Important Questions for Class 6 Maths

Chapter 1 – Patterns in Mathematics

1. What is a pattern? Explain with an example.

Ans: A pattern is a sequence of numbers, shapes, or objects arranged in a way that follows a specific rule or order. These rules can involve addition, subtraction, multiplication, or even a geometric change.

Example: In the pattern 2, 4, 6, 8, 10, each number increases by 2, following a rule where 2 is added to the previous number each time.

2. Find the next three terms in the sequence: 2, 7, 12, 17, __, __, __.

Ans: The pattern increases by 5 each time. Adding 5 to 17 gives 22, adding 5 to 22 gives 27, and adding 5 to 27 gives 32. So, the next three terms are 22, 27, and 32.

3. Find the missing number in the pattern: 8, 16, __, 64, 128.

Ans: The pattern doubles each time. Doubling 16 gives 32, so the missing number is 32.

4. Why are 1, 3, 6, 10, 15, ... called triangular numbers?

Ans: These are called triangular numbers because the dots in these numbers can be arranged to form an equilateral triangle. For example, 6 dots can be arranged in a triangle with 3 dots at the base, 2 in the middle, and 1 at the top.

5. What do you call this sequence of numbers 1, 6, 12, 18, 24?

Ans: This sequence is an arithmetic progression where each number increases by 6. The next number will be 30.

6. Identify the rule in the pattern: 1, 8, 27, 64, __, __.

Ans: This is a pattern of cube numbers, where each number is the cube of a natural number. The next terms are 125 (5^3) and 216 (6^3).

7. Why are 1, 4, 9, 16, 25, … called square numbers or squares?

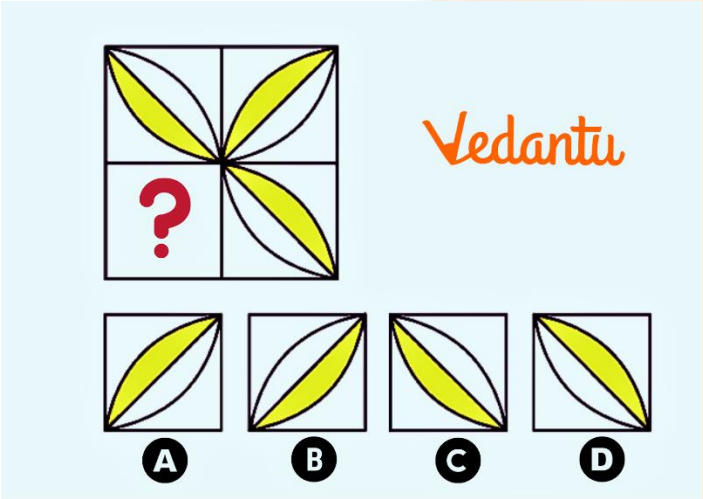
Ans: These numbers are called square numbers because they represent the area of a square. For example, 4 is the area of a square with sides of length 2 ($2 \times 2 = 4$). Each number in this sequence is the product of a number multiplied by itself, which forms the area of a square.

8. Why are 1, 8, 27, 64, 125, … called cubes?

Ans: These numbers are called cubes because they represent the volume of a cube. For example, 8 is the volume of a cube with each side of length 2 ($2 \times 2 \times 2 = 8$). Each number in the sequence is the result of multiplying a number by itself twice, which gives the volume of a cube.

9. Look at the figure below and determine the missing piece.

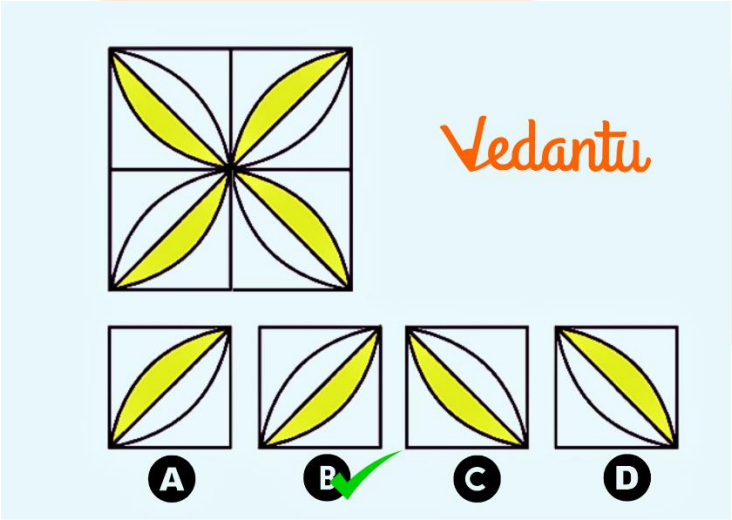
Pattern:



Ans: Observe the given figure, where each section's design is formed by rotating the previous design by 90 degrees in a clockwise direction.

Therefore, the missing piece is option___.

Thus, the completed figure is:



10. Write the next three numbers in the following sequence.

198, 185, 172, 159, 146

Ans: 198, 185, 172, 159, 146

The pattern in the given sequence is:

198 – 13 = 185

185 – 13 = 172

172 – 13 = 159

159 – 13 = 146

So, the next three numbers can be written as:

146 – 13 = 133

133 – 13 = 120

120 – 13 = 107

Thus, the sequence is 198, 185, 172, 159, 146, 133, 120, 107.

11. What is the formula for the pattern of this sequence?

7, 14, 21, 28, 35, 42, 49

Ans: Given, 7, 14, 21, 28, 35, 42, 49

The numbers in this sequence are written as:

7 + 7 = 14, 14 + 7 = 21, 21 + 7 = 28, and so on.

This can also be expressed as:

$7 = 7 \times 1$

$14 = 7 \times 2$

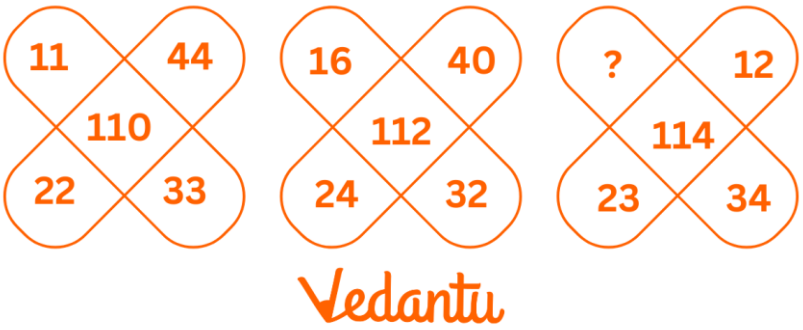
$21 = 7 \times 3$

$28 = 7 \times 4$, and so on.

From this, we can write the formula for the above pattern as: 7n, where n = 1, 2, 3, etc.

12. Observe the pattern below and find the missing number.

Pattern:



Ans: In the given figure, we can see that the sum of the four surrounding numbers equals the number in the centre of the shape.

For example:

11 + 22 + 33 + 44 = 110

16 + 24 + 32 + 40 = 112

? + 23 + 34 + 12 = 114

To find the missing number:

? = 114 - 23 - 34 - 12 = 45

Thus, the missing number is 45.

13. Predict the next number in the following sequence.

3, 5, 10, 18, 31, ?

Ans: Given: 3, 5, 10, 18, 31, ?

Let's calculate the difference between consecutive numbers:

5 - 3 = 2

10 - 5 = 5

18 - 10 = 8

31 - 18 = 13

The differences from the sequence: 2, 5, 8, 13

Notice that each difference increases by an increasing pattern: +3, +3, +5, ...

Thus, the next difference will be 13 + 5 = 18.

To find the next number:

31 + 18 = 49

Therefore, the next number in the sequence is 49.

14. What is the next number in the following sequence?

15, 13, 19, 10, 23, 7, 29, 3, 31, -2, 37, ?

Ans: The given sequence is:

15, 13, 19, 10, 23, 7, 29, 3, 31, -2, 37

To identify the pattern, let's calculate the differences between consecutive numbers:

13 - 15 = -2

19 - 13 = 6

10 - 19 = -9

23 - 10 = 13

7 - 23 = -16

29 - 7 = 22

3 - 29 = -26

31 - 3 = 28

-2 - 31 = -33

37 - (-2) = 39

Here, the differences follow an alternating pattern of negative and positive values, with increasing differences each time.

So, the next number in the sequence will be: 37 + 45 = 82

Thus, the next number in the sequence is 82.

15. Identify the pattern for the following sequence and find the next number.

3, 6, 10, 15, 21, 28, ____.

Ans: Given, 3, 6, 10, 15, 21, 28, ____

The pattern involved in the given sequence is:

3 + 3 = 6

6 + 4 = 10

10 + 5 = 15

15 + 6 = 21

21 + 7 = 28

28 + 8 = 36

Therefore, the next number of the given sequence is 36.