NCERT Solutions for Class 6 Maths

Chapter 1 – Patterns in Mathematics

Exercise 1.3

Table 2 Pictorial representation of some number sequences

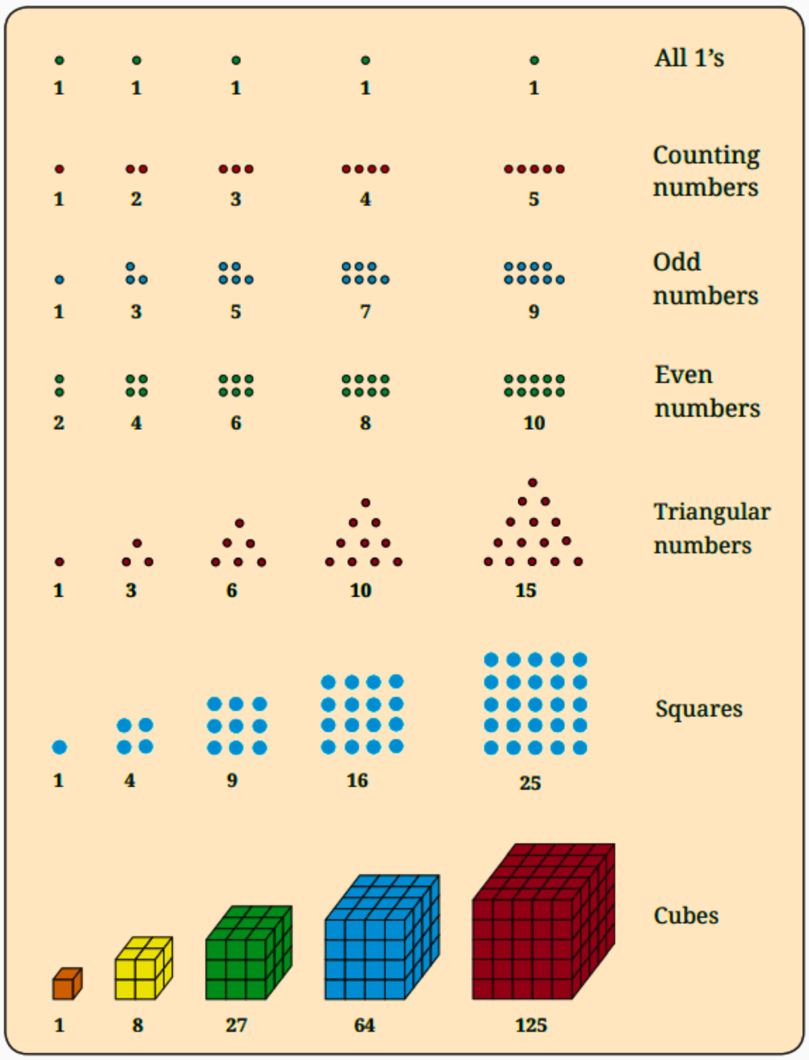
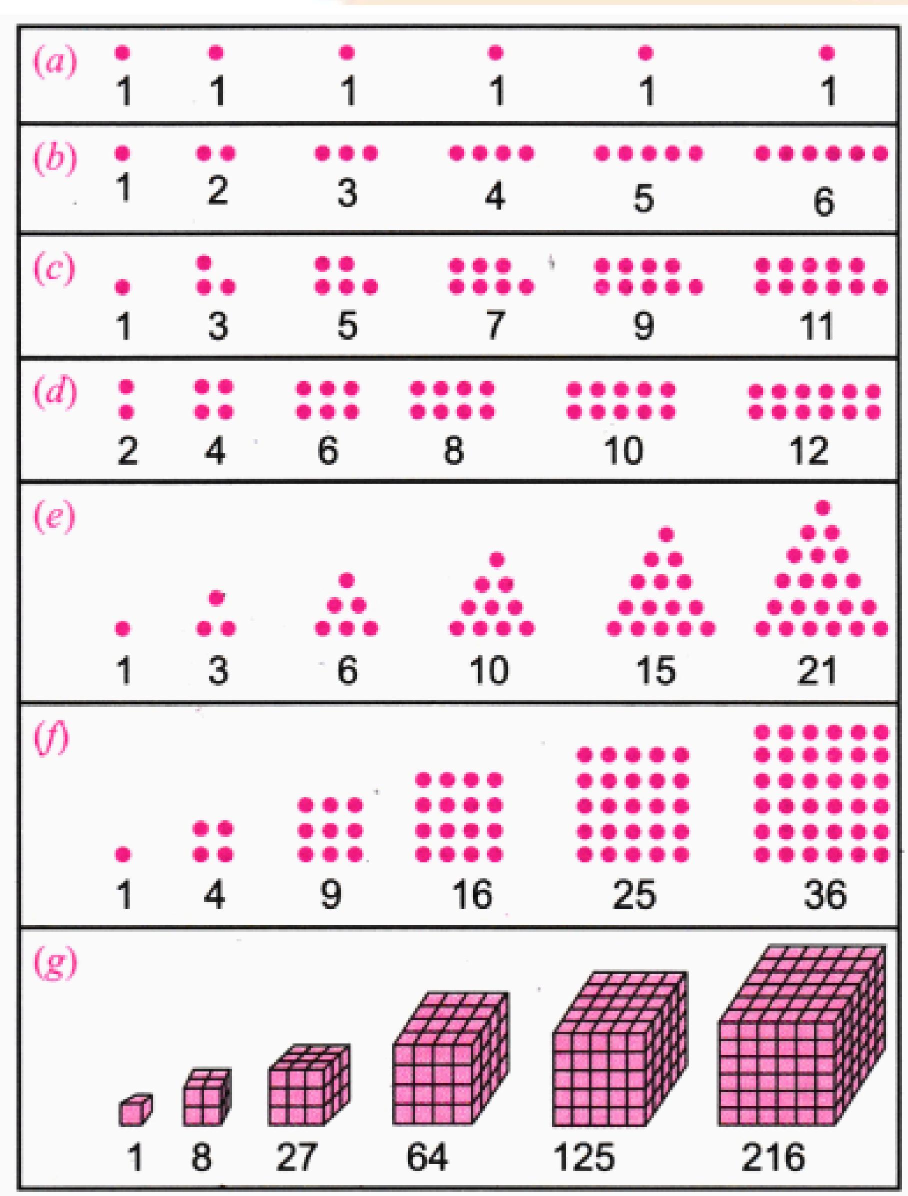


Figure it Out

1. Copy the pictorial representations of the number sequences in Table 2 in your notebook, and draw the next picture for each sequence!

Ans:



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

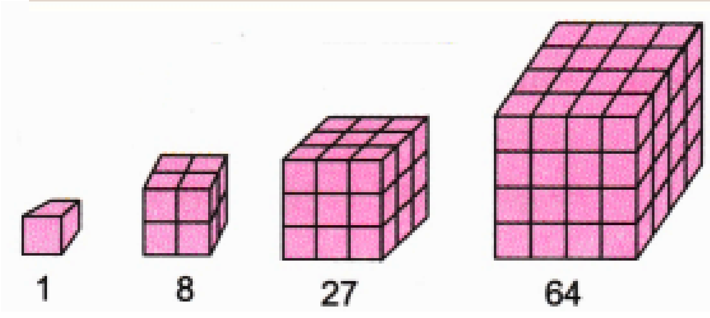
Why are 1, 4, 9, 16, 25, … called square numbers or squares?

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

Ans: 1, 3, 6, 10, 15, … called triangular numbers: These numbers are called triangular numbers because they can be arranged in the shape of an equilateral triangle. For example, 3 can be arranged as a triangle with 2 dots in the base and 1 dot at the top. Each number in the sequence represents the total number of dots that form a triangle when arranged in increasing rows.

1, 4, 9, 16, 25, … called square numbers or squares: 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.

1, 8, 27, 64, 125, … called cubes: 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.



3. You will have noticed that 36 is both a triangular number and a square number! That is, 36 dots can be arranged perfectly both in a triangle and in a square. Make pictures in your notebook illustrating this! This shows that the same number can be represented differently, and play different roles, depending on the context. Try representing some other numbers pictorially in different ways!

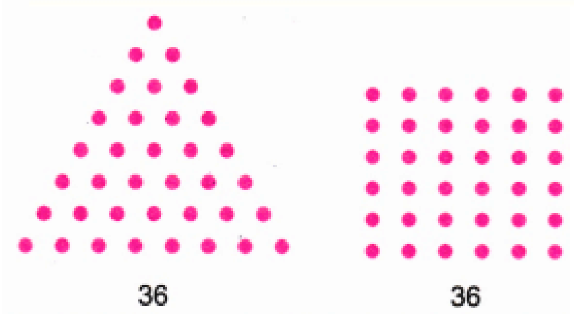
Ans: Three other numbers that can be both triangular and square are 1, 1225, and 41616.

For instance, 1225 is the 49th triangular number, meaning it can be arranged in a triangular pattern with 49 rows.

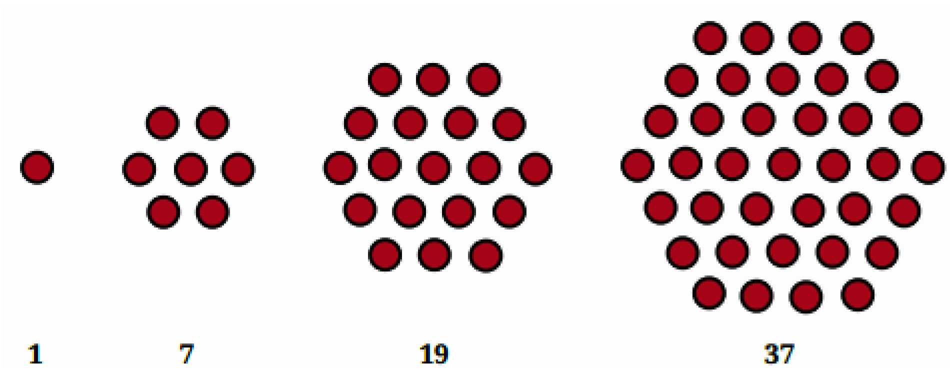
Additionally, 1225 can also be arranged in a square, with each side containing 35 dots (since $35 \times 35 = 1225$).

This shows how certain numbers can be represented in multiple ways, demonstrating their versatility in both triangular and square formations.

The fact that a number like 1225 fits perfectly into both shapes highlights the fascinating connections between different geometric and mathematical properties.



4. What would you call the following sequence of numbers?



That's right, they are called hexagonal numbers! Draw these in your notebook. What is the next number in the sequence?

Ans: Let's break down the pattern in this sequence:

1st number = 1

2nd number = 1 + 6 = 7 (This is found by adding 6 × 1 to the 1st number)

3rd number = 7 + 12 = 19 (This is found by adding 6 × 2 to the 2nd number)

4th number = 19 + 18 = 37 (This is found by adding 6 × 3 to the 3rd number)

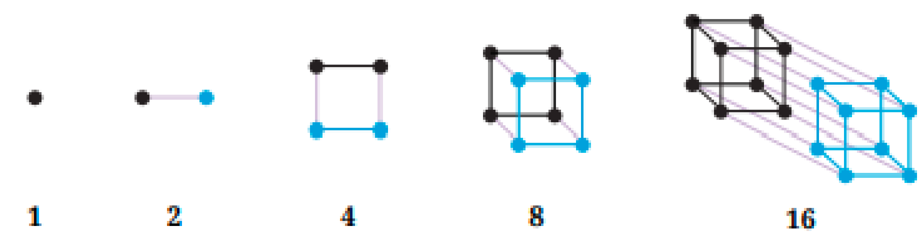
5th number = 37 + 24 = 61 (This is found by adding 6 × 4 to the 4th number)

Thus, the pattern involves adding multiples of 6, with each multiple increasing by 6. So, to find the next number in the sequence, you would add 6 × 5 = 30 to the 5th number (61). Therefore, the next number in the sequence would be 61 + 30 = 91.

This sequence demonstrates a regular pattern of growth, with each term increasing by a progressively larger multiple of 6.

5. Can you think of pictorial ways to visualise the sequence of Powers of 2? Powers of 3?

Here is one possible way of thinking about Powers of 2:



Ans: Pictorial Representation for powers of 3: