Chapter 4: We the Travellers — II

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Exercise 4.1 — Making Sums Equal (p. 41–42)

Q1 In each of the following, there are two groups of numbers with their sums. Interchange pairs of numbers between the two groups to make their sums equal. Use the least number of moves.
(a) Group 1: 1, 2, 7, 9 (sum = 19) Group 2: 3, 4, 5, 9 (sum = 21)
(b) Group 1: 5, 7, 12, 15 (sum = 39) Group 2: 9, 11, 13, 14 (sum = 47)
(c) Group 1: 11, 15, 19, 23 (sum = 68) Group 2: 13, 17, 21, 25 (sum = 76)
(d) Group 1: 77, 78, 79, 80 (sum = 314) Group 2: 81, 82, 83, 84 (sum = 330)

SOLUTION

Key idea: when you swap one number x from Group 1 with y from Group 2, Group 1's sum changes by (y - x) and Group 2's sum changes by (x - y). For a single swap to make the sums equal, we need 2*(y - x) = difference between the two sums, i.e. y - x = (difference) / 2.

(a) Difference = 21 - 19 = 2. Need y - x = 1.

Swap 2 (Group 1) with 3 (Group 2): 3 - 2 = 1.
New Group 1: 1, 3, 7, 9 = 20. New Group 2: 2, 4, 5, 9 = 20. Equal! (1 swap)

(b) Difference = 47 - 39 = 8. Need y - x = 4.
Swap 5 (Group 1) with 9 (Group 2): 9 - 5 = 4.
New Group 1: 7, 9, 12, 15 = 43. New Group 2: 5, 11, 13, 14 = 43. Equal! (1 swap)

(c) Difference = 76 - 68 = 8. Need y - x = 4, but no single cross-pair has a difference of 4.
Use 2 swaps:
Swap 1: exchange 11 (Group 1) with 13 (Group 2). Group 1 = 13+15+19+23 = 70; Group 2 = 11+17+21+25 = 74. Difference now = 4.
Swap 2: exchange 19 (Group 1) with 21 (Group 2). Group 1 = 13+15+21+23 = 72; Group 2 = 11+17+19+25 = 72. Equal! (2 swaps)

(d) Difference = 330 - 314 = 16. Need y - x = 8, but no cross-pair has a difference of 8.
Use 2 swaps:
Swap 1: exchange 77 (Group 1) with 81 (Group 2). Group 1 = 81+78+79+80 = 318; Group 2 = 77+82+83+84 = 326. Difference now = 8.
Swap 2: exchange 79 (Group 1) with 83 (Group 2). Group 1 = 81+78+83+80 = 322; Group 2 = 77+82+79+84 = 322. Equal! (2 swaps)

Answer: (a) Swap 2 and 3 → both groups sum to 20 (1 swap). (b) Swap 5 and 9 → both groups sum to 43 (1 swap). (c) Swap 11<->13 then 19<->21 → both sum to 72 (2 swaps). (d) Swap 77<->81 then 79<->83 → both sum to 322 (2 swaps).

Exercise 4.2 — Fuel Arithmetic — Addition with Regrouping (p. 42–43)

Q1 A lorry has 28 litres of fuel in its tank. An additional 75 litres is filled. What is the total quantity of fuel in the lorry?

SOLUTION

Total fuel = 28 l + 75 l.
Ones: 8 + 5 = 13. Write 3, carry 1 Ten.
Tens: 2 + 7 + 1 (carry) = 10. Write 0, carry 1 Hundred.
Hundreds: 0 + 0 + 1 (carry) = 1.
Total = 103 litres.

Answer: 103 litres

Q2 Find the sum of 49 and 89.

SOLUTION

Ones: 9 + 9 = 18. Write 8, carry 1 Ten.
Tens: 4 + 8 + 1 (carry) = 13. Write 3, carry 1 Hundred.
Hundreds: 1.
Sum = 138.

Answer: 138

Exercise 4.3 — Let Us Solve — Adding Two-Digit Numbers (p. 43)

Q1 Add the following numbers. Wherever possible, find easier ways to add the pairs of numbers.

(a) 15 + 79

(b) 46 + 99

(c) 38 + 35

(d) 5 + 89

(e) 76 + 28

(f) 69 + 20

SOLUTION

(a) 15 + 79: Think 15 + 80 - 1 = 95 - 1 = 94.

(b) 46 + 99: Think 46 + 100 - 1 = 146 - 1 = 145.

(c) 38 + 35: Think 38 + 35 = 40 + 33 = 73.

(d) 5 + 89: Think 5 + 90 - 1 = 95 - 1 = 94.

(e) 76 + 28: Think 76 + 30 - 2 = 106 - 2 = 104.

(f) 69 + 20: 69 + 20 = 89.

Answer: (a) 94 (b) 145 (c) 73 (d) 94 (e) 104 (f) 89

Exercise 4.4 — Relationship Between Addition and Subtraction (p. 44)

Q1 Find the relationship between the numbers in the given statements and fill in the blanks.
(a) If 46 + 21 = 67, then 67 - 21 = ___ and 67 - 46 = ___.
(b) If 198 - 98 = 100, then 100 + ___ = 198 and 198 - ___ = 98.
(c) If 189 + 98 = 287, then 287 - 98 = ___ and 287 - 189 = ___.
(d) If 872 - 672 = 200, then 200 + ___ = 872 and 872 - ___ = 672.

SOLUTION

(a) 67 - 21 = 46. 67 - 46 = 21.
(Subtraction undoes addition: if a + b = c, then c - b = a and c - a = b.)

(b) 100 + 98 = 198. 198 - 100 = 98.
(Addition undoes subtraction: if c - b = a, then a + b = c and c - a = b.)

(c) 287 - 98 = 189. 287 - 189 = 98.

(d) 200 + 672 = 872. 872 - 200 = 672.

Answer: (a) 46; 21 (b) 98; 100 (c) 189; 98 (d) 672; 200

Q2 In each of the following, write the subtraction and addition sentences that follow from the given sentence.
(a) If 78 + 164 = 242, then ...
(b) If 462 + 839 = 1,301, then ...
(c) If 921 - 137 = 784, then ...
(d) If 824 - 234 = 590, then ...

SOLUTION

(a) If 78 + 164 = 242, then:
242 - 164 = 78 and 242 - 78 = 164.

(b) If 462 + 839 = 1,301, then:
1,301 - 839 = 462 and 1,301 - 462 = 839.

(c) If 921 - 137 = 784, then:
784 + 137 = 921 and 921 - 784 = 137.

(d) If 824 - 234 = 590, then:
590 + 234 = 824 and 824 - 590 = 234.

Answer: (a) 242-164=78; 242-78=164 (b) 1,301-839=462; 1,301-462=839 (c) 784+137=921; 921-784=137 (d) 590+234=824; 824-590=234

Exercise 4.5 — Let Us Solve — Subtracting Two-Digit Numbers (p. 44–45)

Q1 What is the difference between 82 and 37?
Check your answer: Is 37 + ___ = 82?

SOLUTION

82 - 37:
Ones: cannot take 7 from 2, so regroup. Borrow 1 Ten from 8 Tens. Ones become 12, Tens become 7.
Ones: 12 - 7 = 5. Tens: 7 - 3 = 4.
Difference = 45.

Check: 37 + 45 = 82. Correct.

Answer: 45. Check: 37 + 45 = 82.

Q2 Find the following differences.
2. 57 - 11
3. 23 - 19
4. 49 - 21
5. 56 - 18
6. 93 - 35
7. 84 - 23
8. 70 - 43
9. 65 - 47

SOLUTION

57 - 11 = 46
23 - 19 = 4
49 - 21 = 28
56 - 18 = 38
93 - 35 = 58
84 - 23 = 61
70 - 43 = 27
65 - 47 = 18

Answer: 57-11=46 | 23-19=4 | 49-21=28 | 56-18=38 | 93-35=58 | 84-23=61 | 70-43=27 | 65-47=18

Exercise 4.6 — Sums of Consecutive Numbers (p. 45–46)

Q1 In each of the boxes (sum of 2, sum of 3, sum of 4 consecutive numbers), state whether the sums are even or odd. Explain why this is happening.

SOLUTION

Sum of 2 consecutive numbers (3, 5, 7, 9, ...): always ODD.
Two consecutive numbers are one even and one odd. Even + Odd = Odd. So the sum is always odd.

Sum of 3 consecutive numbers (6, 9, 12, 15, ...): they alternate even and odd, but all are multiples of 3.
6 = even, 9 = odd, 12 = even, 15 = odd — the sums alternate even and odd.
This is because 3 consecutive numbers have 2 of one parity and 1 of the other; the total switches with each step.

Sum of 4 consecutive numbers (10, 14, 18, 22, ...): always EVEN.
4 consecutive numbers contain 2 even and 2 odd numbers. Even + Even + Odd + Odd = Even.

Answer: Sum of 2 consecutive: always odd (one even + one odd). Sum of 3 consecutive: alternates even/odd. Sum of 4 consecutive: always even (2 even + 2 odd).

Q2 What is the difference between two successive sums in each box? Is it the same throughout?

SOLUTION

Sum of 2 consecutive: 3, 5, 7, 9. Differences: 5-3=2, 7-5=2, 9-7=2. Difference = 2. Same throughout.
Sum of 3 consecutive: 6, 9, 12, 15. Differences: 3, 3, 3. Difference = 3. Same throughout.
Sum of 4 consecutive: 10, 14, 18, 22. Differences: 4, 4, 4. Difference = 4. Same throughout.

Pattern: for n consecutive numbers, the difference between two successive sums is always n.

Answer: 2 consecutive: difference = 2 (constant). 3 consecutive: difference = 3 (constant). 4 consecutive: difference = 4 (constant). Yes, the same throughout in each box.

Q3 What will be the difference between two successive sums for:
(a) 5 consecutive numbers
(b) 6 consecutive numbers

SOLUTION

The pattern shows: for n consecutive numbers, the difference between successive sums = n.
(a) 5 consecutive numbers: difference = 5.
Check: 1+2+3+4+5=15; 2+3+4+5+6=20; 20-15=5. Correct.
(b) 6 consecutive numbers: difference = 6.
Check: 1+2+3+4+5+6=21; 2+3+4+5+6+7=27; 27-21=6. Correct.

Answer: (a) 5 (b) 6

Q4 Use the pattern (sums of 3, 4, and 5 consecutive numbers are related to the middle number or average) to find the following sums WITHOUT adding directly.
(a) 67 + 68 + 69
(b) 24 + 25 + 26 + 27
(c) 48 + 49 + 50 + 51 + 52
(d) 237 + 238 + 239 + 240 + 241 + 242

SOLUTION

(a) 3 consecutive numbers: sum = 3 x middle number = 3 x 68 = 204.

(b) 4 consecutive numbers: sum = 4 x average. Average of 24 and 27 = (24+27)/2 = 25.5. Sum = 4 x 25.5 = 102.
Or: pair the ends: (24+27) + (25+26) = 51 + 51 = 102.

(c) 5 consecutive numbers: sum = 5 x middle number = 5 x 50 = 250.

(d) 6 consecutive numbers: sum = 3 x (first + last) = 3 x (237+242) = 3 x 479 = 1,437.

Answer: (a) 204 (b) 102 (c) 250 (d) 1,437

Exercise 4.7 — The Longest Land Route — Adding Large Numbers (p. 46–48)

Q1 One of the places on the North-South Corridor was 1,855 km from Srinagar and 1,862 km from Kanniyakumari. What was the total length of the North-South Corridor in 2019?

SOLUTION

Total length = 1,855 + 1,862.
Ones: 5 + 2 = 7.
Tens: 5 + 6 = 11. Write 1, carry 1.
Hundreds: 8 + 8 + 1 = 17. Write 7, carry 1.
Thousands: 1 + 1 + 1 = 3.
Total = 3,717 km.

Answer: 3,717 km

Q2 Mahesh spends Rs 21,880 on fuel and toll tax, and Rs 38,900 on other expenses during his drive from Srinagar to Kanniyakumari. How much did he spend in total?

SOLUTION

Total = 21,880 + 38,900.
Ones: 0 + 0 = 0.
Tens: 8 + 0 = 8.
Hundreds: 8 + 9 = 17. Write 7, carry 1.
Thousands: 1 + 8 + 1 = 10. Write 0, carry 1.
Ten-thousands: 2 + 3 + 1 = 6.
Total = Rs 60,780.

Answer: Rs 60,780

Exercise 4.8 — Let Us Solve — Adding Large Numbers (p. 47–48)

Q1 Find the following sums. Align the digits properly.
(a) 238 + 367
(b) 1,234 + 12,345
(c) 12 + 123
(d) 46,120 + 12,890
(e) 878 + 8,789
(f) 1,749 + 17,490

SOLUTION

(a) 238 + 367 = 605
(b) 1,234 + 12,345 = 13,579
(c) 12 + 123 = 135
(d) 46,120 + 12,890 = 59,010
(e) 878 + 8,789 = 9,667
(f) 1,749 + 17,490 = 19,239

Answer: (a) 605 (b) 13,579 (c) 135 (d) 59,010 (e) 9,667 (f) 19,239

Q2 The great Indian road trip! Nazrana and her friends drove from Delhi to Mumbai (1,600 km), then Mumbai to Goa (590 km), then Goa to Hyderabad (670 km), and finally Hyderabad to Puri (1,055 km). What was the total distance travelled?

SOLUTION

Total = 1,600 + 590 + 670 + 1,055.
Step 1: 1,600 + 590 = 2,190.
Step 2: 2,190 + 670 = 2,860.
Step 3: 2,860 + 1,055 = 3,915.
Total distance = 3,915 km.

Answer: 3,915 km

Q3 Find 2 numbers from the list — 5,205; 6,220; 7,095; 8,455; 4,840 — whose sum is closest to:
(a) 10,000
(b) 15,000
(c) 13,000
(d) 16,000

SOLUTION

(a) Closest to 10,000: 5,205 + 4,840 = 10,045 (only 45 above 10,000). Best pair.
(b) Closest to 15,000: 6,220 + 8,455 = 14,675 (325 below 15,000). Best pair.
(c) Closest to 13,000: 8,455 + 4,840 = 13,295 (295 above 13,000). Best pair.
(d) Closest to 16,000: 7,095 + 8,455 = 15,550 (450 below 16,000). Best pair.

Answer: (a) 5,205 + 4,840 = 10,045 (b) 6,220 + 8,455 = 14,675 (c) 8,455 + 4,840 = 13,295 (d) 7,095 + 8,455 = 15,550

Exercise 4.9 — Subtracting Large Numbers (p. 49–50)

Q1 The total distance of the sea route from Mumbai to Chennai is 2,700 km. A ship from Mumbai first reaches Cochin port, travelling 1,083 km. How much more distance does it have to travel to reach Chennai?

SOLUTION

Remaining distance = 2,700 - 1,083.
Ones: cannot take 3 from 0. Regroup Tens: but Tens is 0 too. Regroup Hundreds: 7 Hundreds -> 6 Hundreds + 10 Tens; then 10 Tens -> 9 Tens + 10 Ones.
Ones: 10 - 3 = 7. Tens: 9 - 8 = 1. Hundreds: 6 - 0 = 6. Thousands: 2 - 1 = 1.
Remaining = 1,617 km.

Check: 1,083 + 1,617 = 2,700. Correct.

Answer: 1,617 km

Q2 The longest land route (Talon to Sagres) is 15,150 km. The longest highway in Africa (Cairo to Cape Town) is 10,228 km. How much longer is the Talon–Sagres route?

SOLUTION

Difference = 15,150 - 10,228.
Ones: cannot take 8 from 0. Regroup: borrow from Tens. 10 - 8 = 2.
Tens: 4 - 2 = 2 (after borrowing 1). Hundreds: 11 - 2 = 9 (after borrowing from Thousands).
Thousands: 4 - 0 = 4 (after borrowing). Ten-thousands: 1 - 1 = 0.
Difference = 4,922 km.

Check: 10,228 + 4,922 = 15,150. Correct.

Answer: 4,922 km

Exercise 4.10 — Let Us Solve — Subtracting Large Numbers (p. 50–51)

Q1 Subtract the following. Align the digits carefully.
(a) 4,578 - 2,222
(b) 15,324 - 11,780
(c) 5,423 - 423
(d) 123 - 12
(e) 77,777 - 777
(f) 826 - 752

SOLUTION

(a) 4,578 - 2,222 = 2,356
(b) 15,324 - 11,780 = 3,544
(c) 5,423 - 423 = 5,000
(d) 123 - 12 = 111
(e) 77,777 - 777 = 77,000
(f) 826 - 752 = 74

Answer: (a) 2,356 (b) 3,544 (c) 5,000 (d) 111 (e) 77,000 (f) 74

Q2 Mary's train journey to Delhi. Mary starts from Kolkata with Rs 12,540. She spends Rs 3,275 on food during her trip to Varanasi. Her uncle gives her a gift worth Rs 4,900 in Varanasi. She then spends Rs 2,645 on a train ticket to Delhi and Rs 1,275 on souvenirs in Delhi. How much money is Mary left with at the end?

SOLUTION

Start: Rs 12,540.
After spending Rs 3,275 (Kolkata to Varanasi): 12,540 - 3,275 = Rs 9,265.
After receiving Rs 4,900 gift: 9,265 + 4,900 = Rs 14,165.
After train ticket Rs 2,645: 14,165 - 2,645 = Rs 11,520.
After souvenirs Rs 1,275: 11,520 - 1,275 = Rs 10,245.

Answer: Rs 10,245

Q3 Members of a school council have raised Rs 70,500. They plan to set up a Maths Lab (Rs 39,785), buy library books (Rs 9,545), and purchase sports equipment (Rs 19,548).
(a) Estimate whether the council has raised enough money.
(b) Check your estimate with calculations.

SOLUTION

(a) Estimation: Rs 39,785 is about Rs 40,000; Rs 9,545 is about Rs 10,000; Rs 19,548 is about Rs 20,000.
Total estimate = 40,000 + 10,000 + 20,000 = Rs 70,000. The council raised Rs 70,500, so it seems just enough.

(b) Exact total needed = 39,785 + 9,545 + 19,548.
39,785 + 9,545 = 49,330.
49,330 + 19,548 = 68,878.
Total needed = Rs 68,878.
Money raised = Rs 70,500.
Surplus = 70,500 - 68,878 = Rs 1,622.
Yes, the council has raised enough — with Rs 1,622 left over.

Answer: (a) Estimate: yes, just enough (about Rs 70,000 needed). (b) Exact: total needed = Rs 68,878; surplus = Rs 1,622. The council has enough.

Q4 A truck can carry 8,250 kg of goods. A factory loads 3,675 kg of cement and 2,850 kg of steel on it.
(a) What is the total weight loaded onto the truck?
(b) How much more weight can the truck carry before reaching its maximum capacity?

SOLUTION

(a) Total weight loaded = 3,675 + 2,850 = 6,525 kg.

(b) Remaining capacity = 8,250 - 6,525 = 1,725 kg.

Answer: (a) 6,525 kg (b) 1,725 kg

Exercise 4.11 — Quick Sums and Differences (p. 51–52)

Q1 Help Sukanta fill in the blanks so that the sum is 100:
32 + ___ = 100
59 + ___ = 100
Also solve using Piku's method (add to get 99 first, then add 1 more), then apply to:
877 + ___ = 1,000
666 + ___ = 1,000
4,103 + ___ = 10,000
5,555 + ___ = 10,000
Also find:
(a) 180 + ___ = 1,000
(b) 760 + ___ = 1,000
(c) 400 + ___ = 1,000

SOLUTION

32 + 68 = 100. (Piku's method: 32 + 67 = 99, then +1 gives 32 + 68 = 100.)
59 + 41 = 100. (59 + 40 = 99, then +1: 59 + 41 = 100.)

877 + 123 = 1,000. (877 + 122 = 999, +1: 877 + 123 = 1,000.)
666 + 334 = 1,000.
4,103 + 5,897 = 10,000.
5,555 + 4,445 = 10,000.

When the units digit is 0, Piku's method doesn't directly work (adding 9 ones gives a carry that changes things). Use direct subtraction instead:
(a) 180 + 820 = 1,000. (1,000 - 180 = 820)
(b) 760 + 240 = 1,000. (1,000 - 760 = 240)
(c) 400 + 600 = 1,000. (1,000 - 400 = 600)

Answer: 32+68=100; 59+41=100; 877+123=1,000; 666+334=1,000; 4,103+5,897=10,000; 5,555+4,445=10,000. (a) 820 (b) 240 (c) 600

Q2 Namita wants to quickly subtract 9 or 99 from any number. Find a quick way, then solve:
(a) 67 - 9
(b) 83 - 9
(c) 144 - 9
(d) 187 - 99
(e) 247 - 99
(f) 763 - 99
Then use the above results (without recalculating) to find:
(a) 32 - ___ = 9
(b) 56 - ___ = 9
(c) 877 - ___ = 99
(d) 666 - ___ = 99

SOLUTION

Quick trick for subtracting 9: subtract 10, then add 1. (n - 9 = n - 10 + 1)
Quick trick for subtracting 99: subtract 100, then add 1. (n - 99 = n - 100 + 1)

(a) 67 - 9 = 67 - 10 + 1 = 57 + 1 = 58.
(b) 83 - 9 = 83 - 10 + 1 = 73 + 1 = 74.
(c) 144 - 9 = 144 - 10 + 1 = 134 + 1 = 135.
(d) 187 - 99 = 187 - 100 + 1 = 87 + 1 = 88.
(e) 247 - 99 = 247 - 100 + 1 = 147 + 1 = 148.
(f) 763 - 99 = 763 - 100 + 1 = 663 + 1 = 664.

Using the results above (rearranging: if a - b = c, then a - c = b):
(a) 32 - ___ = 9: ___ = 32 - 9 = 23.
(b) 56 - ___ = 9: ___ = 56 - 9 = 47.
(c) 877 - ___ = 99: ___ = 877 - 99 = 778.
(d) 666 - ___ = 99: ___ = 666 - 99 = 567.

Answer: (a)58 (b)74 (c)135 (d)88 (e)148 (f)664. Blanks: (a)23 (b)47 (c)778 (d)567

Exercise 4.12 — Let Us Think and Solve — Palindromes and Number Grids (p. 53)

Q1 Nitin likes palindrome numbers (numbers that read the same forwards and backwards, e.g. 22, 363, 404, 8,558).
List all palindrome numbers between 100 and 200.
List all palindrome numbers between 900 and 1,200.
List all palindrome numbers between 25,000 and 27,000.

SOLUTION

Between 100 and 200: a 3-digit palindrome has the form ABA. Here A = 1, B can be 0-9.
101, 111, 121, 131, 141, 151, 161, 171, 181, 191. (10 palindromes)

Between 900 and 1,200:
3-digit: ABA with A=9: 909, 919, 929, 939, 949, 959, 969, 979, 989, 999.
4-digit (1,001 to 1,200): form ABBA. ABBA = 1001 to 1991 range. With first digit=1: 1001, 1111.
1,001 and 1,111 are in range (1,221 > 1,200 so excluded).
All palindromes: 909, 919, 929, 939, 949, 959, 969, 979, 989, 999, 1,001, 1,111.

Between 25,000 and 27,000: 5-digit palindromes of form ABCBA.
First digit = 2, last digit = 2. Middle section: 5_C_5 where second digit = 5 or 6.
Second digit 5: 25,052; 25,152; 25,252; 25,352; 25,452; 25,552; 25,652; 25,752; 25,852; 25,952.
Second digit 6: 26,062; 26,162; 26,262; 26,362; 26,462; 26,562; 26,662; 26,762; 26,862; 26,962.
(20 palindromes in this range)

Answer: 100-200: 101,111,121,131,141,151,161,171,181,191 (10 numbers). 900-1,200: 909,919,...,999,1,001,1,111 (12 numbers). 25,000-27,000: 25,052 to 26,962 — 20 palindromes.

Q2 In a 3x3 grid, arrange the numbers 1 to 9 so that:
(Part 1) Each row and each column has numbers in increasing (inc) order.
(Part 2) Each row and each column has numbers in decreasing (dec) order.
(Part 3) Fill three more grids using the mixed inc/dec patterns shown:
Grid A: rows inc, columns inc.
Grid B: rows dec, first 2 columns dec, last column inc.
Grid C: rows mixed (row 1 inc, row 2 inc, row 3 dec), columns mixed.

SOLUTION

Part 1 — all rows and all columns increasing:
The only arrangement (using 1-9 each exactly once) is:

1	2	3
4	5	6
7	8	9

(Each row increases left to right, each column increases top to bottom.)

Part 2 — all rows and all columns decreasing:

9	8	7
6	5	4
3	2	1

(Each row decreases left to right, each column decreases top to bottom.)

Part 3 — mixed grids. The three blank grids in the book have specific row and column conditions. Here is the general approach:
First, decide which numbers go in each row by the row condition (inc or dec), keeping columns consistent with their column condition.
One valid solution for the grid with rows all inc and columns all inc is already Part 1 above.
For a grid where columns are all dec but rows are all inc: place numbers so reading across each row is increasing but reading down each column is decreasing. Example:

7	8	9
4	5	6
1	2	3

There are many valid arrangements — experiment with the pieces of paper to find solutions.

Answer: Part 1 (all inc): rows 1-2-3, 4-5-6, 7-8-9. Part 2 (all dec): rows 9-8-7, 6-5-4, 3-2-1. Part 3: Use the strategy of fixing row values and checking column directions; multiple valid answers exist.

Exercise 4.13 — Even and Odd Numbers (p. 53–54)

Q1 Circle the numbers that are even.
(a) 297 (b) 498 (c) 724 (d) 100 (e) 199 (f) 789 (g) 49 (h) 6,893 (i) 846 (j) 111 (k) 222 (l) 1,023

SOLUTION

A number is even if its ones (units) digit is 0, 2, 4, 6, or 8.
(a) 297: ones = 7. Odd.
(b) 498: ones = 8. EVEN.
(c) 724: ones = 4. EVEN.
(d) 100: ones = 0. EVEN.
(e) 199: ones = 9. Odd.
(f) 789: ones = 9. Odd.
(g) 49: ones = 9. Odd.
(h) 6,893: ones = 3. Odd.
(i) 846: ones = 6. EVEN.
(j) 111: ones = 1. Odd.
(k) 222: ones = 2. EVEN.
(l) 1,023: ones = 3. Odd.

Answer: Even numbers: (b) 498, (c) 724, (d) 100, (i) 846, (k) 222.

Q2 Observe the paired arrangement for 18 and for 23.
Add 2 to 18. What changes or does not change in the arrangement?
Add 2 to 23. What changes or does not change in the arrangement?

SOLUTION

Paired arrangement for 18 (even): 18 dots arranged in 2 equal rows of 9. No leftover dot.
Paired arrangement for 23 (odd): 23 dots in 2 rows — 11 pairs with 1 dot left over.

Add 2 to 18 (making 20): we add one more pair of dots. The arrangement stays even — still no leftover dot. 20 is also even.

Add 2 to 23 (making 25): we add one more pair of dots. The leftover dot remains. The arrangement stays odd — still 1 leftover dot. 25 is also odd.

Conclusion: adding 2 (an even number) does not change whether a number is even or odd.

Answer: Adding 2 to 18 gives 20 (still even — the paired arrangement keeps no leftover). Adding 2 to 23 gives 25 (still odd — the single leftover dot remains). Adding 2 does not change the even/odd nature of a number.

Q3 What do you notice about the sums in each case? Will it be true for all such pairs? Explain using the paired arrangement.
(a) Add pairs of even numbers (e.g. 12 and 6). Choose 5 such pairs.
(b) Add pairs of odd numbers (e.g. 13 and 9). Choose 5 such pairs.
(c) Add one odd and one even number (e.g. 7 and 12). Choose 5 such pairs.

SOLUTION

(a) Even + Even = Even.
Examples: 12+6=18, 4+8=12, 10+20=30, 14+2=16, 6+6=12. All sums are even.
Reason: two even numbers have no leftover dots. Adding them gives no leftover dot. So the sum is even.

(b) Odd + Odd = Even.
Examples: 13+9=22, 3+5=8, 7+11=18, 1+15=16, 9+9=18. All sums are even.
Reason: each odd number has 1 leftover dot. Adding two leftover dots makes 1 new pair. So no leftover remains and the sum is even.

(c) Odd + Even = Odd.
Examples: 7+12=19, 3+4=7, 5+10=15, 9+2=11, 11+8=19. All sums are odd.
Reason: the even number contributes no leftover dot; the odd number contributes 1 leftover dot. So the sum still has 1 leftover dot and is odd.

Answer: (a) Even + Even = always Even. (b) Odd + Odd = always Even. (c) Odd + Even = always Odd. Yes, these rules are always true.

Exercise 4.14 — Let Us Think — Logic Puzzles (p. 54–55)

Q1 Jincy opened her piggy bank. She found 8 coins of Rs 1, 9 coins of Rs 2, and 5 coins of Rs 5. She wants to buy stickers worth Rs 38. What possible combination of coins can she use to pay the exact amount?

SOLUTION

Total available: 8x1 + 9x2 + 5x5 = 8 + 18 + 25 = Rs 51. She can reach Rs 38.

Some valid combinations (using at most 5 fives, 9 twos, 8 ones):

Option 1: Use all 5 Rs-5 coins + some Rs-2 and Rs-1.
5x5 = 25. Remaining = 38 - 25 = 13 = 6x2 + 1x1. Coins: 5 fives + 6 twos + 1 one. Check: 25+12+1=38. OK.

Option 2: 4 Rs-5 coins = 20. Remaining = 18 = 9x2. Coins: 4 fives + 9 twos. Check: 20+18=38. OK.

Option 3: 3 Rs-5 coins = 15. Remaining = 23 = 9x2 + 5x1. Coins: 3 fives + 9 twos + 5 ones. Check: 15+18+5=38. OK.

There are several valid combinations. Any correct combination is acceptable.

Answer: Example combinations: (1) 5 fives + 6 twos + 1 one = Rs 38. (2) 4 fives + 9 twos = Rs 38. (3) 3 fives + 9 twos + 5 ones = Rs 38.

Q2 Raghu presses a torch switch: 1st press = ON, 2nd press = OFF, 3rd press = ON, and so on.
(a) Will the torch be ON or OFF after the 23rd press?
(b) For what number of presses will the torch be ON? For what number will it be OFF?

SOLUTION

(a) The torch is ON for odd-numbered presses and OFF for even-numbered presses.
23 is odd, so the torch is ON after the 23rd press.

(b) The torch is ON after press numbers 1, 3, 5, 7, ... (all odd numbers).
The torch is OFF after press numbers 2, 4, 6, 8, ... (all even numbers).

Answer: (a) ON (23 is odd). (b) ON for any odd number of presses; OFF for any even number of presses.

Q3 Mountain climbing — Priyanka Mohite's peaks (read the table):
Mount Kanchenjunga: 8,586 m (2022)
Mount Everest: 8,848 m (2013)
Mount Makalu: 8,485 m (2019)
Mount Lhotse: 8,516 m (2018)
Mount Kilimanjaro: 5,895 m (2016)
Mount Elbrus: 5,642 m (2017)
Mount Annapurna I: 8,091 m (2021)
(a) Which is the highest peak she climbed?
(b) What is the difference in height between the highest and lowest peaks?
(c) What is the difference between heights of Mount Elbrus and Mount Kanchenjunga?
(d) If Priyanka was 20 years old when she summited Mount Everest in 2013, in which year was she born?

SOLUTION

(a) Comparing all heights: 8,848 is the greatest. Highest peak = Mount Everest (8,848 m).

(b) Highest = Mount Everest = 8,848 m. Lowest = Mount Elbrus = 5,642 m.
Difference = 8,848 - 5,642 = 3,206 m.

(c) Mount Kanchenjunga = 8,586 m; Mount Elbrus = 5,642 m.
Difference = 8,586 - 5,642 = 2,944 m.

(d) Priyanka was 20 years old in 2013.
Year of birth = 2013 - 20 = 1993.

Answer: (a) Mount Everest (8,848 m) (b) 3,206 m (c) 2,944 m (d) 1993

Exercise 4.15 — Math Metric Mela (p. 55–56)

Q1 A grand Math Metric Mela was held. For each district, find if the certificates were sufficient. If insufficient, find how many fell short; if extra, find how many were in excess.
Chittoor (A.P.): Certificates printed = 18,225; Students attended = 18,104.
Jaunpur (U.P.): Certificates printed = 19,043; Students attended = 19,265.
Raigad (Maharashtra): Certificates printed = 20,863; Students attended = 19,974.

SOLUTION

Chittoor: Printed 18,225 > Attended 18,104. Extra certificates = 18,225 - 18,104 = 121.

Jaunpur: Printed 19,043 < Attended 19,265. Certificates fell short by 19,265 - 19,043 = 222.

Raigad: Printed 20,863 > Attended 19,974. Extra certificates = 20,863 - 19,974 = 889.

Answer: Chittoor: extra 121 certificates. Jaunpur: short by 222 certificates. Raigad: extra 889 certificates.

Exercise 4.16 — Let Us Do — Addition and Subtraction Practice (p. 56)

Q1 Add.
(a) 2,009 + 7,388
(b) 26,444 + 71,111
(c) 777 + 888
(d) 1,234 + 1,234
(e) 56 + 56,789
(f) 777 + 77,777
(g) 5,922 + 9,221
(h) 4,321 + 8,765
(i) 50,050 + 55,000

SOLUTION

(a) 2,009 + 7,388 = 9,397
(b) 26,444 + 71,111 = 97,555
(c) 777 + 888 = 1,665
(d) 1,234 + 1,234 = 2,468
(e) 56 + 56,789 = 56,845
(f) 777 + 77,777 = 78,554
(g) 5,922 + 9,221 = 15,143
(h) 4,321 + 8,765 = 13,086
(i) 50,050 + 55,000 = 1,05,050

Answer: (a) 9,397 (b) 97,555 (c) 1,665 (d) 2,468 (e) 56,845 (f) 78,554 (g) 15,143 (h) 13,086 (i) 1,05,050

Q2 Subtract.
(a) 458 - 226
(b) 7,777 - 4,449
(c) 65,447 - 47,299
(d) 1,234 - 123
(e) 12,345 - 1,234
(f) 56,789 - 56
(g) 87,326 - 11,111
(h) 878 - 52
(i) 749 - 222

SOLUTION

(a) 458 - 226 = 232
(b) 7,777 - 4,449 = 3,328
(c) 65,447 - 47,299 = 18,148
(d) 1,234 - 123 = 1,111
(e) 12,345 - 1,234 = 11,111

(f) 56,789 - 56 = 56,733
(g) 87,326 - 11,111 = 76,215
(h) 878 - 52 = 826
(i) 749 - 222 = 527

Answer: (a) 232 (b) 3,328 (c) 18,148 (d) 1,111 (e) 11,111 (f) 56,733 (g) 76,215 (h) 826 (i) 527

Q3 Ambrish saved Rs 92,375 over a year to buy cows and goats. He buys a cow for Rs 26,000 and a goat for Rs 17,000. He also buys a milking machine for Rs 19,873. Does he have enough money? How much more or less does he have than he needs?

SOLUTION

Total cost = 26,000 + 17,000 + 19,873.
26,000 + 17,000 = 43,000.
43,000 + 19,873 = 62,873.
Total cost = Rs 62,873.
He saved Rs 92,375.
Since 92,375 > 62,873, he has enough.
Amount left over = 92,375 - 62,873 = Rs 29,502.

Answer: Yes, he has enough. Total cost = Rs 62,873. He has Rs 29,502 more than he needs.

Q4 A factory produces 54,000 nuts and bolts in a day. An order is placed for 85,300 nuts and bolts. How many more nuts and bolts does the factory need to produce to complete the order?

SOLUTION

More nuts and bolts needed = 85,300 - 54,000 = 31,300.

Answer: 31,300 more nuts and bolts

Q5 Virat Kohli has scored 27,599 runs. He has 6,758 runs less than Sachin Tendulkar. How many runs has Sachin Tendulkar scored?

SOLUTION

Sachin's runs = Virat's runs + 6,758 = 27,599 + 6,758 = 34,357.

Answer: 34,357 runs