Chapter 3: Patterns Around Us

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Exercise 3.1 — Let Us Count

Q1 Gundappa has some land with tall coconut trees. How many coconut trees does Gundappa have?

SOLUTION

Count the coconut trees in the top-view grid. The grid shows 8 columns and 6 rows of trees. 8 × 6 = 48 coconut trees.

Q2 Gundappa has plucked 5 coconuts from each tree. How many coconuts has he plucked?

SOLUTION

From Q1, Gundappa has 48 coconut trees. He plucks 5 coconuts from each tree. Total coconuts = 48 × 5 = 240 coconuts.

Q3 Muniamma makes plates and cups. Number of cups = ?

SOLUTION

Count the stacked cups in the figure. The cups are arranged in 7 columns, each column 7 cups high. 7 × 7 = 49 cups.

Q4 Muniamma has arranged coconut laddoos and milk peda in trays. All trays have the same arrangement. How many coconut laddoos are there in the trays?

SOLUTION

One tray has 9 coconut laddoos (arranged in a cross pattern: 5 in a cross + 4 in the spaces). There are 3 trays stacked. Total coconut laddoos = 9 × 3 = 27.

Q5 How many milk pedas are there in the trays?

SOLUTION

One tray has 4 milk pedas (one in each corner of the tray). There are 3 trays stacked. Total milk pedas = 4 × 3 = 12.

Exercise 3.2 — Patterns with Money

Q1 Shirley and Shiv arranged their play money in some nice patterns. How much money is shown in Shirley's arrangement?

SOLUTION

Shirley's arrangement shows 9 coins (8 coins in a ring and 1 coin in the centre). Each coin is a 5 coin. Total = 9 × 5 = 45.

Q2 How much money is shown in Shiv's arrangement?

SOLUTION

Shiv's arrangement shows 3 rows of 10 notes (2 notes per row = 6 notes = 60) and 6 coins of 5 below (6 × 5 = 30). Total = 60 + 30 = 90.

Q3 Arrange play money of amounts 1, 2, 5, and 10 to show 36, 125, and 183.

SOLUTION

To make 36: Use three 10 coins = 30, one 5 coin = 5, one 1 coin = 1. Total = 30 + 5 + 1 = 36.
To make 125: Use twelve 10 coins = 120, one 5 coin = 5. Total = 120 + 5 = 125.
To make 183: Use eighteen 10 coins = 180, one 2 coin = 2, one 1 coin = 1. Total = 180 + 2 + 1 = 183.
There are many valid ways — the key is that the denominations (1, 2, 5, 10) must add up to the target amount.
36 = 3×10 + 1×5 + 1×1; 125 = 12×10 + 1×5; 183 = 18×10 + 1×2 + 1×1
(one valid arrangement each)

Q4 Write the number of coins in the triangles for Shirley's arrangement.

SOLUTION

Shirley arranges coins in odd-number groups. The figure shows strips with triangles labelled 3 and 5 already filled. Count coins in the next two strips: 7 coins (write 7 in the triangle) and 9 coins (write 9 in the triangle). Shirley's numbers are odd: 3, 5, 7, 9.

Q5 Write the number of coins in the triangles for Shiv's arrangement.

SOLUTION

Shiv arranges coins in even-number groups. The figure shows one strip with triangle labelled 4 already filled. Count coins in the next two strips: 6 coins (write 6 in the triangle) and 8 coins (write 8 in the triangle). Shiv's numbers are even: 4, 6, 8.

Q6 Describe Shiv's arrangement and write his numbers.

SOLUTION

Shiv arranges his coins in pairs — every coin has a partner.
This means each group can be divided equally into two equal halves.
Shiv's numbers are: 2, 4, 6, 8, 10, 12, 14, ... — these are called even numbers.
Even numbers end in 0, 2, 4, 6, or 8.
Shiv pairs his coins with no leftover. His numbers are even numbers: 2, 4, 6, 8, 10, 12, 14, ...

Q7 Describe Shirley's arrangement and write her numbers.

SOLUTION

Shirley arranges coins in pairs but always has one coin left over without a partner.
This means the group cannot be divided into two equal halves.
Shirley's numbers are: 1, 3, 5, 7, 9, 11, 13, ... — these are called odd numbers.
Odd numbers end in 1, 3, 5, 7, or 9.
Shirley has one coin left unpaired. Her numbers are odd numbers: 1, 3, 5, 7, 9, 11, 13, ...

Exercise 3.3 — Even and Odd Numbers (1 to 20)

Q1 Identify numbers between 1 and 20 as even or odd. Write them in the correct columns.

SOLUTION

A number is even if it can be divided into two equal groups (no leftover). It ends in 0, 2, 4, 6, or 8.

A number is odd if there is always one leftover when divided into pairs. It ends in 1, 3, 5, 7, or 9.

Odd numbers (1–20): 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Even numbers (1–20): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Odd (1–20): 1, 3, 5, 7, 9, 11, 13, 15, 17, 19 | Even (1–20): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Q2 Do you think all numbers in the times-2 table are even?

SOLUTION

The times-2 table gives: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...

Each is 2 × some whole number, so it always divides into two equal groups.

Check: 2×1=2 (even), 2×2=4 (even), 2×3=6 (even), 2×4=8 (even), 2×5=10 (even).

Yes, all multiples of 2 are even numbers.

Yes. Every number in the times-2 table is even because multiplying by 2 always gives a number that pairs perfectly.

Exercise 3.4 — Crayons Arrangement — Circle Odd, Square Even

Q1 Circle the odd numbers and put a square around each even number: 8, 5, 36, 69.

SOLUTION

Look at the last digit to decide: even last digits = 0,2,4,6,8; odd last digits = 1,3,5,7,9.

8 → last digit 8 → even → put a square around 8.

5 → last digit 5 → odd → circle 5.

36 → last digit 6 → even → put a square around 36.

69 → last digit 9 → odd → circle 69.

Square (even): 8, 36 | Circle (odd): 5, 69

Exercise 3.5 — Identify Even and Odd — Larger Numbers

Q1 Identify which of the following numbers are even and which are odd: 30, 46, 78, 67, 300, 154, 415, 99.

SOLUTION

Check the last digit of each number to decide even or odd.
30 → last digit 0 → even.
46 → last digit 6 → even.
78 → last digit 8 → even.
67 → last digit 7 → odd.
300 → last digit 0 → even.
154 → last digit 4 → even.
415 → last digit 5 → odd.
99 → last digit 9 → odd.
Even: 30, 46, 78, 300, 154 | Odd: 67, 415, 99

Q2 Make two 2-digit numbers using the digits 1 and 6 without repetition. Identify the numbers as even or odd.

SOLUTION

Using digits 1 and 6 without repeating, we can make two 2-digit numbers.
Place 1 in tens place and 6 in units place: 16 → last digit 6 → even.
Place 6 in tens place and 1 in units place: 61 → last digit 1 → odd.
So the two numbers are 16 (even) and 61 (odd).
16 (even) and 61 (odd)

Q3 Choose any two digits and make 2-digit numbers such that the numbers are even.

SOLUTION

To make a 2-digit number even, its units (last) digit must be even: 0, 2, 4, 6, or 8.
Choose two even digits, for example 2 and 6.
26 → last digit 6 → even. 62 → last digit 2 → even.
Both numbers are even when both chosen digits are even.
Another example: digits 4 and 8 → 48 (even) and 84 (even).
Example: using digits 2 and 6 → 26 and 62 (both even). Using two even digits always gives even numbers.

Q4 Are there more even or odd numbers between 1 and 100?

SOLUTION

Count even numbers from 1 to 100: 2, 4, 6, ..., 100 → these are 50 numbers.
Count odd numbers from 1 to 100: 1, 3, 5, ..., 99 → these are 50 numbers.
There are exactly 50 even and 50 odd numbers between 1 and 100.
So there are an equal number of even and odd numbers.
There are equal numbers of each — 50 even and 50 odd numbers between 1 and 100.

Exercise 3.6 — Even–Odd Patterns in Consecutive Numbers

Q1 Shirley notices that both the numbers before and after an odd number are even. Is this true? Check and discuss.

SOLUTION

Pick any odd number, for example 7.
Number before 7 is 6 (even). Number after 7 is 8 (even).
Try another: odd number 13. Before = 12 (even). After = 14 (even).
This is always true: odd − 1 = even, odd + 1 = even.
So both neighbours of any odd number are always even.
Yes, true. The number before and after any odd number are always even. Example: before 7 is 6 (even), after 7 is 8 (even).

Q2 Shiv wonders: are both the numbers before and after an even number odd? Check and discuss.

SOLUTION

Pick any even number, for example 8.
Number before 8 is 7 (odd). Number after 8 is 9 (odd).
Try another: even number 20. Before = 19 (odd). After = 21 (odd).
This is always true: even − 1 = odd, even + 1 = odd.
So both neighbours of any even number are always odd.
Yes, true. The number before and after any even number are always odd. Example: before 8 is 7 (odd), after 8 is 9 (odd).

Q3 Choose any 10 consecutive numbers. Write whether each is even or odd. What do you notice?

SOLUTION

Let us choose 10 consecutive numbers starting from 21: 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.
21 → odd, 22 → even, 23 → odd, 24 → even, 25 → odd, 26 → even, 27 → odd, 28 → even, 29 → odd, 30 → even.
Pattern noticed: even and odd numbers alternate — they keep changing one after the other.
No two consecutive numbers are both even or both odd.
Even and odd numbers alternate perfectly in any sequence of consecutive numbers. Example with 21–30: O E O E O E O E O E.