

Number Play — Practice Worksheet

Set 1

Name: _____

Class: 6

Section: _____

Date: _____

Section A: Fill in the Blanks [5 Marks]

1. A cell in a number grid is called a _____ if it is greater than all its neighbouring cells.
2. The smallest 5-digit number is _____.
3. A number that reads the same from left to right and right to left is called a _____.
4. The digit sum of the number 4,567 is _____.
5. One followed by five zeros is written in numerals as _____.

Section B: Multiple Choice Questions [5 Marks]

1. Which of these is a palindrome number?
(a) 4321 (b) 5665 (c) 1234 (d) 8790
2. The largest number formed using the digits 3, 8, 1, 6 (no repetition) is:
(a) 8631 (b) 6831 (c) 1368 (d) 8613
3. In a row of numbers, a number is a supercell if it is:
(a) smaller than both neighbours (b) greater than both neighbours (c) equal to a neighbour (d) the first number in the row
4. The smallest 6-digit number is:
(a) 99,999 (b) 1,00,000 (c) 9,00,000 (d) 1,00,001
5. How many 3-digit numbers are there in all?
(a) 900 (b) 999 (c) 90 (d) 100

Section C: True or False [5 Marks]

1. A supercell must be greater than every one of its neighbouring cells.
2. The number 121 is a palindrome.
3. The smallest number whose digit sum is 14 is 59.
4. The number 1,000 has six digits.
5. The greatest possible digit sum of a 3-digit number is 27.

Section D: Solve the Following [10 Marks]

1. Arrange these numbers in descending order: 45,678 45,687 54,678 44,987 45,700

2. Find the digit sum of 7,29,384.

3. In the row of numbers 3456, 7890, 2345, 9999, 1000 (each number compared only to its immediate left and right neighbour, as in a single row), identify all the supercells.

4. Using the digits 2, 0, 6, 9, 1 exactly once each, write the smallest and the largest possible 5-digit numbers. Find their difference.

5. Reverse the number 68 and add it to itself. Keep reversing and adding the result until you reach a palindrome. Show every step.

Answer Key — Set 1**Section A: Fill in the Blanks**

1. supercell
2. 10,000
3. palindrome
4. 22
5. 1,00,000

Section B: Multiple Choice Questions

1. (b) 5665
2. (a) 8631
3. (b) greater than both neighbours
4. (b) 1,00,000
5. (a) 900

Section C: True or False

1. True
2. True
3. True
4. False — 1,000 has four digits.
5. True

Section D: Solve the Following

1. $54,678 \rightarrow 45,700 \rightarrow 45,687 \rightarrow 45,678 \rightarrow 44,987$
2. $7 + 2 + 9 + 3 + 8 + 4 = 33$
3. 7890 (greater than 3456 and 2345) and 9999 (greater than 2345 and 1000) are the two supercells.
4. Smallest = 10,269 (cannot start with 0); Largest = 96,210; Difference = $96,210 - 10,269 = 85,941$
5. $68 + 86 = 154$ (not a palindrome); $154 + 451 = 605$ (not a palindrome); $605 + 506 = 1,111$ — a palindrome is reached after 3 steps.

Number Play — Practice Worksheet

Set 2

Name: _____ Class: 6 Section: _____ Date: _____

Section A: Fill in the Blanks [5 Marks]

- The Kaprekar constant for 4-digit numbers is _____.
- Rounding a number to get an approximate value is called _____.
- On a number line, numbers increase towards the _____.
- The smallest 4-digit number with all different digits is _____.
- Rounding 4,567 to the nearest hundred gives _____.

Section B: Multiple Choice Questions [5 Marks]

- In Kaprekar's process, the next number is obtained by:
 - smallest – largest
 - largest – smallest
 - largest + smallest
 - largest $\times$ smallest
- Every 4-digit number (with at least two different digits), when Kaprekar's process is repeated, eventually reaches:
 - 1000
 - 6174
 - 9999
 - 4321
- Estimating an answer before calculating it exactly helps us to:
 - get the exact answer instantly
 - check if our exact answer is reasonable
 - avoid solving the problem
 - none of these
- Which number lies exactly midway between 2,000 and 3,000 on a number line?
 - 2,200
 - 2,500
 - 2,800
 - 2,999
- Rounding 15,083 to the nearest ten gives:
 - 15,080
 - 15,090
 - 15,000
 - 15,100

Section C: True or False [5 Marks]

- The Kaprekar constant 6174 is itself a palindrome.
- Every 4-digit number reaches 6174 in exactly 7 rounds.
- Rounding off always gives the exact value of a number.
- On a number line, 9,950 lies closer to 10,000 than to 9,000.
- Applying Kaprekar's process to 1111 (all identical digits) gives 0000.

Section D: Solve the Following [10 Marks]

- Apply Kaprekar's process to the 4-digit number 2,856. How many rounds does it take to reach 6174? Show every step.

2. Estimate the sum $4,872 + 3,145$ by rounding each number to the nearest hundred. Then find the exact sum and compare.

3. On a number line marked from 9,990 to 10,000 in steps of 1, point P is 4 steps to the right of 9,990. What number does P represent?

4. Round the number 68,472 to the nearest thousand and to the nearest ten-thousand.

5. Sheetal, a Class 6 student, claims she has spent 13,000 hours in school till date. Using 6 school hours a day and about 200 working days a year, estimate her actual school hours and state whether her claim is reasonable.

Answer Key — Set 2**Section A: Fill in the Blanks**

1. 6174
2. estimation (approximation)
3. right
4. 1,023
5. 4,600

Section B: Multiple Choice Questions

1. (b) largest – smallest
2. (b) 6174
3. (b) check if our exact answer is reasonable
4. (b) 2,500
5. (a) 15,080

Section C: True or False

1. False — reversed, 6174 becomes 4716, which is different.
2. False — the number of rounds varies with the starting number.
3. False
4. True
5. True

Section D: Solve the Following

1. $2856 \rightarrow 8652 - 2568 = 6084$ (round 1) $\rightarrow 8640 - 0468 = 8172$ (round 2) $\rightarrow 8721 - 1278 = 7443$ (round 3) $\rightarrow 7443 - 3447 = 3996$ (round 4) $\rightarrow 9963 - 3699 = 6264$ (round 5) $\rightarrow 6642 - 2466 = 4176$ (round 6) $\rightarrow 7641 - 1467 = 6174$ (round 7). It takes 7 rounds.
2. Rounded: $4,872 \rightarrow 4,900$ and $3,145 \rightarrow 3,100$; estimated sum = 8,000. Exact sum = $4,872 + 3,145 = 8,017$. The estimate is very close to the exact answer.
3. $P = 9,990 + 4 = 9,994$
4. Nearest thousand: $68,472 \rightarrow 68,000$. Nearest ten-thousand: $68,472 \rightarrow 70,000$.
5. $13,000 \div (6 \times 200) = 13,000 \div 1,200 \approx 10.8$ years. A Class 6 student has been in school for about 8 years (Nursery to Class 6), so 13,000 hours is too high — her claim is not reasonable.

Number Play — Practice Worksheet

Set 3

Name: _____ Class: 6 Section: _____ Date: _____

Section A: Fill in the Blanks [5 Marks]

- In the Collatz conjecture, if a number is odd, we multiply it by 3 and add _____.
- Every Collatz sequence, however it starts, is believed to eventually reach _____.
- A palindromic clock time such as 4:44 reads the same _____.
- The sum of two 5-digit numbers can have at most _____ digits.
- The smallest whole number is _____.

Section B: Multiple Choice Questions [5 Marks]

- Starting a Collatz sequence with 6, the very next number is:
(a) 18 (b) 3 (c) 19 (d) 2
- The correct Collatz step for the odd number 5 is:
(a) $5 \div 2$ (b) 5×3 (c) $5 \times 3 + 1 = 16$ (d) $5 + 1$
- Two 5-digit numbers are added. The smallest possible sum is:
(a) 10,000 (b) 20,000 (c) 11,111 (d) 19,999
- Which of these is NOT a palindromic-style date written as DD/MM/YYYY?
(a) 02/02/2020 (b) 01/02/2021 (c) 11/02/2011 (d) 20/02/2002
- Using the digits 1, 3, 5, 7, 9 once each, the difference between the largest and smallest 5-digit numbers formed is:
(a) less than 50,000 (b) exactly 50,000 (c) more than 50,000 (d) zero

Section C: True or False [5 Marks]

- In the Collatz conjecture, halving is applied only to even numbers.
- The number 1 is treated as an even number in the Collatz sequence.
- A 4-digit number added to a 4-digit number can never give a 6-digit sum.
- It is possible to write one 5-digit number and two 3-digit numbers whose sum is 18,670.
- The smallest number in a table can also be a supercell.

Section D: Solve the Following [10 Marks]

- Write out the Collatz sequence starting from 14 until it reaches 1.

- A game: starting with 0, two players alternately add a number between 1 and 3 to a running total. The first player to reach 22 wins. Explain a winning strategy.

3. Choose a number between 210 and 390 (not 250) and design a number pattern (rows of numbers, like a pyramid) that adds up to your chosen number. Show your pattern.

4. Write one 5-digit number and two 3-digit numbers such that their sum is exactly 24,850.

5. We are the group of 5-digit numbers between 40,000 and 80,000 in which every digit is even. Who is the largest number in the group? Who is the smallest?

Answer Key — Set 3**Section A: Fill in the Blanks**

- 1
- 1
- forwards and backwards (in both directions)
- 6
- 0

Section B: Multiple Choice Questions

- (b) 3
- (c) $5 \times 3 + 1 = 16$
- (b) 20,000
- (b) 01/02/2021
- (c) more than 50,000

Section C: True or False

- True
- False — 1 is always treated as odd ($3 \times 1 + 1 = 4$).
- True — the greatest possible sum, $9,999 + 9,999 = 19,998$, still has only 5 digits.
- True — for example, $18,000 + 300 + 370 = 18,670$.
- False — the smallest number in a table can never be a supercell, since all its neighbours are larger.

Section D: Solve the Following

- $14 \rightarrow 7 \rightarrow 22 \rightarrow 11 \rightarrow 34 \rightarrow 17 \rightarrow 52 \rightarrow 26 \rightarrow 13 \rightarrow 40 \rightarrow 20 \rightarrow 10 \rightarrow 5 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow 2 \rightarrow 1$
- The first player should say '2' first. After that, whatever number (1, 2 or 3) the opponent adds, the first player should add a number so that the two numbers added in that round always total 4. This lets the first player always land on 2, 6, 10, 14, 18 and finally 22 — winning the game.
- Sample answer — Number chosen: 300. Pattern: five equal rows of 60 ($60 + 60 + 60 + 60 + 60 = 300$), or a pyramid of 30, 30 on top, 60, 60, 60 in the middle row, and 30, 30 at the bottom.
- Sample answer: $24,000 + 400 + 450 = 24,850$ (many other combinations are possible).
- Largest = 68,888 (first digit must be less than 8 to stay under 80,000, so 6 is used, with remaining digits 8); Smallest = 40,000.