

Chapter 3 Class 6

Ganita Prakash -

Number Play

- Mix Questions

Worksheet 2

by *teachoo*

Chapter: [Chapter 3 Class 6 Ganita Prakash - Number Play](#)

Name: _____

School: _____

Roll Number: _____

1. Two AI bots are playing a game. They start at 0 and take turns adding either 2 or 4 to a running total. The bot that adds a number to reach exactly 20 wins. Analyze the game to find the winning strategy. Which bot has the advantage (the first or second player)?

2. A company's quarterly profits were:

Q1: ₹85,000, Q2: ₹1,20,000, Q3: ₹98,000, Q4: ₹1,10,000. The CEO's report claims an "average quarterly profit of around one lakh." Draw these figures on a number line with a clear mark for ₹ 1,00,000. Is the CEO's estimation fair for the shareholders? Justify your answer.

3. An online platform creates a User ID checksum based on the user's birth year. If your birth year is 2007, the checksum is $2 + 0 + 0 + 7 = 9$. The system then assigns a 4-digit PIN that must have the same checksum. What is the smallest and largest possible PIN you could be assigned?

5-Mark Questions

4. A game designer is creating a 3×3 "treasure map" grid. They are placing 9 treasures with unique values from 1 to 9. A "Major Find" (a supercell) is a treasure that is more valuable than all its adjacent treasures (N, S, E, W).

- a) Design a layout that maximizes the number of "Major Finds" to make the map challenging.
- b) Explain the logic of your placement.
- c) What is the maximum number of "Major Finds" possible in a 3×3 grid? Justify why you can't create more.

5. A cryptographer is testing if the Kaprekar routine can be used for 3-digit encryption keys.

- a) Take three different 3-digit numbers with unique digits (e.g., 123, 508, 941).
- b) Apply the Kaprekar process to each until you find a repeating number or a loop.
- c) Based on your results, what is the "Kaprekar Constant" for 3-digit numbers? Formulate a hypothesis about why it's different from the 4-digit constant.

6. You are developing a "perpetual calendar" app. A user wants to know when they can reuse their 2025 calendar.

- a) What two conditions must be met for a calendar of one year to be identical to another?
- b) A normal year has 365 days. How many days of the week does the start day of the year shift forward each year? How does a leap year affect this shift?
- c) Calculate the next year that will have a calendar identical to 2025 (a non-leap year starting on a Wednesday).

7. The Collatz Conjecture is being studied for its potential in generating pseudo-random numbers for simulations.

- a) Trace the full Collatz sequence for the starting number 27. Note the total number of steps and the highest value the sequence reaches.
- b) Explain, from a logical standpoint, why once any sequence reaches a power of 2 (e.g., 16), it is mathematically guaranteed to proceed to 1 .

8. You are solving a digital "escape room". A puzzle gives you these clues for a 5-digit code:

- "The code is a perfect palindrome."
- "The first digit is the result of $9 \div 3$."
- "The middle digit is the Kaprekar constant for 3-digit numbers."
- "The sum of all five digits is 25. "

Determine the code, explaining each logical step of your deduction.

9. As a data scientist, you have two algorithms for finding anomalies: the "Palindrome Check" (reverse-and-add) and the "Kaprekar Routine". Compare and contrast these two processes. Discuss their similarities (e.g., iterative nature) and their key differences in terms of mathematical operation, input requirements, and the nature of their output (a specific pattern vs. a specific constant).
10. You are designing the final boss fight in a game. The boss has 100 HP . You and the boss take turns attacking. Each turn, a player can choose to deal 1,2,3,4,5,6, or 7 damage. The player who deals the last point of damage (i.e., takes the HP from a positive number to 0 or less) wins. Determine the complete winning strategy. Which numbers must you land the boss's HP on to guarantee a win?

Important links

- Answer of this worksheet - <https://www.teachoo.com/25639/5398/Mix-Questions---Worksheet-2/category/Teachoo-Questions---Mix/>
- Full Chapter with Explanation, Activity, Worksheets and more – <https://www.teachoo.com/subjects/cbse-maths/class-6/chapter-3-ganit-prakash/>
- Curiosity Class 6 (Science) - <https://www.teachoo.com/subjects/science/class-6/>
- Ganita Prakash Class 6 (Maths) - <https://www.teachoo.com/subjects/cbse-maths/class-11th/>

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