half b) Quarter c) Whole d) Zero

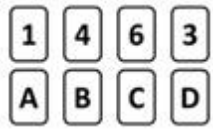
---

10. **In a chocolate shop, four buyers come in one by one to buy chocolates. Each buyer purchases half of the chocolates that are currently in the shop. For example, if there are X chocolates initially, the first buyer buys X/2 chocolates. Then, from the remaining chocolates, the second buyer buys half. This process continues until the fourth buyer, who buys only 1 chocolate. How many chocolates were there in the shop initially?**

    a) 8 b) 32 c) 16 d) 20

The Thinking Spot

Given below is a set of 8 cards, each having a WHOLE NUMBER on it. Cards A, B, C, and D represent numbers that are either one more or one less than the number on the card directly above them. If all 8 numbers on these cards are different, what is the sum of B and C?



(a) 12
(b) 10
(c) 11
(d) Cannot be determined

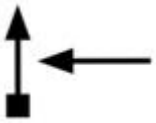
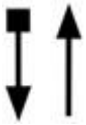
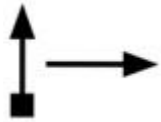
Chapter 3: Angles as Turns

1. **P and Q are standing in a playground. P took a right-angle turn in the clockwise direction and Q took a right-angle turn in the anti-clockwise direction, and now both of them face the same direction. If P is currently facing North, which direction was Q initially facing?**

   a) East
   b) West
   c) South
   d) Cannot be determined

---

2. **Two arrows must pass through five blocks to reach the opposite side, making a right-angle clockwise turn each time they enter a block. Which of the following options shows the correct positions of these arrows when they are present in the shaded block?**

a) 
b) 
c) 
d) 

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3. **Prachi is facing North. She takes a right-angle turn in the clockwise direction. She then takes a right-angle turn again in the clockwise direction. What direction is she facing now?**

   a) North
   b) East
   c) West
   d) South

---

4. **The given question image could be rotated clockwise or anticlockwise multiple times. Which of the following options will you NOT get on rotating the given question image?**

a) 
b) 
c) 
d) 

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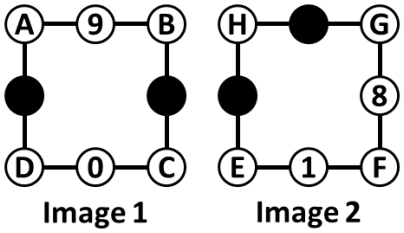
5. **Sam rotates Image 2 by a right-angle clockwise turn. If Tom places the rotated Image 2 on Image 1, which of the following statements is NOT true?**



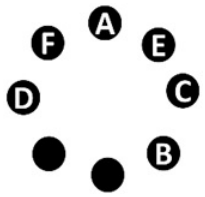
   a) A and E overlap with each other
   b) 9 and 8 are opposite to each other
   c) F and B are diagonal to each other
   d) 9 and 1 overlap with each other

6. **Pratik is facing north. He first makes a 1/4 clockwise turn, followed by a 1/2 anti-clockwise turn. In which direction was he facing at the end?**

a) North b) East c) West d) South

---

7. **A, B, C, D, E, and F are seated around a table, facing the centre, with two chairs left empty, as shown below. Two new members join the group. E, C, and B move one seat clockwise, while D and F move one seat anticlockwise. After these changes, the new members occupy the empty chairs. Who is sitting between the two new members?**



a) A b) B c) E d) F

---

8. **Rohan and Kamini are facing East. Rohan takes 2 quarter turns in clockwise direction and Kamini takes 2 quarter turns in anti-clockwise direction and then Kamini takes 1 quarter turn in clockwise direction. Which of the following will lead Kamini and Rohan to face opposite directions?**

a) Rohan taking 1 quarter turn in a clockwise direction
b) Kamini taking 1 quarter turn in a clockwise direction
c) Rohan taking 2 quarter turns in an anti-clockwise direction
d) Both options a and b

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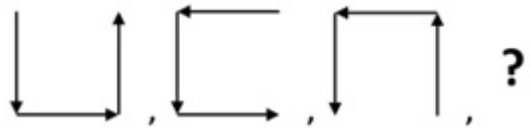
9. **What will come in place of "?" in the given series?**



a) b) c) d)

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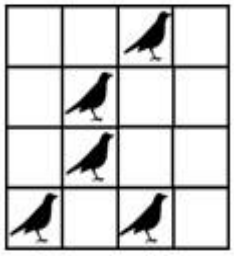
10. **If both the blue boxes shift to the next corner in clockwise direction, how will the image look after the shift?**

a) b) c) d)

The Thinking Spot

In the grid given below, colour some of the empty blocks such that each bird has exactly one coloured block adjacent to it. What is the MINIMUM number of blocks that need to be coloured?

Note: *For two blocks to be adjacent they MUST share one common side. Blocks having only a common corner are not adjacent*



(a) 2 (b) 3 (c) 4 (d) 5

Chapter 4: We the Travellers - II

1. **Which statement is DEFINITELY true about a five-digit number that consists of three odd digits and two even digits?**

   a) The sum of all the 5 digits is an odd number
   b) The sum of all the 5 digits is an even number
   c) The sum of all the 5 digits is a prime number
   d) Cannot be determined

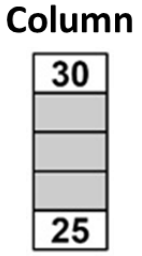
---

2. **A has 5 gold coins and B has 7 silver coins. B can exchange 2 silver coins for 1 gold coin with A. If B exchanges as many coins as possible, what will be the total number of coins (both gold and silver) with A at the end?**

   a) 8 b) 6 c) 5 d) 2

---

3. **In how many different ways can you fill in all the shaded cells such that the numbers in the column are arranged in descending order and each cell has a unique number?**



   a) 2 b) 3 c) 4 d) 5

---

4. **John has Rs. 12 with him. He went to a shop and bought 3 balls and 2 balloons. After buying these items, he still has Rs. 2 remaining, which is exactly the cost of 1 ball. What is the cost of 1 balloon?**

   a) Rs. 1 b) Rs. 2 c) Rs. 3 d) Rs. 4

---

5. **If you add 1 to the digit in the ones place and subtract 2 from the digit in the tens place in the numbers given below, how many of the new numbers will be even?**

   4434, 2655, 3561, 1636, 1253, 8094, 1371, 3038, 2335, 1045

   a) 5 b) 6 c) 7 d) 8

---

6. **You have to place 4 numbers from 1, 2, 3, 4, and 5 in the squares below to satisfy the given comparisons. How many different arrangements of numbers are possible if box B contains number 1? Note:** *You cannot use the same number twice in the same arrangement*

   a) 8 b) 9 c) 11 d) 12

7. **Bob has 4 coins with different values: 2, 4, 6, and 8.**
   Coin C is worth more than Coin A.
   The total value of Coins B and C is equal to the value of Coin D.
   Which TWO coins can Bob use to buy a candy that costs Rs. 14?

   a) Coins A and D b) Coins B and D c) Coins A and C d) Coins C and D

---

8. **How many different three-digit even numbers can you make using the digits given below?**
   Note: *You can use any one, any two, or all the digits, and you may repeat the digits*

   5 0 9

   a) 3 b) 4 c) 5 d) 6

---

9. **X is a 4-digit number which has only even numbers and only 2 unique digits. What could be the minimum value of the sum of the digits of the number X?**

   a) 2 b) 4 c) 8 d) 12

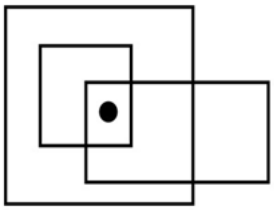
---

10. **A, B, and C each walk a certain distance.**
    - The person who covered the least distance walks 25 km, and another person walks 6 times this distance
    - C walks 12 km more than B, while A did not cover the least distance
    If only two among A, B, and C are allowed to walk further, how many more kilometres must they walk so that their COMBINED distance (from the start) equals the distance walked by the third person?

    a) 92 km b) 78 km c) 88 km d) 62 km

The Thinking Spot

Count the number of rectangles which contain the black circle.
Note: *Please count the squares also as rectangles for the purpose of this question*



(a) 3 (b) 4 (c) 5 (d) 6

Chapter 5: Far and Near

1. **Ram tied his cat to a small pole using a 10 feet long rope. At noon, Ram placed some milk 15 feet away FROM THE PLACE WHERE THE CAT WAS STANDING at that time. Can the cat reach the milk?**
   (Assume that the cat's body length is negligible and it is tied in the middle of an open field)
   a) Definitely yes
   b) Definitely no
   c) Sometimes yes, sometimes no; it depends on the exact location of the milk
   d) None of these

---

2. **Given below are the results for Javelin and High Jump competition.**
   - Tom threw the javelin 12 m farther than Roy
   - Kim jumped 1 inch higher than Roy
   - Roy jumped 2 inches less than John
   Which participant has secured the same position in both the sports?

Participants	Javelin throw (m)	Position	High jump (inches)	Position
Roy	40			
Tom			20	
John	34		29	1st
Kim	31			
Mary	58	1st	24	

   a) Mary b) Tom c) Roy d) John

---

3. **Soham collected 10 sticks, each measuring 6 cm. He breaks each stick into two equal halves. Using all the stick pieces, what is the maximum number of squares of side 3 cm he can form if each piece can be used only once and no piece can be shared by two squares?**
   a) 3 b) 4 c) 5 d) 6

---

4. **A snail moves forward by 3 cm in 1 minute, and then immediately after that moves backward by 2 cm in 1 minute. It follows the same rhythm in its movement. How much time will the snail take to reach the food placed 10 cm away for the first time?**
   a) 20 minutes b) 10 minutes c) 4 minutes d) 15 minutes

---

5. **A and B are two friends. They are standing at two opposite ends of a football field which is 60 metres long. They both start running towards each other. A runs with a speed which is double the speed of B. There is a football at the centre of the field. When they meet each other, who is farther from the football?**
   a) A
   b) B
   c) Need to know the speed of A or B to know the distance
   d) None of these

6. **I have to cut a 50-metre piece of cloth into sections of 1 metre each. How many cuts will I have to make at minimum? Note:** *I cannot double up the cloth to make 2 layers*

a) 47 b) 48 c) 49 d) 50

---

7. **Rishi visited Goa and made new friends. His new friends stay near the beach.**
Parish lives 800 metres east of the beach.
Anil lives 1400 metres east of the beach.
Sunil's house is exactly between the houses of Parish and Anil.
What distance must Rishi travel if he visits the houses of Sunil and Parish, starting from the beach and returning to the beach?

a) 2500 m b) 3800 m c) 1900 m d) 2200 m

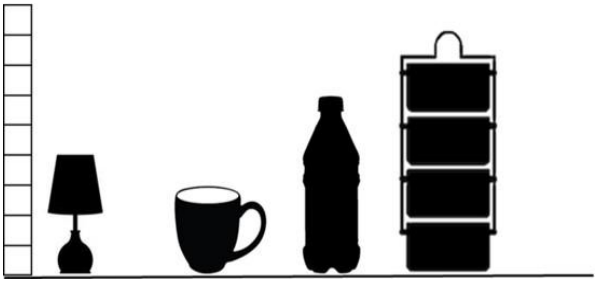
---

8. **A group of trees with different heights is shown below. How many trees have both a taller and a shorter tree immediately next to them, compared to their own height?**

a) 1 b) 2 c) 3 d) 4

---

9. **Statement: The lamp is __A__ unit(s) taller than the cup but 2 units shorter than the __B__. What will come in place of A and B, in the given statement?**



a) A - 2, B - lunch box b) A - 1, B - bottle
c) A - 1, B - lunch box d) A - 2, B - bottle

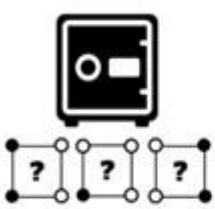
---

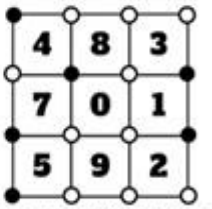
10. **Mahesh knew that the distance between A and B was more than 3 km but less than 7 km. Ravi knew that the distance was more than 5 km but less than 10 km. If both of them are correct and the distance can only be an EXACT (integer) number of kilometres, how much must they pay if the taxi charges Rs. 8 per km?**

a) Rs. 48 b) Rs. 56 c) Rs. 40 d) Rs. 64

The Thinking Spot

The locker has a secret code. Identify the code with the help of the given code key chart.





CODE KEY CHART

(a) 541 (b) 585 (c) 582 (d) 581

Chapter 6: The Dairy Farm

1. **A mason laid 100 bricks in a row. He grouped bricks together, where every group has 25 bricks. If 8 bricks from each group are removed, then how many bricks are left in total?**

   a) 32 b) 64 c) 68 d) 92

---

2. **Two types of boxes, A and B, are being transported. Each carton can hold either 8 boxes of type A or 10 boxes of type B. If a total of 76 boxes were transported, what is the minimum number of cartons required, given that all the cartons are full?**

   a) 6 b) 7 c) 8 d) 9

---

3. **8 teams are divided into two pools of 4 teams. The teams within a pool play with every other team in the pool twice. After these matches, the top team from each pool is selected and they play a final to decide the winner. How many matches will be played in total?**

   a) 24 b) 25 c) 28 d) 29

---

4. **Raj took an entrance exam where he attempted 38 questions out of 40, out of which he got 3 questions wrong. If the marking scheme per question is shown below, what is the maximum marks Raj could score?**

Section A (25 Questions)	**Section B** (15 Questions)
Correct Answer : +2	Correct Answer : +3
Wrong Answer : -2	Wrong Answer : -2
Un-attempted : 0	Un-attempted : -1

   a) 76 b) 79 c) 81 d) 83

---

5. **80 kg of material needs to be transported to a place that is 10 km away.**

   The material must be divided into only one fixed load size for the entire transport. The possible load sizes are 10 kg, 20 kg, or 40 kg. Any number of couriers may be used.

   Each courier:

   - **Charges ₹10 per hour**
   - **Travels at 10 km/hr when empty**
   - **Travels at 5 km/hr while carrying 10 kg**
   - **Travels at 2 km/hr while carrying 20 kg**
   - **Travels at 1 km/hr while carrying 40 kg**

   A courier can carry at most 40 kg at a time.

   After delivering a load, the courier must return empty before the next trip. Even after the final delivery, the courier returns empty, and all return journeys are charged.

   What is the minimum total cost required to transport all 80 kg of material?

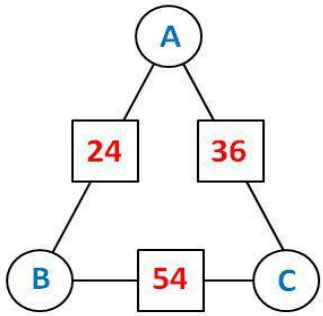
   a) Rs. 220 b) Rs. 240 c) Rs. 260 d) Rs. 280

6. **In a theatre, seats are arranged in rows labelled A to F and columns labelled 1 to 5. If the entire row C and the entire columns 3 and 5 are empty and the rest of the seats are sold out, then how many tickets are sold in total?**

a) 13 b) 17 c) 15 d) 14

---

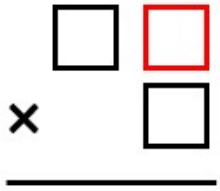
7. **If the number in each square is the product of the two numbers in the circles connected to it, what is the value of B?**



a) 9 b) 6
c) 4 d) Cannot be determined

---

8. **If we place the numbers 5, 6, and 7 in the boxes shown below and the product is 455, which number will go in the red box?**



a) 5 b) 6
c) 7 d) Either option a or option c

---

9. **In a classroom, there are 5 desks in each row. The number of rows is not known. First, all the desks in the front row are removed. Then, one desk is added to the leftmost side of each remaining row. After these changes, the total number of desks in the classroom becomes one of the following: 18, 20, 22, or 28.**
Which of these could represent the number of rows remaining after the front row was removed at the start?

a) 3 b) 4 c) 5 d) 7

---

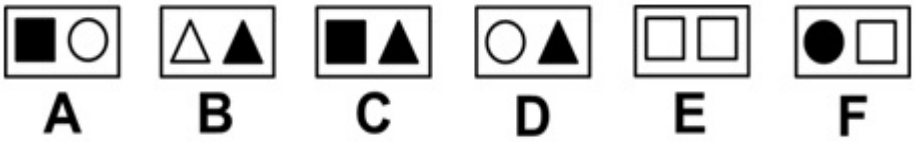
10. **The numbers in Row C have been changed to the numbers in Row D by using a specific rule. Which of the following options shows that rule?**

ROW C	30	60	10	90	150
ROW D	240	480	80	720	1200

a) 8 × C = D b) 8 × D = C
c) C + 210 = D d) Both a and c are correct

The Thinking Spot

Given below are 6 boxes, A, B, C, D, E, and F, each having a pair of shapes. They need to be categorised into 4 groups, as follows:
- If both shapes in a box are of the same colour, they belong to Group 1. If not, they belong to Group 2
- If both shapes in a box are the same (irrespective of their colour), they belong to Group 3. If not, they belong to Group 4
- One box can be part of more than one group
How many boxes belong to BOTH groups 2 and 4?



(a) 3 (b) 4 (c) 2 (d) 1

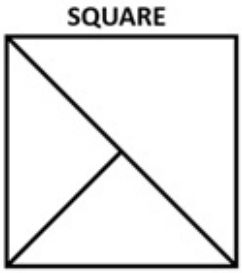
Chapter 7: Shapes and Patterns

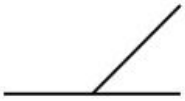
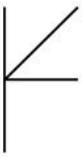
1. **In a wall there are some triangular tiles with equal sides, of which, some have been removed, leaving a black coloured wall. How many such triangular tiles have been removed?**

a) 4 b) 5 c) 6 d) 7

---

2. **Which of the following additional lines, shown in the options, should be drawn so that the square given in the question image is divided into 8 EQUAL parts?**
Note: *You cannot rotate the question or option images*



a)  b)  c)  d) 

---

3. **Sam divided a rectangle into 6 equal parts using lines such that each line further divided the rectangle into more parts. Which of the below options could represent the number of lines used by Sam?**

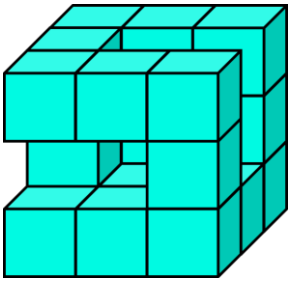
a) The rectangle is divided using 3 horizontal and 3 vertical lines
b) The rectangle is divided using 3 horizontal and 2 vertical lines
c) The rectangle is divided using 2 horizontal and 2 vertical lines
d) The rectangle is divided using 2 horizontal and 1 vertical line

---

4. **A paper piece is in the form of a regular pentagon. At most how many times can it be folded in half? Note:** *Once the paper is folded, it cannot be unfolded*

a) 0 b) 1 c) 2 d) 3

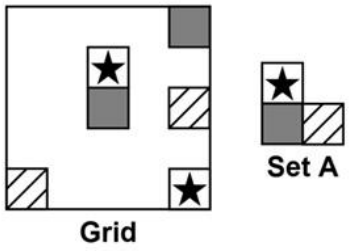
5. **Given below is an incomplete arrangement of a 3 x 3 x 3 cube where all the smallest cubes are of the same size. How many such smallest cubes are required to complete the cube?**



a) 4 b) 5 c) 6 d) 7

---

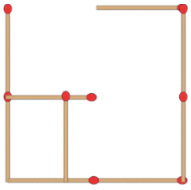
6. **In how many different ways can Set A (without rotating) be placed completely on the grid so that no two squares overlap and no two adjacent squares have the same pattern?**
Note: *Squares that share common sides are considered to be adjacent. Squares that share a common corner alone, are NOT adjacent*



a) 4 b) 5 c) 6 d) 7

---

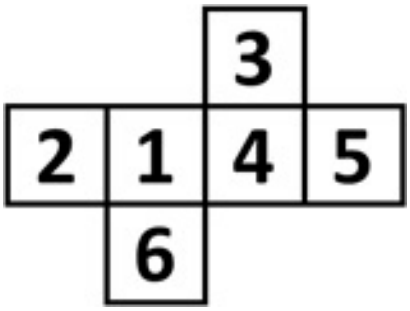
7. **What is the minimum number of matchsticks needed to make a figure which is divided into 6 equal parts?**
Note: *You can't change the placement of the matchsticks already in the image*



a) 4 b) 5 c) 6 d) 7

---

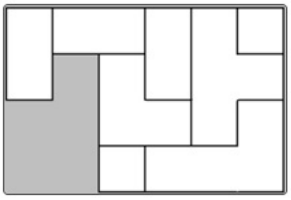
8. **Given below is the net of an unfolded cube. Which of the following pairs of numbers would be on the opposite faces of the cube when the net is folded?**

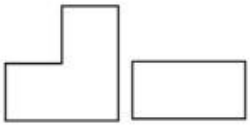


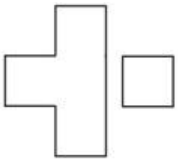
a) 6 and 4 b) 1 and 3 c) 5 and 6 d) 1 and 5

9. Which of the following set of pieces CANNOT be arranged in the grey space to complete the rectangle?

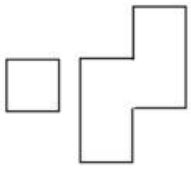
Note: *You cannot rotate or overlap the given pieces*



a) 

b) 

c) 

d) 

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10. Two faces of a plain white cube are painted red. Now the cube is divided into 27 small cubes of equal dimensions. How many such smaller cubes will have at least one face painted?

a) 6
b) 12
c) 15
d) Cannot be determined

The Thinking Spot

A, B, C, D, E, and F are 6 friends.
A, C, and F are girls, while the others are boys.
C and E are playing chess, while the others are playing Ludo.
How many boys are playing Ludo?

(a) 1 (b) 2 (c) 3 (d) 4

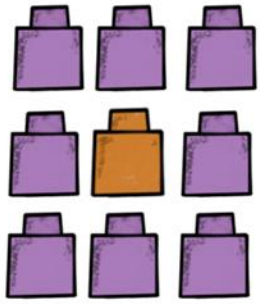
Chapter 8: Weight and Capacity

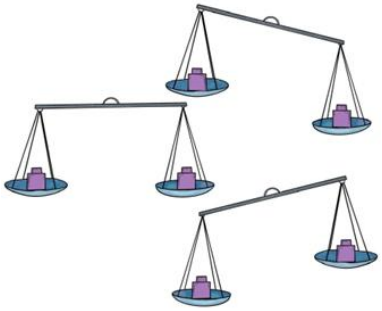
Activity Time

Measuring Weight

Activity: Searching with a Weighing Scale

Imagine we have **9 identical-looking weights,** out of which one is **lighter, a fake weight**. We have to figure out which one is lighter using only a weighing scale (and nothing else). Our goal is to find the fake in the least number of weighings.



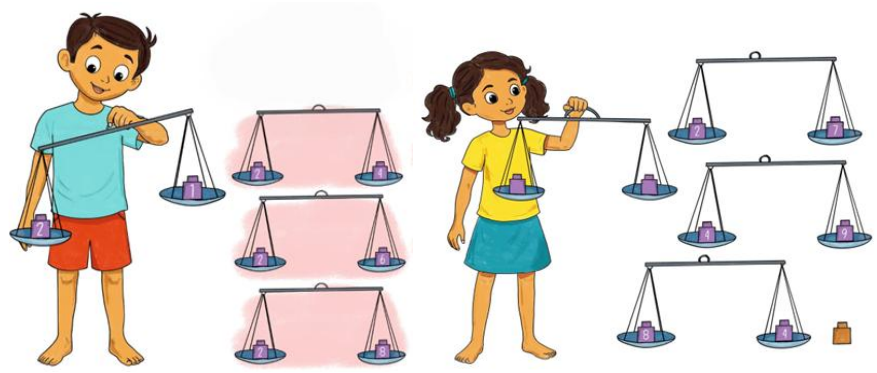


How will we figure this out? What process will we use to determine the fewest weighings needed to identify the lighter fake weight? Always assume that you have the worst luck and will get the fake weight in the last possible step.

A: Initial attempt

Let's take **two weights** at a time and compare. Taking two weights at a time can be done in two different ways:

- In the first method, we keep the weight on **one side constant** (let's say the right) and choose **a new weight** for the left side at each weighing.
- In the second method, we choose **two new weights** for every weighing.



1. **Is one of the methods above faster (fewer weighings) than the other, and if yes which one?**
   a) Yes, method one is faster

b) Yes, method two is faster
c) No, both take the same number of weighings

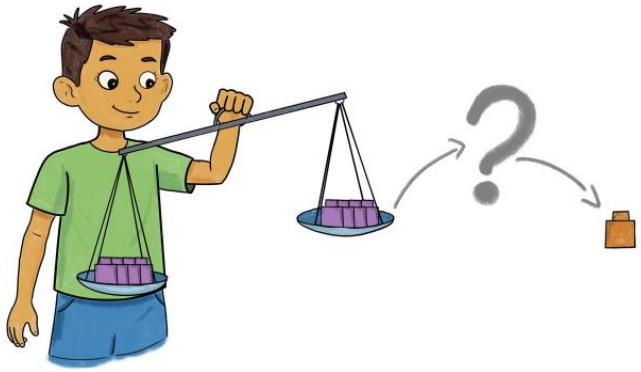
---

2. How many minimum weighings will it take to guarantee figuring out the fake (lighter) weight when you compare two weights at a time?
(This means we are assuming you always have bad luck and get the fake one in the last possible step)

a) 5 weighings b) 8 weighings c) 4 weighings d) 7 weighings

B: A faster way (Binary search)

To do it faster, we need to remove as many weights as possible in each round and use divide-and-conquer better. Can we divide the 9 weights more effectively? Maybe into groups of 4.



1. After one weighing, how many weights remain?

a) 1 b) 4 c) 5 d) 8

---

2. If the fake is among the 4 remaining weights, how many more weighings are needed (minimum) to find the fake weight?

a) 1 b) 2 c) 3 d) 4

C: Fastest possible algorithm in a three-state system

Can we do this faster than the binary search? Let's bring together the various points we observed above. Let's try dividing into 3 equal parts, and now we will weigh two groups of three.

1. How many weights get removed after the first weighing?

a) 2 b) 4 c) 3 d) 6

---

2. How many steps does this method require to determine the fake weight?

a) 1 b) 2 c) 3 d) 4

We see that if we have three equal groups, we can find the lightest group in one step. If these groups each have three weights, then in the second weighing, we get the lightest weight.

Conclusion:

We see that dividing the search space into three parts is faster for finding the fake weight using a balance. This happens because in a three-state system, “ternary search” is a faster searching algorithm.
We broke the problem into 3-weight chunks, understood the pattern, saw how it gets solved, and used the same algorithm to solve the bigger 9-weight problem.

Questions

1. **Which object would be the 3rd heaviest if you arrange the following objects in decreasing order of their weights?**

a)  b)  c)  d) 

---

2. **Amit, Devashish, and Ajay are weighing themselves on a FAULTY weighing machine. This machine always shows weight more than the actual weight by some constant amount in kg. This machine shows Devashish's weight as 78 kg. Amit's weight is 6 kg less than Devashish's weight, and the actual weight of Amit is 65 kg. What will be Ajay's weight shown by this machine if Ajay's actual weight is 56 kg?**

   a) 65 kg b) 63 kg c) 60 kg d) 49 kg

---

3. **John weighs 2 kg more than Bob. Sam weighs 1 kg less than John. What is the difference between the weights of Sam and Bob?**

   a) 1 kg b) 2 kg c) 3 kg d) 4 kg

---

4. **Which of the following statements is/are sufficient to answer the following question?**
   QUESTION: What will be the total weight of 10 tiles, if each of them weighs the same?
   STATEMENT 1: One-fifth of the weight of all the tiles together is at least 10 kg more than the weight of each tile.
   STATEMENT 2: The total weight of three tiles is 10 kg more than the total weight of two tiles.
   a) Statement 1 alone is sufficient
   b) Statement 2 alone is sufficient
   c) Both Statement 1 and Statement 2 are necessarily required
   d) Question cannot be answered even if both Statement 1 and Statement 2 are taken

---

5. **The sum of the weights of A and B is 50 kg, while the sum of the weights of B and C is 70 kg. If the weight of A is greater than or equal to 20 kg, which of the following CANNOT be the weight of C?**

   a) 30 kg b) 40 kg c) 50 kg d) 60 kg

---

6. **A total of 15 litres of water is completely emptied into five different buckets.**
   Three of the five buckets have capacities of 3 litres, 6 litres, and 2 litres.
   If all five buckets are filled such that 1 litre of space remains unfilled in each bucket, find the capacities of the remaining two buckets.

   a) 2 litres and 3 litres b) 4 litres and 5 litres c) 3 litres and 4 litres d) 5 litres and 6 litres

7. There are three bags, P, Q, and R, and the weight of each bag is a NATURAL NUMBER. Two bags have the same weight.

• P and R weigh 4 kg together

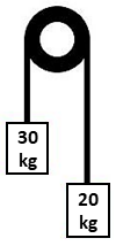
• Q and R weigh 6 kg together

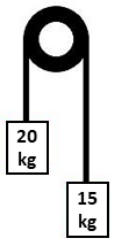
What is the MINIMUM possible weight of a bag?

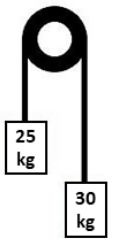
a) 2 kg b) 3 kg c) 4 kg d) 1 kg

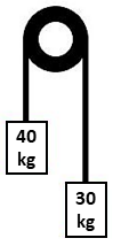
---

8. Find the odd one out.

a) 

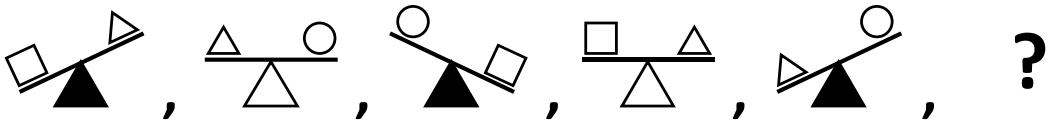
b) 

c) 

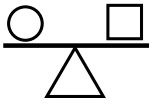
d) 

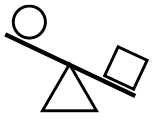
---

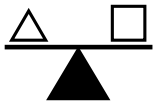
9. What will come in place of "?" in the given series?



a) 

b) 

c) 

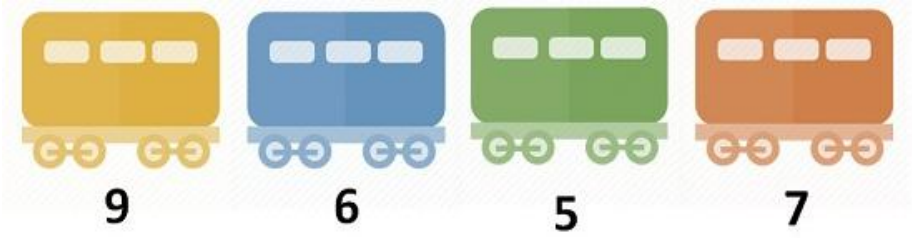
d) 

---

10. The numbers below the bogies show the number of passengers each bogie can carry.

A train is formed using three bogies, each of a different colour, and one of them must be green.

What is the MAXIMUM total number of passengers the train can carry?



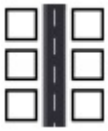
a) 21 b) 17 c) 23 d) 18

The Thinking Spot

A road has shops on both sides (left and right as shown in the image below) such that:

- **The Sweet shop is on the opposite side of the Electronics shop**
- **The Toy shop is next to the Electronics shop**
- **On the opposite side of the Toy shop is the Furniture shop**
- **The Clothes shop is next to the Toy shop**
- **The Dairy shop is next to the Furniture shop**

Which shop is on the same side of the road as the Dairy shop?



(a) Toy Shop (b) Clothes Shop (c) Electronics Shop (d) Sweets Shop

Chapter 9: Coconut Farm

1. **Given below is a question followed by two statements. Identify which of the following statement(s) is/are necessary to answer the question.**
   Question: Four students are added to a dance class. Will the teacher be able to divide her students evenly into a dance team (or teams) of 8?
   Statement A: If 12 students were added, the teacher could put everyone in teams of 8 without any leftovers.
   Statement B: The number of students in the class is currently not divisible by 8.

   a) Statement A alone is sufficient
   b) Statement B alone is sufficient
   c) Both statements are required
   d) None of the above

---

2. **There are 24 soldiers in an army. A commando wants to arrange them in rows and columns such that:**
   - **Each row has the same number of soldiers across all the rows**
   - **Each column has the same number of soldiers across all the columns**
   - **Several rows and columns are formed**

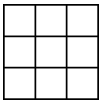
   In how many different ways can this arrangement be done? Note: *Number of rows and columns are not same*

   a) 4
   b) 3
   c) 6
   d) 8

---

3. **Some natural numbers from 101 to 200 are to be placed in the 3 × 3 grid shown below. The arrangement must follow these rules:**
   1. **In each row and each column, the three numbers must leave different remainders when divided by 3**
   2. **No number can be repeated**

   Which of the following statements is correct?



   a) A row can have three consecutive even numbers
   b) A row can have three consecutive odd numbers
   c) A row can have three consecutive numbers
   d) All of these

---

4. **A three-digit number divisible by 18 leaves a remainder of 6 when divided by 12. How many different possible values can this number have?**

   a) 50
   b) 26
   c) 25
   d) 20

---

5. **Which of the following operators CANNOT replace "@" to satisfy the condition given below?**
   10 @ 1 < 11

   a) ÷
   b) -
   c) ×
   d) +

6. **Each of the letters A, B, C, D, E, and F is assigned a value, shown by the mathematical expression written above it. If the letters are rearranged in descending order of their values, how many letters will stay in the same position as before?**

42 x 1	22 x 2	60 x 0	16 x 4	12 x 3	10 x 5
A	B	C	D	E	F

a) 0 b) 1 c) 2 d) More than 2

---

7. **Captain Malhotra has to align his troop of soldiers into some rows. Each row should have exactly 25 soldiers. He knows the total number of soldiers in his troop. He wants to find out if any soldiers will be left out after the alignment is done. How can he do this?**

a) Divide the total number of soldiers by 5 and check if the remainder left is 0
b) Divide the total number of soldiers by 15 and check if the remainder left is 0
c) Divide the total number of soldiers by 25 and check if the remainder left is 0
d) None of these

---

8. **An employee at a pizza shop works for 15 days, receiving 2 slices of pizza each day he works. Each pizza contains 8 slices. By the end of 15 days, how many whole pizzas and individual slices has he received?**

a) 4 pizzas and 2 slices b) 2 pizzas and 6 slices
c) 3 pizzas and 6 slices d) 3 pizzas and 4 slices

---

9. **If the multiplication operator is placed only between two even digits and an addition operator is placed in any other case, then which of the following expressions gives the highest output?**

a) 3 _ 2 _ 4 _ 7 b) 5 _ 2 _ 6 _ 3 c) 3 _ 9 _ 2 _ 4 d) 6 _ 4 _ 3 _ 7

---

10. **Find the next term of the given series:**

8, 24, 12, 36, 18, 54, ?

a) 27 b) 28 c) 37 d) 39

The Thinking Spot

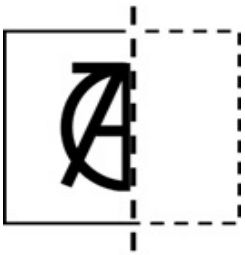
Exactly one letter of the given word should be replaced with any other letter of the English alphabet to form a number name. How many number names can be formed this way?
Note: *The remaining letters of the word cannot be rearranged to form a meaningful word*

F I N E

(a) 3 (b) 2 (c) 1 (d) 0

Chapter 10: Symmetrical Designs

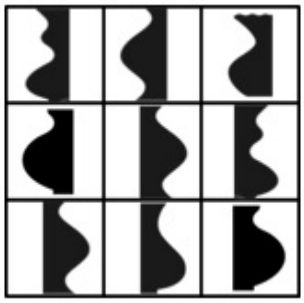
1. **A transparent symmetrical sheet of paper has letters written on it and is folded in half. Which of the following letters given in the options is NOT present if the given sheet is unfolded?**



a) N b) T c) A d) O

---

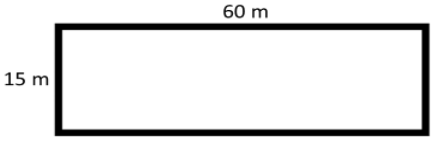
2. **Some symmetrical figures are cut into two halves and placed in the grid below. Which of the following options has only one half present in the grid?**



a)  b)  c)  d) 

---

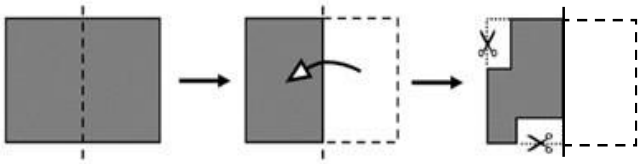
3. **At least how many times should the given paper sheet be folded in half to make a square?**

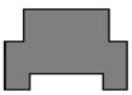
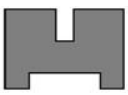


a) 0 b) 1 c) 2 d) 3

---

4. **A sheet of paper is folded in half and after folding, some part is cut as shown in the image below. Now the sheet is unfolded. Choose the option which represents the piece after unfolding.**



a)  b)  c)  d) 

5. **Along how many different lines can a circular sheet be folded into half?**

a) 1 b) 2 c) 100 d) More than 100

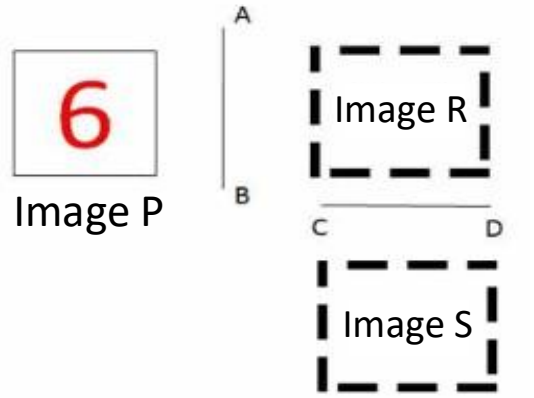
---

6. **A symmetrical paper sheet is in the form of a polygon. It is cut into halves so that each half forms a polygon of 5 sides. How many sides were possibly there in the original paper sheet?**

a) 6 b) 7 c) 8 d) All of these

---

7. **The given Image P is first reflected along the line AB to obtain Image R. Then, Image R is reflected along the line CD to obtain Image S. Which of the following options is the same as Image S?**



a) 

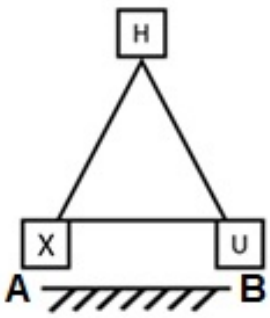
b) 

c) 

d) 

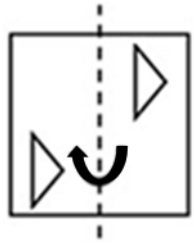
---

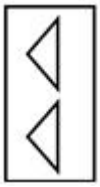
8. **Which of the following pairs of letters will have the same image if they are reflected in a mirror placed along the line AB?**



a) H and U b) X and U c) H and X d) All of the above

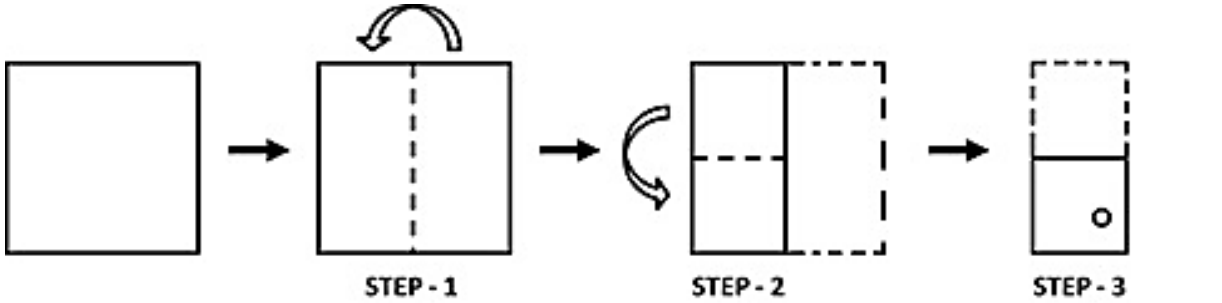
9. A transparent sheet of paper of the given shape is folded along the dotted line in the direction as shown by the arrow. What will the folded sheet look like?
Note: *You cannot rotate the question or option images*

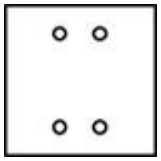
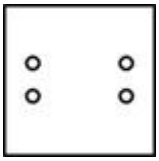
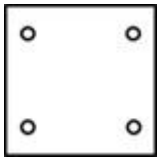
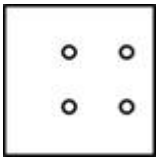


a) 
b) 
c) 
d) 

---

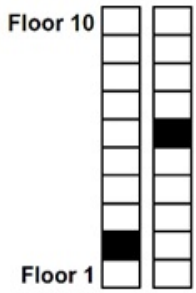
10. A sheet of paper is folded along the dotted line in steps 1 and 2, as shown in the image below. After this, a hole is made, as shown in step 3. How will the paper look after it is unfolded?



a) 
b) 
c) 
d) 

The Thinking Spot

Given below is a 10-storey building with 2 elevators, with their current positions highlighted in black. If the buttons for both elevators are pressed simultaneously on floor 1, and both elevators travel at the same speed to the topmost floor and return to the 1st floor without stopping, on which floor will they meet?



(a) Floor 7 (b) Floor 8 (c) Floor 9 (d) Floor 10

Chapter 11: Grandmother's Quilt

1. **A piece of regular hexagonal paper is cut along a line joining two opposite corners. What would be the areas of the two pieces?**

   a) Areas would be unequal
   b) Areas would be equal to each other
   c) Area would be one fourth of original sheet
   d) Cannot be determined

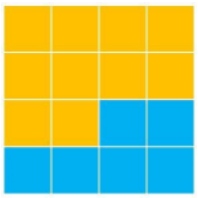
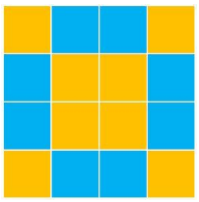
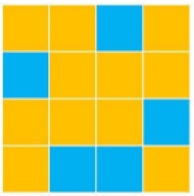
---

2. **If a square sheet is cut in half along one of its sides, how does the perimeter of the original square compare with the combined perimeter of the two new shapes formed?**

   a) The combined perimeter is greater than the perimeter of the original square
   b) The combined perimeter is less than the perimeter of the original square
   c) The combined perimeter is equal to the perimeter of the original square
   d) Cannot be determined

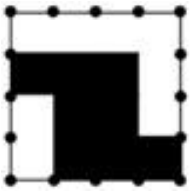
---

3. **Which option has the maximum area filled with orange colour?**

   a) 
   b) 
   c) 
   d) 

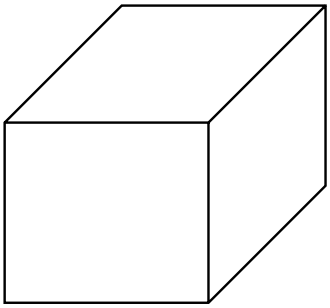
---

4. **Which of the following grids does NOT have an EQUAL portion of black and white area?**
   Note: *The dots along each edge are spaced equidistantly*

   a) 
   b) 
   c) 
   d) 

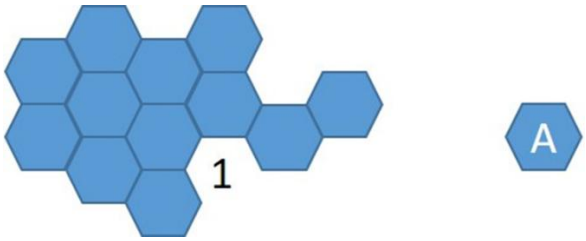
---

5. **The Length and Breadth of a cube are reduced to half. The areas of how many faces of the cube will become exactly half because of this?**



   a) 0
   b) 2
   c) 4
   d) 6

6. What will happen to the overall perimeter of the puzzle if piece A is placed at position 1?



a) It will increase
b) It will decrease
c) It will remain unchanged
d) Cannot say

---

7. If the diameter of a circle is equal to the side of a square, what can you say about the area of both the shapes?

a) The area of the circle is greater than that of the square
b) The area of the square is greater than that of the circle
c) The area of the square is the same as that of the circle
d) None of these

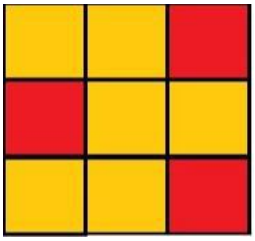
---

8. Question: How many metres of wire are needed to cover the perimeter of the field once, without overlapping?
Information 1: The shape of the field is an isosceles triangle
Information 2: One of the sides of the field has length 16 metres and another side has length 40 metres
To answer the given question, which of the given information is/are sufficient?

a) Only 1
b) Only 2
c) Both 1 and 2 together
d) Question cannot be answered even if both information are used

---

9. In the given square, there are some red blocks and some yellow blocks each being equal in area. Find the area occupied by the red blocks if the side of the bigger square is equal to 6 units.



a) 6 sq. units
b) 12 sq. units
c) 8 sq. units
d) 16 sq. units

---

10. Two identical polygonal shaped paper sheets A and B are taken and joined (not overlapping) along an equal side. What would be the perimeter of the resultant paper sheet?

a) More than twice the perimeter of sheet B
b) Lesser than twice the perimeter of sheet B
c) Twice the perimeter of sheet B
d) None of these

The Thinking Spot

Maths, English, Science, History, French, and Geography books are stacked one above the other. The Maths book is stacked below only 2 books. Five books are stacked on top of the French book. The Geography book has only 1 book below it, and History is not one of the 2 books stacked above Maths. If Ms. Patsy pulls out the top two books from the stack, which two books did she pull out?

(a) Maths and Science
(b) History and English
(c) Science and English
(d) Cannot be Determined

Chapter 12: Racing Seconds

1. **Tom started playing cricket with his friends at 10:15 AM. They played for 1 hour and 15 minutes before stopping for lunch, which they completed by 12:30 PM. How long did their lunch take?**

   a) 45 minutes b) 60 minutes c) 90 minutes d) 75 minutes

---

2. **A light bulb is turned ON for seven minutes and OFF for seven minutes. This process is then repeated. At what time will the light bulb be turned on for the 4th time?**

   a) Beginning of 43rd minute
   b) Beginning of 29th minute
   c) Beginning of 57th minute
   d) Beginning of 50th minute

---

3. **A term is missing in between the sequence. Find the missing term.**
   10:15 AM, 10:45 AM, 11:15 AM, 11:45 AM, _____ , 12:45 PM, 1:15 PM

   a) 11:30 AM b) 12:15 PM c) 12:15 AM d) 12:30 PM

---

4. **If an alarm clock is set to ring every three hours, how many times will it ring between 8 AM and 4 PM, if it rings for the first time at 9 AM?**

   a) 1 b) 2 c) 3 d) 4

---

5. **A, B, C, and D are going to a party. A leaves home at 6:10 PM and reaches the party after 70 minutes. B reaches the party 30 minutes before A. If D reaches the party 60 minutes after C, at what exact time does D reach the party?**

   a) 19:00
   b) 18:30
   c) 19:30
   d) Cannot be determined

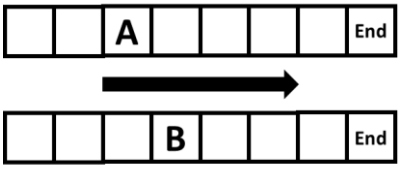
---

6. **Four friends Mayank, Rahul, Sachin, and Virat have different writing speeds.**
   • Mayank can write 2 pages in 10 minutes
   • Rahul can write 4 more pages than what Mayank writes in 10 minutes
   • In 15 minutes, Sachin can write half the number of pages as Rahul can write in 10 minutes
   • In 30 minutes, Virat finishes 1 page less than the number of pages Sachin finishes in 30 minutes
   How many pages can Virat write in an hour?

   a) 10 b) 8 c) 9 d) 12

---

7. **As shown in the image, A and B are racing towards the End box.**
   A takes 5 seconds to move from one box to the next.
   B takes 4 seconds to move from one box to the next.
   How many seconds after B will A reach the End box?



   a) 6 b) 9 c) 10 d) 8

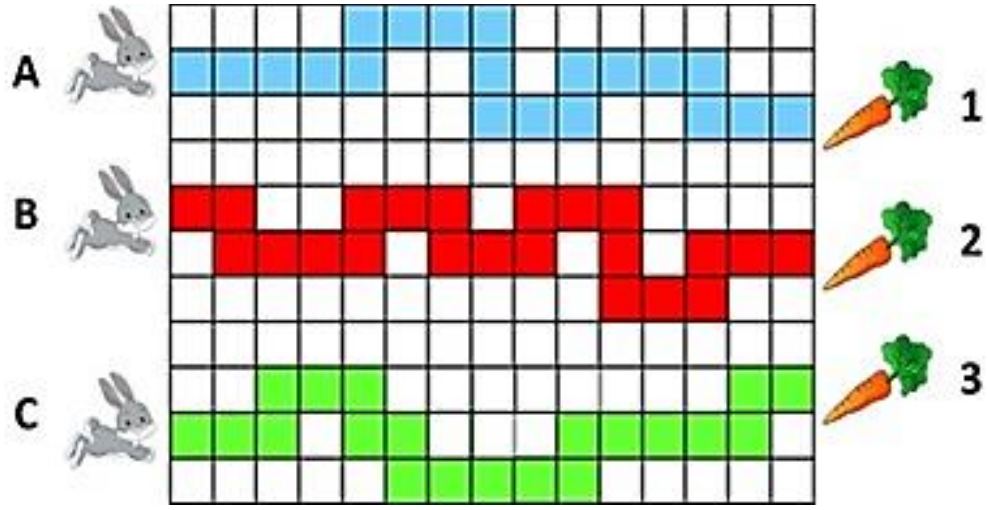
8. **Mary and her sister went to a badminton game on Friday. They left the house at 5:25 PM and reached the badminton court 20 minutes before the game started. If it took them 5 minutes to drive to the badminton court, then at what time did the badminton game start?**

a) 06:00 PM b) 05:50 PM c) 05:45 PM d) 05:10 PM

---

9. **Rabbit A runs on blue-coloured boxes. Similarly, rabbit B runs on red-coloured boxes and rabbit C runs on green-coloured boxes. If each rabbit runs at the same speed and starts at the same time to reach the carrots, which among the following rabbits can be seen in the same column upon taking the 13th step?**

Note: *A column is a vertical stack of blocks in the given grid*



a) Rabbits A and B b) Rabbits B and C c) Rabbits A and C d) None of these

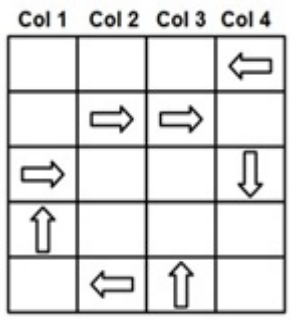
---

10. **A and B are boarding different trains. B arrives at the station 10 minutes before A. B's train is scheduled to depart at 6:30 PM and he arrives 5 minutes before the scheduled departure. At what time is A's train scheduled if he reaches exactly on time?**

a) 6:20 PM b) 6:25 PM c) 6:30 PM d) 6:35 PM

The Thinking Spot

In the grid given below, if all the arrows move EXACTLY one block in the direction they are pointing to, then which column will have the MAXIMUM number of arrows?



(a) Column 1 (b) Column 2 (c) Column 3 (d) Column 4

Chapter 13: Animal Jumps

1. **I am a two-digit number. The digit in the ones place is twice the digit in the tens place. Which of the following numbers would I always be divisible by?**

   a) 4 b) 6
   c) 7 d) Both options a and b

---

2. **Tom wants to make gift boxes combining chocolates and toys. He has 36 chocolates and 48 toys. If he wants to make all the boxes identical and have nothing left over, what is the maximum number of gift boxes he can make?**

   a) 12 b) 24 c) 10 d) 13

---

3. **Sam has 22 pencils and Mary has 14 pencils. They both need to individually divide their pencils among 4 students such that neither Sam nor Mary has any pencil left. Also, all the 4 students should receive an equal number of pencils. What is the least number of pencils that Sam must give to Mary to fulfil the condition?**

   a) 1 pencil b) 2 pencils c) 4 pencils d) 6 pencils

---

4. **Alex has four boxes - A, B, C, and D.**
   - **A can accommodate all numbers which are multiples of 5**
   - **B can accommodate all numbers which are multiples of 3**
   - **C can accommodate all numbers which are even**
   - **D can accommodate all numbers which are multiples of 4**

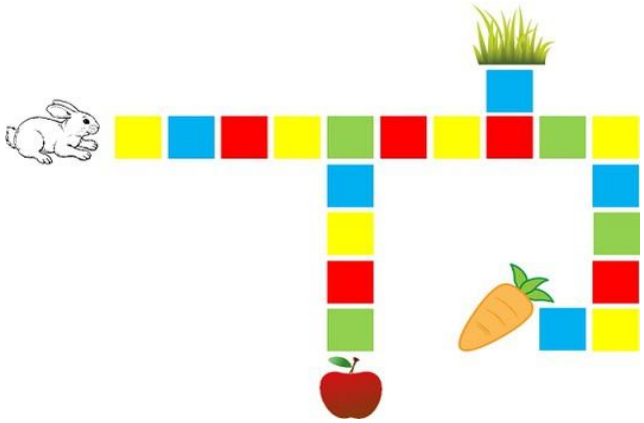
   Alex has to fit the following numbers in the boxes above. What is the MINIMUM number of boxes he needs?

   3, 15, 24, 36, 45, 60

   a) 1 b) 2 c) 3 d) 4

---

5. **If the rabbit always jumps to every third tile from its position and it takes 2 minutes for each jump, how long will it take the rabbit to reach the carrot?**



   a) 10 minutes b) 8 minutes c) 6 minutes d) 5 minutes

6. All the number pairs given in the options have a characteristic common to them, except one pair which is different. Find the number pair that is the odd one out.

a) 13, 25 b) 12, 42 c) 10, 15 d) 45, 72

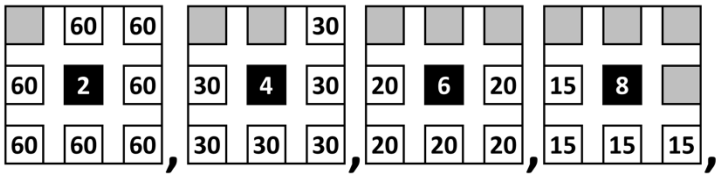
---

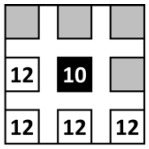
7. Seema has two yarns measuring 56 cm and 98 cm which she plans to cut into pieces of equal length with nothing left over.
What is the greatest possible length of each piece?

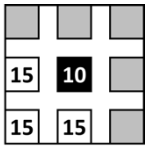
a) 7 cm b) 14 cm c) 21 cm d) 28 cm

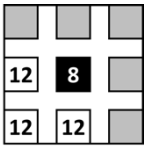
---

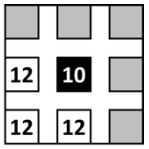
8. Find the next term in the following series:



a) 

b) 

c) 

d) 

---

9. Which of the following statements is/are sufficient to answer the given question?
Question: Is any one of the integers A, B, or C divisible by 3?
Statement 1: A, B, and C are three consecutive natural numbers.
Statement 2: Value of B is 32.

a) Only 1 is sufficient b) Only 2 is sufficient
c) Both 1 and 2 are necessarily required d) None of these

---

10. What is the value of X?

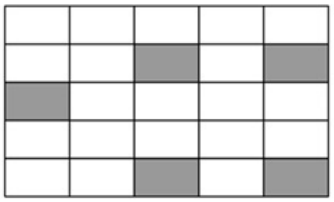
Information 1: The sum of factors of X is 42
Information 2: X has exactly two factors
To answer the given question, which of the given information is/are sufficient?

a) Only 1
b) Only 2
c) Both 1 and 2 are required
d) Question cannot be answered even if both pieces of information are used

The Thinking Spot

At how many DIFFERENT POSITIONS can we place FRAME A in GRID X such that none of the grey blocks of the FRAME overlap any grey block of the GRID? The entire FRAME A should lie on the GRID.
Note: *You cannot rotate the FRAME*

GRID X

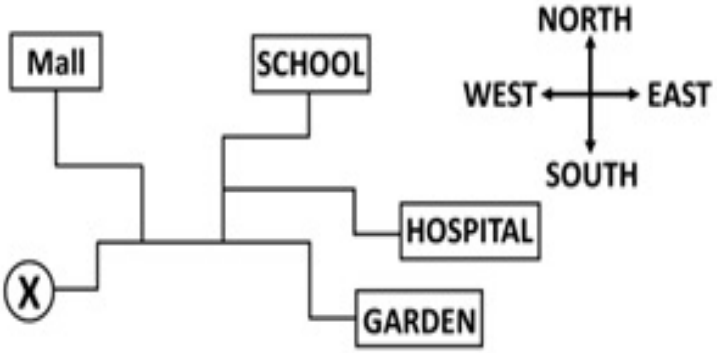


FRAME A

(a) 8 (b) 6 (c) 10 (d) 11

Chapter 14: Maps and Locations

1. **Aman can only travel EAST and NORTH from point X, following the route shown on the map. Which of the following locations can Aman reach?**



a) Garden b) School c) Hospital d) Both b and c

---

2. **There are 5 villages, P, Q, R, S, and T, situated close to each other. P is to the west of Q, R is to the south of P, T is to the north of Q, and S is to the east of T. In which direction is R with respect to S?**

a) North-West b) South-East c) South-West d) North-East

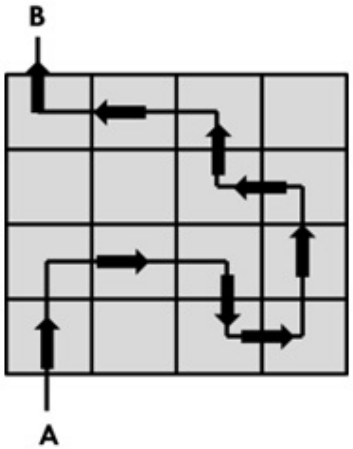
---

3. **Due to an accident, a direction pole at a road crossing turns in such a manner that now the east pointer is showing south-west. A traveller went in the wrong direction thinking that he was travelling south. In what direction did he actually end up going?**

a) South-West b) North-West c) North-East d) South-East

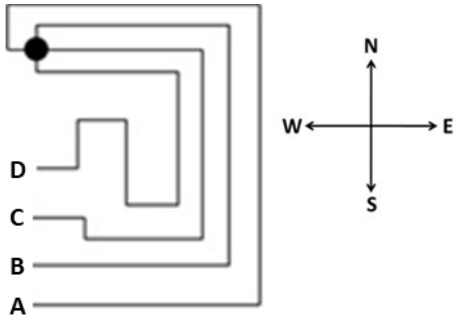
---

4. **A person travels from point A to B along the path shown. How many times did the person take a right turn?**



a) 4 b) 5 c) 6 d) 7

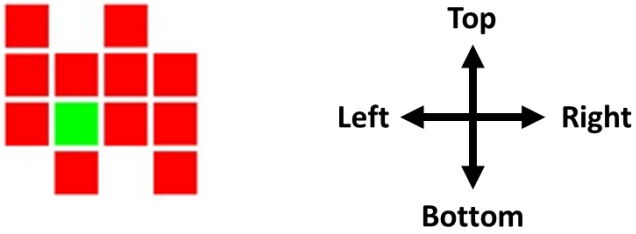
5. **Given below are jogging tracks with four different gates A, B, C, and D.**
   - A person who enters from Gate A must exit through Gate C and vice versa
   - A person who enters from Gate B must exit through Gate D and vice versa
   Which gate should a person choose to enter if he wants the sun to be on his left when he reaches the black circle for the first time in the morning?



a) A b) B c) C d) D

---

6. **If a person can only move upwards (towards the top) or to the right, how many red blocks can he never reach if he starts from the green block?**



a) 3 b) 4 c) 5 d) 6

---

7. **Sam and Bob are facing North. After this, they take the following turns:**
   1. Sam takes 1 left turn, then 2 right turns, and finally 1 left turn
   2. Bob takes 2 left turns followed by 3 right turns
   Which of the following directions are they facing currently?
   Note: *A Right or a Left turn refers to a 90-degree turn*

   a) Sam faces North and Bob faces East
   b) Sam faces North and Bob faces South
   c) Sam faces North and Bob faces West
   d) Sam faces East and Bob faces North

---

8. **Three cars A, B, and C started moving towards the East. After travelling for a while, cars A and B took a right turn. After travelling further, car C took a left turn and car A took another right turn. In which directions are cars A, B, and C travelling now?**

   a) A = East, B = West, C = North
   b) A = West, B = North, C = South
   c) A = West, B = South, C = North
   d) A = East, B = West, C = South

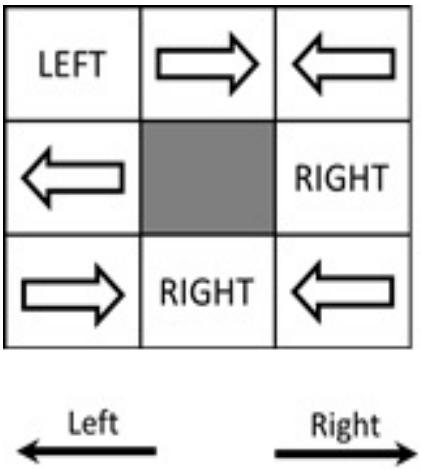
---

9. **Two airplanes A and B are moving north. After flying for 50 metres:**
   1. Airplane A turns right and travels for 25 metres, then turns left and travels for another 25 metres
   2. Airplane B turns left and travels for 50 metres, then turns right and travels for 25 metres
   What is the distance between the airplanes now if the initial distance between them is 10 metres and A is on the right side?

   a) 25 meters b) 85 meters c) 50 meters d) 100 meters

10. How many arrows in the image below are pointing in the OPPOSITE DIRECTION compared to the direction written in the boxes they are adjacent to?

Note: *For two boxes to be adjacent they MUST share one common side. Boxes having only a common corner are not adjacent*



a) 2 b) 3 c) 4 d) 5

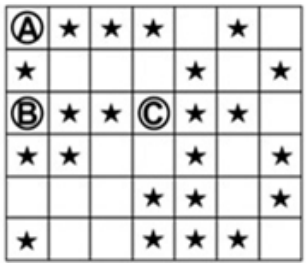
The Thinking Spot

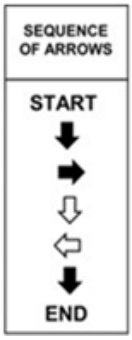
Three friends - A, B, and C - are standing in a grid as shown below. Each of them moves 5 steps in the grid by following the exact sequence of arrows given below, such that:

• For a WHITE arrow, they move in the OPPOSITE direction of the arrow

• For a BLACK arrow, they move in the SAME direction as the arrow

If they score 1 point for stepping on a block with a star then which friend will score the HIGHEST points?





(a) A
(b) B
(c) C
(d) All will get an equal number of points

Chapter 15: Data Through Pictures

1. **Each flower has a value shown in Image 1. These flowers are placed in Image 2. The numbers written at the end of each row represent the sum of the values of the flowers in that row. Which flowers from the options below can come in place of A and D?**

IMAGE 1

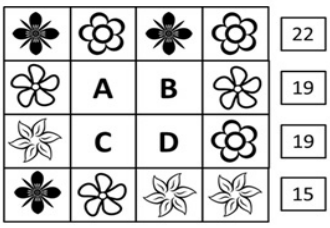


IMAGE 2

a) A = D =

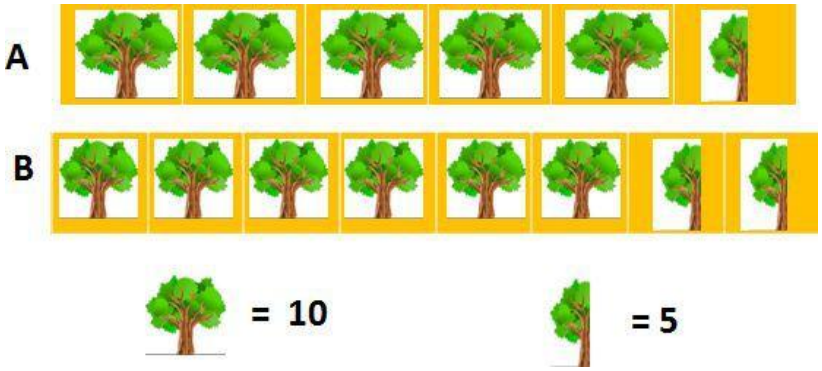
b) A = D =

c) A = D =

d) A = D =

---

2. **The given image shows the number of trees with Teams A and B. One full tree picture represents 10 trees, and a half tree represents 5 trees. How many more trees does Team B have than Team A?**



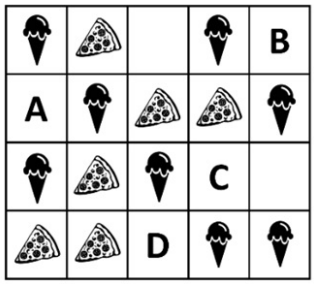
a) 5 b) 10 c) 15 d) 20

---

3. **Company A packages different types of mobile parts/accessories on the following days:**
   - Charger on Mondays, Tuesday, and Thursdays
   - Batteries on all days except on Friday
   - Earphones only on Mondays and Wednesdays
   - Screen on all days except on Thursday
   - Headphones on all days except on Wednesday
   On which days would it be possible for at least three accessories/parts to be packaged on the same day?

   a) Everyday
   b) All days except Thursday
   c) All days except Friday
   d) Only on Mondays and Tuesdays

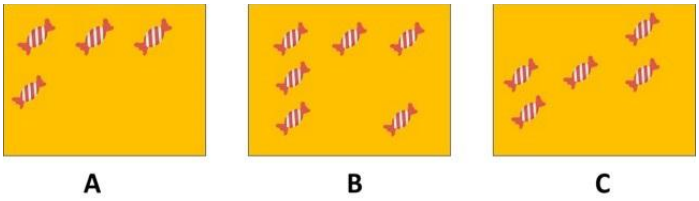
4. **Sam is standing on a block where there are 6 items in total in its row and column combined, with more ice creams than pizza. Out of A, B, C, and D, which block is Sam standing on?**



a) A b) B c) C d) D

---

5. **If at most 9 candies can be kept on each table, then how many more candies in total can be kept on table B and table C?**



a) 6 b) 7 c) 8 d) 9

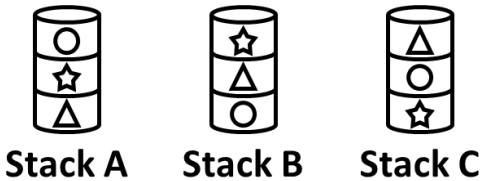
---

6. **Shown below are six towers of different heights. Which two towers have the same number of shorter towers placed to their left?**
Note: *Please consider ALL towers to the left while counting the number of shorter towers*

a) B - C b) B - D c) C - F d) D - F

---

7. **All three stacks shown below are placed one on top of another so that exactly one shape separates each pair of neighbouring stars. After arranging the stacks, which shape is fourth from the top?**
Note: *You cannot rearrange the shapes of each stack*



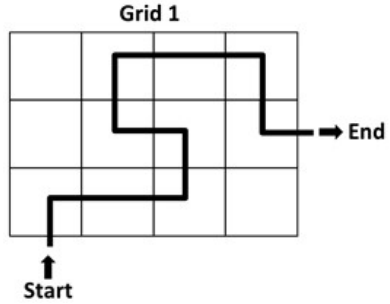
a) 

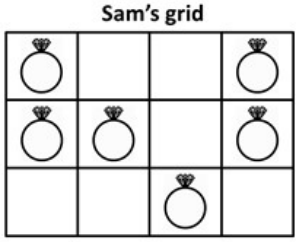
b) 

c) 

d) Cannot be determined

8. Sam must travel across the grid following the path shown in Grid 1.
Each block along his path must have a ring.
Some blocks already have rings placed on them.
How many MORE rings does Sam need to place along his path? Note: *Rings in Sam's grid cannot be moved*





a) 6 b) 5 c) 4 d) 3

---

9. From the towers shown below, Tom, Paul, John, and Sam each owns one tower:
- **Tom owns a tower which is positioned between A and C**
- **Paul owns a tower which is positioned between B and D**
- **John owns a tower which is positioned between F and H**
- **Sam owns a tower which is positioned between E and G**

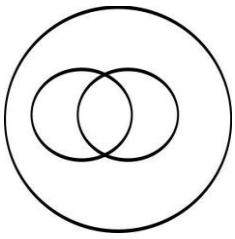
Which friend's tower is the tallest among them?

a) Sam b) Tom c) Paul d) John

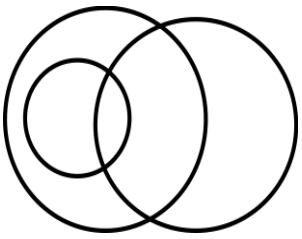
---

10. Which of the following Venn diagrams depicts the relationship between females, mothers, and doctors?

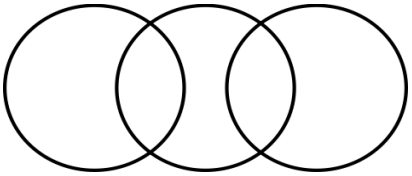
a)



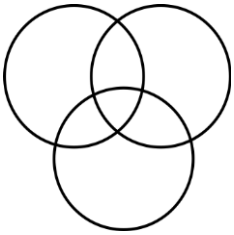
b)



c)

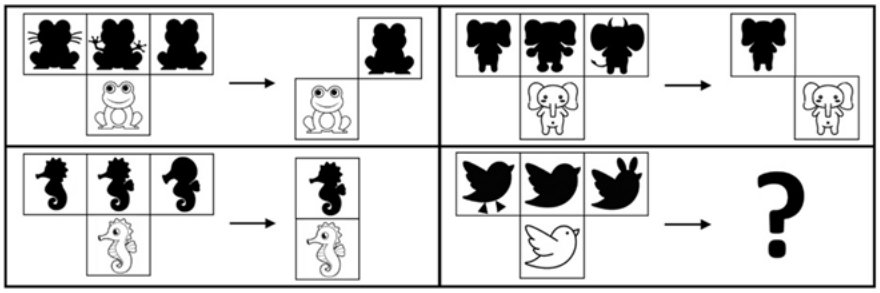


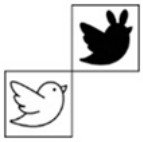
d)

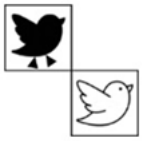


The Thinking Spot

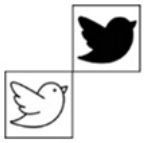
If each of the following terms follows the same theme, what will come in place of "?"



(a) 

(b) 

(c) 

(d) 

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