

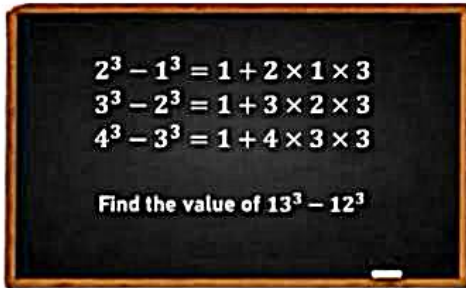
Chapter 1: A Square and a Cube

1. In the following grid, all the circles follow the same theme. What will be the value of $A + B$?

4		5	
25		106	
	3		9
13		117	
2		B	
	A	85	

- a) 12 b) 14 c) 13 d) 15
-
2. Sam writes a list of natural numbers. The list has three perfect cubes and three perfect squares. If no number in the list has more than two digits, what is the MINIMUM number of distinct numbers he must have written?
- a) 3 b) 4 c) 5 d) 6
-
3. If AB is a two-digit number whose cube is in the form of a 4-digit number “___ C” such that $A < C < B$, how many different values can C have?
- a) 2 b) 3 c) 4 d) More than 4
-
4. $56 \times k$ is a perfect cube where k is a natural number. What could be the smallest possible value of k ?
- a) 36 b) 49 c) 56 d) 72
-
5. Each geometrical shape denotes a certain operation. What will come in place of “?”
- $\boxed{16} \rightarrow 256$ $\boxed{19} \rightarrow 361$
 $\boxed{15} \rightarrow 3375$ $\boxed{11} \rightarrow 1331$
 $\boxed{14} + \boxed{12} \rightarrow ?$
- a) 2888 b) 1914 c) 1924 d) 340
-
6. XYZ is a 3-digit number such that it is the square of a multiple of 5. What will be the HIGHEST possible remainder of $(XYZ)/100$?
- a) 10 b) 15 c) 20 d) 25

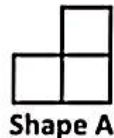
7. A class teacher wrote the following pattern on the board, where an expression is written after the "=" sign in each row. She then asked the class to find the expression for $13^3 - 12^3$. Which DIGIT appears the HIGHEST number of times in the expression that denotes $13^3 - 12^3$?



- a) 1 b) 2 c) 3 d) 4
8. Fill in the grid with the squares and cubes of digits 2 to 5 such that:
- Each square/cube number appears twice
 - Both square and cube of the same number cannot appear in the same row/column
 - Same numbers do not appear diagonally

What is the maximum possible sum that can be obtained by the cells present in the configuration of Shape A (without rotation)?

64			4
27	125		
8		9	25
		16	



GRID

- a) 197 b) 161 c) 193 d) 216
9. The image below shows a logic machine, where numbers move from Column to Column (starting from column 1 as input and reach column 4) through the tunnel, where they change in a different way, each time. What would be the sum of A, B, and C?

Column 1	Column 2	Column 3	Column 4
4	15	6	216
22	483	15	3375
11	120	3	27
7	A	B	C

- a) 2259 b) 1795 c) 180 d) 1788
10. Every column follows a certain rule. What number should come in place of "?"

CL1	CL2	CL3	CL4
16	28	25	12
9	7	16	27
12	14	20	?

- a) 17 b) 18 c) 19 d) 21

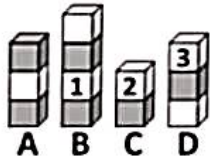


The Thinking Spot

Boxes are stacked in four columns A, B, C, and D, such that:

- Each box is labelled with a number from 1, 2, and 3, with labels on some of the boxes already shown in the image given below
- No two adjacent boxes in the same column are labelled with the same number
- No two adjacent columns have the same number on the topmost box
- For every column, the sum of the numbers labelled on the topmost and bottommost block is equal

In the shaded boxes, which of these numbers will occur the HIGHEST number of times?



a) 1

b) 2

c) 3

d) All of them occur equally



Chapter 2: Power Play

1. Each term is written in exponential form. If the terms are rearranged in ascending order of their numerical values from left to right, how many terms remain in the same position as in the original arrangement?

Left $4^3, 2^4, 3^3, 2^8, 5^2, 3^6$ Right

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

2. What will come in place of “?” in the given series?

6, 26, 126, 626, ?

- a) 3125 b) 3126 c) 926 d) 916

3. A team is to be formed from a group of 7 students: A, B, C, D, E, F, and G where:

- A and B cannot be in the same team, but at least one of them must be included in the team
- C and D must either both be included or both be excluded from the team
- E and F must either both be included or both be excluded from the team

If the team consists of 4 students, in how many different ways can it be formed?

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

4. Let X, Y, and Z be single-digit whole numbers. The number XY is a two-digit number formed using digits X and Y.

If $4000 < (XY)^Z < 5000$, what is the minimum possible value of XY?

- a) 10 b) 16 c) 17 d) 15

5. Raj must select three numbers from the grid from three DISTINCT shapes such that:

1. Each number is chosen from a different row
2. The number selected from Row R1 is the n th power of 3
3. No digit is repeated among the bases and exponents of the chosen numbers

Based on these rules, what is the sum of the three selected numbers?

R1	 3^4	 4^3	 3^6
R2	 4^5	 5^4	 2^7
R3	 2^7	 6^5	 3^5

- a) 1881 b) 7968 c) 1482 d) 1100

6. A man has a bag with a maximum capacity of 2^4 units. He earns certain points for the books he carries in that bag and the load of each book is shown in the table below:

- For every Management book added to the bag, 2 Fiction books must be added
- For every Mathematics book added to the bag, 2 Physics books must be added

If he has to carry at least one book of each genre, what is the maximum number of points he can earn without exceeding the bag's capacity?

BOOK GENRE	LOAD	POINTS
Management	2^2	2^5
Mathematics	2^1	2^4
Physics	2^0	2^3
Fiction	2^0	2^2

- a) 116 b) 120 c) 112 d) 104

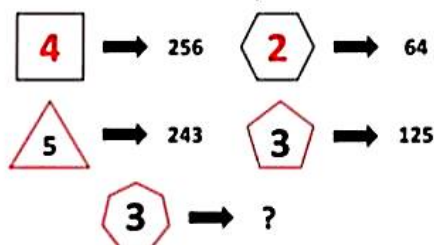
7. How many possible combinations of 1 owl and 1 tree can be made from 3 owls and 5 trees?

- a) 9 b) 10 c) 15 d) 16

8. Sam has Rs. 4000 in such a way that he has Re. 1 coins in power of 10, Rs. 2 coins in power of 5, Rs. 5 coins in power of 2, and the remaining coins of Rs. 10. The amount of money of each individual denomination of Re. 1, Rs. 2, and Rs. 5 is greater than or equal to thousand. At MAXIMUM, how many coins of Rs. 10 can he have?

- a) 53 b) 47 c) 38 d) 45

9. What will come in place of “?”



- a) 243 b) 125 c) 343 d) 2187

10. Sam and Tim are playing a number-maximizing game. Their numbers are shown in the table below (where A and B are undefined). They must modify their numbers using ONLY ONE of the following rules:

- If the base is smaller than the exponent, the base n is replaced with $1/n$
- If the base is greater than the exponent, the exponent n is replaced with $1/n$

Sam and Tim choose A and B and apply the rule exactly once in a way that maximizes their own numbers. What is the difference between the final numbers of Sam and Tim, where A and B are single-digit natural numbers?

Sam's number	4^A
Tim's number	B^2

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



The Thinking Spot

Enter all the letters and the numbers of the Set in the empty squares of the grid given below, such that:

- Every vowel must have an even number in at least one of its adjacent squares
- The letter 'H' is not adjacent to 'A' or 6
- Two consecutive numbers cannot be in any adjacent squares

What will come in place of “?”

Note: Squares are considered to be adjacent only if they share a common side. Squares sharing a common corner are not considered adjacent

	5	
3	?	H

Set: A, E, Y, 2, 4, 6

a) 6

b) Y

c) E

d) A

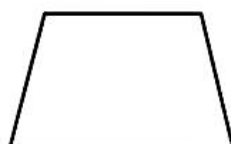


Chapter 4: Quadrilaterals

1. Raj colored the following shapes (Trapezium, Parallelogram, Square, Kite) in Red, Yellow, Green, and Blue, not necessarily in the same order.

- The shape colored in Red has no parallel sides
- The shape with each of its angles equal to 90° , is not Yellow
- The shape with two pairs of parallel sides is not Green

Which shape did he color in yellow?



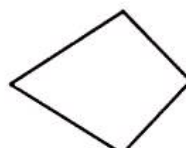
a) Trapezium



b) Parallelogram

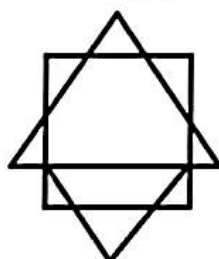


c) Square



d) Kite

2. How many quadrilaterals are there in the given figure?



a) 8

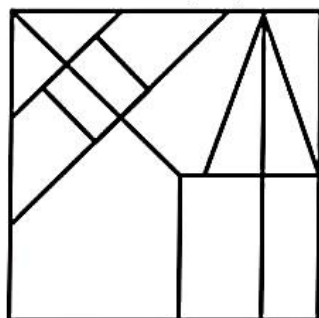
b) 9

c) 10

d) 11

3. How many rectangles are there in the given figure?

Note: For the purpose of this question, please count all squares also as rectangles



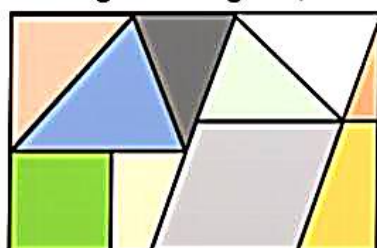
a) 8

b) 9

c) 10

d) 11

4. In the given tangram, how many quadrilaterals are made with exactly 3 colored tiles?



a) 4

b) 3

c) 2

d) 1

5. Below are three families of shapes and a set of Property Cards.

- A property card should be placed into a family if the property applies to that family
- A single property may belong to more than one family

After placing all the property cards, which family will have the maximum number of properties?

Rectangle Family	Property Cards • All sides are equal and all angles are 90°. • All angles are 90° and opposite sides are equal. • Opposite sides are parallel. • Diagonals are equal and bisect each other. • Opposite sides are equal and parallel.
Square Family	
Parallelogram Family	

- a) Square Family b) Rectangle Family c) Parallelogram Family d) Both a and c

6. In the grid, each letter stands for the initial of a shape: Square, Rhombus, Kite, Trapezium, and Parallelogram. How many pairs of adjacent letters represent two shapes in which the diagonals bisect each other?

R K S P T R P S T P R S K

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

7. Find the option that does NOT belong to the elements in the given set.

Set = (Angle between diagonals of a Rhombus, Each angle of a rectangle, Each angle of a square)

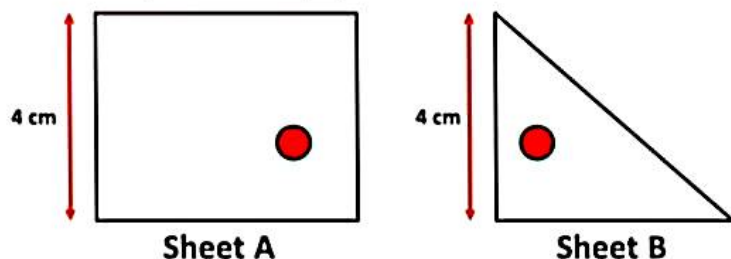
- a) Angle inscribed in a semicircle
- b) Half of sum of opposite angles of a Cyclic Quadrilateral
- c) Each angle of an Equilateral Triangle
- d) Angle opposite to Hypotenuse in a Right - Angled Triangle

8. Which shapes from the given options will NOT form a quadrilateral when any two identical shapes are joined along any one of their sides?

Note: You can rotate the shapes but they cannot overlap each other

- a) Triangle b) Rhombus c) Trapezium d) Pentagon

9. Two transparent sheets are shown below. Sheet A is a rectangle and Sheet B is a right-angled triangle. Rearrange the sheets so that the red points overlap exactly (without rotating or flipping the sheets). How many quadrilaterals are formed in the final figure?



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

10. Paul and Sam are at different positions and start walking in opposite directions but along parallel paths. After covering the same distance, each of them turns toward the starting point of the other person and walks straight (without taking any other turns) until they reach each other's starting points. What can we say for certain about the shape formed by BOTH their paths together?

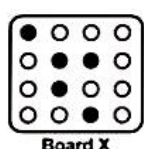
- a) The shape of the paths is a rectangle
 b) It has no lines of symmetry
 c) Opposite sides are of same length
 d) Both options a and c



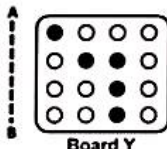
The Thinking Spot

Given below are two boards, X and Y. Clicking any circle on Board Y changes its colour from black to white, or white to black.

What is the MINIMUM number of clicks required to transform Board Y into the MIRROR IMAGE of Board X?



Board X



Board Y

(a) 2

(b) 3

(c) 5

(d) 4

