Number Play — Case Study Worksheet

Set 1

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

Case Study: The Housing Society Parcel Grid

Meera lives in a housing society where flats are arranged in a 3 × 3 grid of blocks, and the number of parcels delivered to each block yesterday was noted below. A block is called a "delivery hotspot" (a supercell) if the number of parcels it received is greater than the number of parcels received by every block immediately next to it (left, right, top, and bottom — not diagonally).

Block Grid (parcels delivered):

Row 1: A-Block: 45 B-Block: 78 C-Block: 30

Row 2: D-Block: 52 E-Block: 90 F-Block: 61

Row 3: G-Block: 38 H-Block: 47 I-Block: 55

Answer the following questions based on the case study above *[10 Marks]*

1. Which blocks are adjacent (neighbours) to E-Block? List all of them.

_____

_____

2. Is E-Block a delivery hotspot (supercell)? Show your reasoning by comparing it with all its neighbours.

_____

_____

3. Is B-Block a delivery hotspot? Justify your answer using its neighbours (A-Block, C-Block, and E-Block).

_____

_____

4. The society manager wants to add one more block, J-Block, next to I-Block (to its right) so that I-Block becomes a delivery hotspot. What is the smallest whole number of parcels J-Block could have received, given I-Block received 55 parcels and its other neighbour F-Block received 61 parcels?

_____

_____

5. Arrange the number of parcels received by all 9 blocks in ascending order.

_____

_____

Answer Key — Set 1

1. E-Block's neighbours are B-Block (top), D-Block (left), F-Block (right), and H-Block (bottom).
2. Yes. E-Block has 90 parcels, which is greater than B-Block (78), D-Block (52), F-Block (61), and H-Block (47) — greater than all four neighbours, so it is a supercell.
3. No. B-Block has 78 parcels. Its neighbour E-Block has 90 parcels, which is greater than B-Block, so B-Block is not a supercell (a cell must be greater than ALL its neighbours).
4. I-Block already has 55 parcels, which is less than F-Block's 61, so I-Block can never become a supercell no matter what J-Block receives — F-Block will always be a larger neighbour. (I-Block would need more than 61 parcels itself, which is not possible by only changing J-Block.)
5. 30, 38, 45, 47, 52, 55, 61, 78, 90

Number Play — Case Study Worksheet

Set 2

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

Case Study: The Number-Magic Classroom Activity

Mr Rao, a Class 6 Mathematics teacher, plays a "number magic" game with his students using Kaprekar's process: take any 4-digit number (not all digits the same), arrange its digits to form the largest and the smallest number, and subtract the smaller from the larger. Repeat with the result. He tells the class that every such number eventually reaches the same constant number.

Riya picks the number 3524 and starts the process to test Mr Rao's claim, while Aman picks the year of his birth, 2012, to try the same process.

Answer the following questions based on the case study above *[10 Marks]*

1. What is the name of the special number that every 4-digit number (with at least two different digits) eventually reaches through this process?

_____

_____

2. Help Riya complete the first round: arrange the digits of 3524 to form the largest and smallest 4-digit numbers, then subtract to find the result of round 1.

_____

_____

3. Continue the process on Riya's result from Question 2 for one more round (round 2).

_____

_____

4. Aman's number is 2012. Perform round 1 of Kaprekar's process on 2012 (remember to treat a missing digit position as 0 when a digit is 0).

_____

_____

5. Why does this process never work for a 4-digit number in which all four digits are identical, such as 5555? Explain using the process itself.

_____

_____

Answer Key — Set 2

1. The Kaprekar constant, 6174.
2. Digits of 3524: 2, 3, 4, 5. Largest = 5432, Smallest = 2345. 5432 − 2345 = 3087.
3. Digits of 3087: 0, 3, 7, 8. Largest = 8730, Smallest = 0378 = 378. 8730 − 378 = 8352.
4. Digits of 2012: 0, 1, 2, 2. Largest = 2210, Smallest = 0122 = 122. 2210 − 122 = 2088.
5. If all four digits are the same, the largest and smallest numbers formed from the digits are identical (e.g., for 5555, both are 5555), so the subtraction always gives 0000, and the process cannot proceed further to reach 6174.

Number Play — Case Study Worksheet

Set 3

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

Case Study: Planning the Class 6 Picnic Budget

The Class 6 students of Green Valley School are planning a day picnic for 48 students and 4 teachers. The class monitor, Kabir, has to estimate costs before asking the school for an exact budget, since exact prices are not yet known.

Approximate costs collected by Kabir: Bus rental ≈ ₹8,200; Snacks per person ≈ ₹95; Entry tickets per person ≈ ₹120; A surprise contingency amount the teacher suggests keeping aside ≈ ₹1,500.

Kabir decides to round all amounts before adding them, to quickly check whether the picnic can be done within the school's sanctioned budget of ₹15,000.

Answer the following questions based on the case study above *[10 Marks]*

1. Round the bus rental amount, ₹8,200, to the nearest thousand.

_____

_____

2. There are 52 people going on the picnic (48 students + 4 teachers). Round 52 to the nearest ten, and use it to estimate the total snack cost (snacks ≈ ₹95 per person, round ₹95 to the nearest hundred first).

_____

_____

3. Using the same rounded number of people (52 ≈ 50), estimate the total ticket cost if tickets are ≈ ₹120 per person.

_____

_____

4. Add Kabir's four rounded estimates (bus, snacks, tickets, and contingency) to find the estimated total cost of the picnic.

_____

_____

5. Based on your estimate, is the picnic possible within the school's sanctioned budget of ₹15,000? Explain why estimation is useful here even though it does not give the exact cost.

_____

_____

Answer Key — Set 3

1. ₹8,200 rounds to ₹8,000 (nearest thousand).
2. 52 rounds to 50 (nearest ten); ₹95 rounds to ₹100 (nearest hundred); estimated snack cost = 50 × ₹100 = ₹5,000.
3. Estimated ticket cost = 50 × ₹120 = ₹6,000.
4. ₹8,000 + ₹5,000 + ₹6,000 + ₹1,500 = ₹20,500.
5. No, the estimated total (₹20,500) is well above the sanctioned budget of ₹15,000. Estimation is useful because it lets Kabir quickly check feasibility and adjust the plan (for example, choose a cheaper bus or fewer paid activities) before spending time calculating exact prices.