# Chapter 9: Equal Groups

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## Exercise 9.1 — Animal Jumps

**Q1** The frog jumps 3 steps at a time. Which numbers will the frog touch? Will it touch 67?

SOLUTION

The frog starts at 0 and lands on every multiple of 3: 0, 3, 6, 9, 12, 15, 18, 21, ...
These numbers are called multiples of 3.
To check 67: 67 ÷ 3 = 22 remainder 1.
Because 67 is not exactly divisible by 3, it is not a multiple of 3.
The frog will NOT touch 67.

Q2 The squirrel jumps 4 steps at a time. Which numbers will the squirrel touch? How many times should the squirrel jump to reach 60?

SOLUTION

The squirrel lands on multiples of 4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, ...
These numbers are multiples of 4.
To reach 60: 60 ÷ 4 = 15.
The squirrel needs to jump 15 times to reach 60.

Q3 The rabbit jumps 6 steps at a time. Which numbers will the rabbit touch? What is the smallest 3-digit number on which the rabbit will land? How many times did the rabbit jump to reach this number?

SOLUTION

The rabbit lands on multiples of 6: 0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, ...
These numbers are multiples of 6.
The smallest 3-digit multiple of 6: 96 is 2 digits (9, 6), and 102 is the first with 3 digits.
Check: 102 ÷ 6 = 17. So 102 is indeed a multiple of 6.
The rabbit jumps 17 times to reach 102.

Q4 The kangaroo jumps 8 steps at a time. Which numbers will the kangaroo touch? Are there numbers that both the rabbit and the kangaroo will touch?

SOLUTION

The kangaroo lands on multiples of 8: 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, ...
These numbers are multiples of 8.
The rabbit lands on multiples of 6; the kangaroo on multiples of 8.
Numbers both touch are common multiples of 6 and 8.
LCM(6, 8) = 24. Common multiples: 24, 48, 72, 96, 120, ...
Yes, both the rabbit and the kangaroo will touch 24, 48, 72, 96, ...

Q5 To reach 48, how many times did the rabbit jump? How many times did the kangaroo jump to reach the same number? What did you observe?

SOLUTION

Rabbit jumps 6 steps each time. Jumps to reach 48: 48 ÷ 6 = 8 jumps.
Kangaroo jumps 8 steps each time. Jumps to reach 48: 48 ÷ 8 = 6 jumps.
Observation: The rabbit took more jumps (8) than the kangaroo (6) to reach the same number, because the kangaroo covers more distance in each jump.

Q6 To reach 60, how many times did the frog jump? How many times did the rabbit jump to reach the same number? What do you observe?

SOLUTION

Frog jumps 3 steps each time. Jumps to reach 60: 60 ÷ 3 = 20 jumps.

Rabbit jumps 6 steps each time. Jumps to reach 60: 60 ÷ 6 = 10 jumps.

Observation: The frog needs twice as many jumps as the rabbit because the rabbit's jump size (6) is exactly double the frog's (3).

## Exercise 9.2 — Common Multiples

Q1 Which numbers do both the frog and the squirrel touch? A few common multiples of 3 and 4 are ___.

SOLUTION

Frog touches multiples of 3; squirrel touches multiples of 4.
LCM(3, 4) = 12 (since 3 and 4 share no common factor other than 1).
Common multiples of 3 and 4: 12, 24, 36, 48, 60, 72, 84, ...

Q2 Which numbers do both the rabbit and the kangaroo touch? A few common multiples of 6 and 8 are ___.

SOLUTION

Rabbit touches multiples of 6; kangaroo touches multiples of 8.
LCM(6, 8): factors of 6 = 2 × 3; factors of 8 = $2^3$. LCM = $2^3 \times 3 = 24$.
Common multiples of 6 and 8: 24, 48, 72, 96, 120, ...

Q3 If the cat and the rat land on the same number, the cat will catch the rat. The cat is now on 6 and the rat on 12. When the cat jumps 3 steps forward, the rat jumps 2 steps forward. Will the cat catch the rat? If yes, at which number?

SOLUTION

Start: Cat = 6, Rat = 12.
After each round: Cat moves +3, Rat moves +2.
Track positions: Jump 1 — Cat: 9, Rat: 14. Jump 2 — Cat: 12, Rat: 16. Jump 3 — Cat: 15, Rat: 18.
Jump 4 — Cat: 18, Rat: 20. Jump 5 — Cat: 21, Rat: 22. Jump 6 — Cat: 24, Rat: 24.
After 6 jumps both are at 24. Yes, the cat catches the rat at 24.

## Exercise 9.3 — Find Multiplication and Division Sentences

**Q1** Find multiplication and division sentences in the number grid. Shade the sentences. How many can you find?

SOLUTION

The grid is 8 columns × 8 rows. Two sentences are already shaded: 2 × 2 = 4 (shaded in row 2) and 10 × 2 = 20 (shaded in column 1). Look for three numbers in the grid where A × B = C or A ÷ B = C — they can be in any row, column, or connected path. Other examples visible: 3 × 4 = 12 (rows 1–3, col 1), 2 × 6 = 12, 6 × 3 = 18, 4 × 2 = 8, 2 × 5 = 10, 7 × 2 = 14, 6 ÷ 2 = 3, 8 ÷ 2 = 4, 10 ÷ 2 = 5. This is an open exploration activity — shade every valid multiplication or division sentence you can find.

## Exercise 9.4 — Gulabo's Garden

Q1 Gulabo's garden has lily flowers. Each lily flower has 3 petals. How many petals are there in 12 flowers?

SOLUTION

Total petals = 12 × 3.
Petals in 10 lilies = 10 × 3 = 30 petals.
Petals in 2 lilies = 2 × 3 = 6 petals.
Petals in 12 lilies = 30 + 6 = 36 petals.
Multiplication statement: 12 × 3 = 36.

Q2 In a hibiscus flower there are 5 petals. Gulabo counted all the petals and found them to be 80. How many flowers did she have?

SOLUTION

Number of flowers = 80 ÷ 5.
5 petals = 1 flower. 10 petals = 2 flowers. 50 petals = 10 flowers.
80 petals = 50 + 30 petals = 10 + 6 flowers = 16 flowers.
Check: 16 × 5 = 80. Correct.
Gulabo has 16 hibiscus flowers.

Q3 Gulabo plants some marigold saplings in a box as shown in the picture. How many saplings has she planted?

SOLUTION

The seedling tray in the picture shows 10 saplings in each row and 4 rows from front to back. There are 10 saplings in each row. There are 4 rows. How many saplings has she planted? 10 × 4 = 40. Gulabo has planted 40 marigold saplings. Mathematical Statement: 10 × 4 = 40.

Q4 A 'Dailyfresh' supermarket has kept boxes of strawberries in a big tray. How many boxes of strawberries does the supermarket have?

SOLUTION

The big tray in the picture is divided into two sections by a dashed line. Counting the top row: the left section has 10 boxes and the right section has 6 boxes — 16 columns in all. Counting top to bottom: 6 boxes in each column. There are 16 columns of strawberry boxes. There are 6 boxes in each column. There are 16 × 6 = 96 boxes in all. Mathematical Statement: 16 × 6 = 96.

Q5 Radha runs a bakery shop. She bakes 18 cupcakes in one tray. (a) Complete arranging the cupcakes in the two trays. (b) How many cupcakes can she make in one attempt using two trays? (c) She has made 108 cupcakes. How many trays has she baked? (d) She has a square baking tray for 36 mini cupcakes. Complete the arrangement and find columns and cupcakes per column.

SOLUTION

(a) The first tray in the picture shows 6 cupcakes in the top row and 3 rows total — so the tray holds 6 × 3 = 18 cupcakes. Complete the second tray in the same arrangement: 6 cupcakes per row, 3 rows. (b) Two trays × 18 cupcakes each = 2 × 18 = 36 cupcakes in one attempt. (c) 108 ÷ 18 = 6 trays. She has baked 6 trays. (d) The square tray picture shows an L-shaped starter: 6 dots across the top row and 6 dots down the first column. Complete the remaining empty cells to fill a 6 × 6 grid. Number of columns: 6. Number of cupcakes in each column: 6. Multiplication statement: 6 × 6 = 36.

## Exercise 9.5 — The Doubling Magic

Q1 Anvi starts with 23 flowers and doubles them. How many flowers are there now? Complete the doubling table: 23→46, 10→?, 51→?, 95→?, 150→?, 199→?, 425→?, 500→?, 222→?, 410→?

SOLUTION

Doubling means multiplying by 2.
23 × 2 = 46 flowers.
10 × 2 = 20. 51 × 2 = 102. 95 × 2 = 190. 150 × 2 = 300.
199 × 2 = 398. 425 × 2 = 850. 500 × 2 = 1000. 222 × 2 = 444. 410 × 2 = 820.
Anvi doubled the flowers — that is the magic!

Q2 Find doubles: (a) Double of 32, (b) Double of 14, (c) Double of 26, (d) Double of 17, (e) Double of 39, (f) Double of 45.

SOLUTION

(a) 32 × 2 = 64.
(b) 14 × 2 = 28.
(c) 26 × 2 = 52.
(d) 17 × 2 = 34.
(e) 39 × 2 = 78.
(f) 45 × 2 = 90.

Q3 Guess the ones digit of the following numbers when doubled: (a) 28, (b) 56, (c) 45, (d) 17.

SOLUTION

(a) 28 × 2 = 56. Ones digit = 6.
(b) 56 × 2 = 112. Ones digit = 2.
(c) 45 × 2 = 90. Ones digit = 0.
(d) 17 × 2 = 34. Ones digit = 4.

Q4 Give examples of numbers that when doubled give the following digits in the ones place: (a) 0, (b) 2, (c) 4, (d) 6, (e) 8. Can we get 3, 5, 7, 9 as the ones digit after doubling?

SOLUTION

(a) Ones digit 0: 5, 10, 15, 20, 25 (any number ending in 5 or 0 when doubled gives ones digit 0).
(b) Ones digit 2: 1, 11, 21, 31 (numbers ending in 1 when doubled give 2).
(c) Ones digit 4: 2, 12, 22, 32 (numbers ending in 2 when doubled give 4).
(d) Ones digit 6: 3, 13, 23, 33 or 8, 18, 28 (numbers ending in 3 or 8 when doubled give 6).
(e) Ones digit 8: 4, 14, 24, 34 or 9, 19, 29 (numbers ending in 4 or 9 when doubled give 8).
We can NEVER get 3, 5, 7, or 9 as the ones digit after doubling — doubling always gives an

even number.

## Exercise 9.6 — Multiplication Table — Fill and Observe

Q1 Share the patterns that you notice in the multiplication table.

SOLUTION

Each row is a list of multiples of that row's number.
Products increase by a fixed amount as we move right along any row.
The diagonal from top-left to bottom-right contains perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100 — these are the green-shaded numbers (n × n).
Moving diagonally, numbers repeat from different row-column combinations showing commutativity.

Q2 Are the numbers in row 7 the same as the numbers in column 7? In general, are the numbers in a given row the same as the numbers in the corresponding column? Why?

SOLUTION

Yes, the numbers in row 7 are: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70.
The numbers in column 7 are also: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70.
They are the same because multiplication is commutative: 7 × 3 = 3 × 7.
In general, row N and column N always contain the same set of products.

Q3 Is there a row where all answers (products) are even numbers? Which rows have this property?

SOLUTION

Rows 2, 4, 6, 8, and 10 have all even products.
This is because any even number times any whole number gives an even product (even × any = even).

Q4 Is there a row having only odd numbers as products?

SOLUTION

No. Every row contains a product with an even column number (2, 4, 6, 8, 10), which makes that product even.
So no row can have ALL odd products — every row has at least 5 even products.

Q5 Are there rows that have both even and odd numbers? What do you notice? Why is it so?

SOLUTION

Yes — rows 1, 3, 5, 7, and 9 (the odd rows) have both even and odd products.
For an odd row number N: odd × odd column = odd; odd × even column = even.
So these rows alternate between odd and even products.

Q6 Are there more even numbers in the chart or odd numbers? How do you know?

SOLUTION

There are more even numbers.
In a 10 × 10 table: rows 2, 4, 6, 8, 10 (5 rows) have ALL 10 products even = 50 even products.
Rows 1, 3, 5, 7, 9 (5 odd rows) have 5 even products (even columns) and 5 odd products each = 25 even + 25 odd.
Total even = 50 + 25 = 75. Total odd = 25.
So there are 75 even and 25 odd numbers — 3 times more even numbers.

Q7 Colour the common multiples of: (a) 2 and 3, (b) 4 and 8, (c) 7 and 9. Share observations.

SOLUTION

(a) Common multiples of 2 and 3 are multiples of LCM(2,3) = 6: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96.
(b) Common multiples of 4 and 8 are multiples of LCM(4,8) = 8: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96 (all multiples of 8, since 8 is already a multiple of 4).
(c) Common multiples of 7 and 9 are multiples of LCM(7,9) = 63: only 63 appears in the 10×10 table.
Observation: When one number is a multiple of the other (like 8 is a multiple of 4), their common multiples are just the multiples of the larger number.

Q8 Observe the pattern in the ones digits of the products in row 5. Observe the ones digit in other rows also. What patterns do you notice?

SOLUTION

Row 5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50. Ones digits: 5, 0, 5, 0, 5, 0, 5, 0, 5, 0 — alternating 5 and 0.
Row 2: ones digits 2, 4, 6, 8, 0, 2, 4, 6, 8, 0 — repeating block of 5.
Row 1: ones digits 1, 2, 3, 4, 5, 6, 7, 8, 9, 0 — all 10 digits, each once.
Row 10: ones digit is always 0.
Each row's ones-digit pattern repeats with a cycle length that depends on the row number.

Q9 Row 8 ones digits: 8, 6, 4, 2, 0, 8, 6, 4, 2, 0 — a repeating pattern. Guess the ones digit of: 11 × 8, 12 × 8, 13 × 8.

SOLUTION

The ones digits of row 8 repeat as: 8, 6, 4, 2, 0 (cycle of 5).
Position 11 in row 8: 11 mod 10 = 1st position → ones digit 8. Verify: 11 × 8 = 88, ones digit = 8.
Position 12: 12 mod 10 = 2nd position → ones digit 6. Verify: 12 × 8 = 96, ones digit = 6.
Position 13: 13 mod 10 = 3rd position → ones digit 4. Verify: 13 × 8 = 104, ones digit = 4.

Q10 In row 8, there is no number whose ones digit is 1. What other digits do not appear as the ones digit in row 8?

SOLUTION

Row 8 ones digits cycle: 8, 6, 4, 2, 0. Only even digits appear.
Digits that do NOT appear: 1, 3, 5, 7, 9 (all odd digits).
This makes sense because 8 is even — even × any number = even, so the product always has an even ones digit.

Q11 Is there a row in which all the digits from 0 to 9 appear as the ones digit? Which rows have this property?

SOLUTION

Rows 1, 3, 7, and 9 each have all 10 digits (0–9) as ones digits within the first 10 products.
Row 1: 1,2,3,4,5,6,7,8,9,0 — all 10 digits.
Row 3: ones digits are 3,6,9,2,5,8,1,4,7,0 — all 10 digits.
Row 7: ones digits are 7,4,1,8,5,2,9,6,3,0 — all 10 digits.
Row 9: ones digits are 9,8,7,6,5,4,3,2,1,0 — all 10 digits.
These are rows where the row number shares no common factor with 10 (i.e., gcd with 10 = 1).

Q12 In row 8, 0 appears as the ones digit two times (at 40 and 80). What numbers give 0 as the ones digit when multiplied by 8? Give 5 examples.

SOLUTION

A product N × 8 has ones digit 0 when N ends in 5 or 0.
5 examples: 5 × 8 = 40, 10 × 8 = 80, 15 × 8 = 120, 20 × 8 = 160, 25 × 8 = 200.
Any number ending in 5 or 0 will give a product ending in 0 when multiplied by 8.

Q13 Is there a row in which 0 appears as the ones digit only once? Which rows have this property?

SOLUTION

In the 1-to-10 products, ones digit 0 appears only at the 10th product for rows 1, 3, 7, and 9.
For row 1: only 10 × 1 = 10 ends in 0 (once).
For row 3: only 10 × 3 = 30 ends in 0 (once in first 10 products).
Similarly for rows 7 and 9.
So rows 1, 3, 7, and 9 have 0 as ones digit exactly once in their first 10 products.

Q14 What do you notice about the answers for Questions 11 and 13? Share in the grade.

SOLUTION

The rows where all 10 digits appear as ones digits (Q11: rows 1, 3, 7, 9) are the same rows where 0 appears as ones digit only once (Q13).

This happens because these row numbers are coprime to 10 (share no common factors with 10).

When a row number is coprime to 10, multiplying it by 1 through 10 produces all possible ones digits exactly once — 0 appears exactly once, and all other digits 1–9 each appear once.

## Exercise 9.7 — Multiples of Tens

Q1 Count the number of wheels in tricycles. Number of wheels in 10 tricycles with 3 wheels in each; 20 tricycles.

SOLUTION

10 tricycles × 3 wheels = 10 × 3 = 30 wheels.
10 more tricycles × 3 wheels = 10 × 3 = 30 wheels.
Total for 20 tricycles = 30 + 30 = 60 wheels.
10 × 3 = 30. 20 × 3 = 60.

Q2 Count the number of wheels in cars. 10 cars with 4 wheels each; 30 cars with 4 wheels each.

SOLUTION

10 cars × 4 wheels = 10 × 4 = 40 wheels.
30 cars × 4 wheels = 3 groups of (10 × 4) = 40 + 40 + 40 = 120 wheels.
10 × 4 = 40. 30 × 4 = 120.

Q3 Solve: (a) 10 × 6, (b) 40 × 6, (c) 10 × 8, (d) 60 × 8, (e) 6 × 8, (f) 60 × 8, (g) 4 × 6, (h) 40 × 8.

SOLUTION

(a) 10 × 6 = 60.
(b) 40 × 6 = 4 × 10 × 6 = 4 × 60 = 240.
(c) 10 × 8 = 80.
(d) 60 × 8 = 6 × 10 × 8 = 6 × 80 = 480.
(e) 6 × 8 = 48.
(f) 60 × 8 = 480 (ten times the answer to (e): 48 × 10 = 480).
(g) 4 × 6 = 24.
(h) 40 × 8 = 4 × 10 × 8 = 4 × 80 = 320.

## Exercise 9.8 — Multiplying Using 10s

**Q1** Radha is packing cupcakes in boxes of 4. She has packed 18 boxes. How many cupcakes are there?

SOLUTION

Total cupcakes = 18 × 4.
Split 18 = 10 + 8.
10 boxes × 4 = 40 cupcakes.
8 boxes × 4 = 32 cupcakes.
18 × 4 = 40 + 32 = 72 cupcakes.

**Q2** 8 bamboo rods are needed to make a bullock cart. How many bamboo rods are needed for 23 carts?

SOLUTION

Total rods = 23 × 8.
Split 23 = 20 + 3.
20 carts × 8 = 160 rods.
3 carts × 8 = 24 rods.
23 × 8 = 160 + 24 = 184 rods.

## Exercise 9.9 — Let Us Solve — Multiplication

Q1 A flock of 25 geese and 12 sheep have gathered around a pond. Chippi the lizard sees many legs. How many legs does it see?

SOLUTION

Geese have 2 legs each: 25 × 2 = 50 legs.
Sheep have 4 legs each: 12 × 4 = 48 legs.
Total legs = 50 + 48 = 98 legs.

Q2 In an auditorium, 8 children are sitting in each row. There are 15 such rows. How many children are in the auditorium?

SOLUTION

Total children = 15 × 8.
Split 15 = 10 + 5.
10 × 8 = 80. 5 × 8 = 40.
15 × 8 = 80 + 40 = 120 children.

Q3 A book shop has kept 9 books in each pile. There are 14 such piles. How many books does the shop have?

SOLUTION

Total books = 14 × 9.
Split 14 = 10 + 4.
10 × 9 = 90. 4 × 9 = 36.
14 × 9 = 90 + 36 = 126 books.

Q4 Surya is making a patchwork with beads of two colours as shown in the picture. How many beads has he used? How many golden and how many white?

SOLUTION

The bead patchwork on Surya's table is a rectangular grid of 10 columns × 6 rows = 60 beads in total. The columns alternate in pairs: 2 golden, 2 white, 2 golden, 2 white, 2 golden — giving 6 golden columns and 4 white columns. Golden beads: 6 × 6 = 36. White beads: 4 × 6 = 24. Total beads used: 36 + 24 = 60. Surya has used 60 beads — 36 golden colour beads and 24 white colour beads.

Q5 Make your own stories for: (a) 34 × 3, (b) 75 × 5, (c) 46 × 6, (d) 50 × 9.

SOLUTION

(a) 34 × 3: Story — A garden has 34 rows of plants with 3 plants in each row. Total plants = 34 × 3 = 102.

(b) 75 × 5: Story — A school has 75 classrooms each needing 5 chairs. Total chairs = 75 × 5 = 375.

(c) 46 × 6: Story — A baker bakes 46 trays with 6 cookies on each. Total cookies = 46 × 6 = 276.

(d) 50 × 9: Story — A shopkeeper has 50 boxes each holding 9 oranges. Total oranges = 50 × 9 = 450.

## Exercise 9.10 — Division

**Q1** A factory has ordered 58 wheels for small tempos. Each tempo has 3 wheels. In how many tempos can they fix the wheels?

SOLUTION

Number of tempos = 58 ÷ 3.
Take away 10 tempos worth: 10 × 3 = 30 wheels used. Remaining: 58 − 30 = 28 wheels.
Take away 5 more tempos: 5 × 3 = 15 wheels used. Remaining: 28 − 15 = 13 wheels.
Take away 3 more tempos: 3 × 3 = 9 wheels used. Remaining: 13 − 9 = 4 wheels.
Take away 1 more tempo: 1 × 3 = 3 wheels used. Remaining: 4 − 3 = 1 wheel.
Total tempos = 10 + 5 + 3 + 1 = 19 tempos. 1 wheel is left over.
The factory can make 19 tempos; 1 wheel remains.

**Q2** A dairy farm has many cows. Chippi the lizard sees 88 legs. How many cows are there?

SOLUTION

Each cow has 4 legs. Number of cows = 88 ÷ 4.
Take away 10 cows: 10 × 4 = 40 legs. Remaining: 88 − 40 = 48 legs.
Take away 10 more cows: 10 × 4 = 40 legs. Remaining: 48 − 40 = 8 legs.
Take away 2 more cows: 2 × 4 = 8 legs. Remaining: 8 − 8 = 0.
Total cows = 10 + 10 + 2 = 22 cows.

## Exercise 9.11 — Let Us Solve — Division

**Q1** In a big aquarium, Jolly fish sees 72 legs of octopuses. How many octopuses are there?

SOLUTION

An octopus has 8 legs. Number of octopuses = 72 ÷ 8 = 9.
Check: 9 × 8 = 72. Correct.
There are 9 octopuses.

**Q2** A sports store packs 4 shuttlecocks in a box. They have 50 shuttlecocks. How many boxes will they need? Can they pack all the shuttlecocks? How many are left?

SOLUTION

Number of boxes = 50 ÷ 4 = 12 remainder 2.
12 × 4 = 48 shuttlecocks packed. Remaining: 50 − 48 = 2 shuttlecocks.
They need 12 full boxes. They cannot pack all 50 — 2 shuttlecocks are left over.

**Q3** Rakul Chachi has planted 75 saplings of roses. Each row has 5 saplings. How many rows of saplings has she planted?

SOLUTION

Number of rows = 75 ÷ 5.
10 rows × 5 = 50. Remaining: 75 − 50 = 25.
5 more rows × 5 = 25. Remaining: 25 − 25 = 0.
Total rows = 10 + 5 = 15 rows.

**Q4** Make stories for: (a) 70 ÷ 5, (b) 84 ÷ 7, (c) 69 ÷ 3, (d) 93 ÷ 6.

SOLUTION

(a) 70 ÷ 5 = 14. Story — 70 children are divided equally into 5 teams. Each team has 14 children.
(b) 84 ÷ 7 = 12. Story — A shopkeeper has 84 apples packed equally in 7 boxes. Each box has 12 apples.
(c) 69 ÷ 3 = 23. Story — 69 books are shared equally among 3 students. Each gets 23 books.
(d) 93 ÷ 6 = 15 remainder 3. Story — 93 marbles are packed 6 per bag. 15 full bags are made with 3 marbles left over.

## Exercise 9.12 — Multiples of 100

**Q1** 100 bikes with 2 people on each — how many people? 200 bikes?

SOLUTION

100 bikes × 2 people = 100 × 2 = 200 people.
200 bikes × 2 people = 200 × 2 = 400 people.
Notice: 200 bikes is twice 100 bikes, so the answer is also doubled: 200 × 2 = 400.

**Q2** 100 cars with 4 people in each — how many people? 500 cars?

SOLUTION

100 cars × 4 = 100 × 4 = 400 people.
500 cars × 4 = 5 × 100 × 4 = 5 × 400 = 2000 people.
Pattern: when the number of groups is a multiple of 100, multiply the single-digit fact and attach the zeros.

**Q3** Observe the pattern and complete: 500 × 4 = ?, 100 × 4 = ?, 5 × 4 = ?, 50 × 4 = ?

SOLUTION

5 × 4 = 20.
50 × 4 = 200 (ten times 5 × 4).
100 × 4 = 400.
500 × 4 = 2000 (hundred times 5 × 4).

**Q4** Observe and complete the pattern sets: (1×3, 10×3, 100×3), (2×3, 20×3, 200×3), (4×3, 40×3, 400×3), (2×4, 20×4, 200×4), (4×2, 40×2, 400×2), (8×1, 80×1, 800×1), (3×4, 30×4, 300×4), (3×5, 30×5, 300×5), (3×9, 30×9, 300×9).

SOLUTION

1×3=3, 10×3=30, 100×3=300.
2×3=6, 20×3=60, 200×3=600.
4×3=12, 40×3=120, 400×3=1200.
2×4=8, 20×4=80, 200×4=800.
4×2=8, 40×2=80, 400×2=800.
8×1=8, 80×1=80, 800×1=800.
3×4=12, 30×4=120, 300×4=1200.
3×5=15, 30×5=150, 300×5=1500.
3×9=27, 30×9=270, 300×9=2700.
Pattern: multiply by 10 once → add one zero; multiply by 100 → add two zeros.

## Exercise 9.13 — More Multiplication

Q1 Big electric autorickshaws can carry 8 passengers. How many people can travel in 125 such autos in a single round?

SOLUTION

Total passengers = 125 × 8.
Split 125 = 100 + 20 + 5.
100 autos × 8 = 800 passengers.
20 autos × 8 = 160 passengers.
5 autos × 8 = 40 passengers.
125 × 8 = 800 + 160 + 40 = 1000 passengers.

Q2 Kahlu and Rabia pack 6 kulhads in a box and have packed 174 boxes. How many kulhads have they made?

SOLUTION

Total kulhads = 174 × 6.
Split 174 = 100 + 70 + 4.
100 × 6 = 600.
70 × 6 = 420.
4 × 6 = 24.
174 × 6 = 600 + 420 + 24 = 1044 kulhads.

## Exercise 9.14 — Let Us Solve — Larger Multiplication

Q1 BP Girl's school has 465 students. It wants to give 2 pencils to every student on the first day of school. How many pencils does the school need to buy?

SOLUTION

Total pencils = 465 × 2.
Split 465 = 400 + 60 + 5.
400 × 2 = 800. 60 × 2 = 120. 5 × 2 = 10.
465 × 2 = 800 + 120 + 10 = 930 pencils.

Q2 234 children of a school each contribute 5 to organise a school mela. How much money do they collect?

SOLUTION

Total money = 234 × 5.
Split 234 = 200 + 30 + 4.
200 × 5 = 1000. 30 × 5 = 150. 4 × 5 = 20.
234 × 5 = 1000 + 150 + 20 = 1170.

Q3 Make stories for the following and solve: (a) 439 × 4, (b) 514 × 8, (c) 356 × 5, (d) 623 × 7.

SOLUTION

(a) 439 × 4: Story — A library has 439 shelves with 4 books on each. Total books: 400×4 + 30×4 + 9×4 = 1600 + 120 + 36 = 1756.
(b) 514 × 8: Story — 514 buses each carry 8 bags of mail. Total bags: 500×8 + 14×8 = 4000 + 112 = 4112.
(c) 356 × 5: Story — A packing factory fills 356 boxes with 5 items each. Total items: 300×5 + 56×5 = 1500 + 280 = 1780.
(d) 623 × 7: Story — A farmer plants 623 rows with 7 seeds per row. Total seeds: 600×7 + 23×7 = 4200 + 161 = 4361.

## Exercise 9.15 — More Division

Q1 9 boats have to ferry 108 people. Every boat carries the same number. How many people should be ferried in each boat?

SOLUTION

People per boat = 108 ÷ 9.
If 5 sit in each boat: 9 × 5 = 45. Remaining: 108 − 45 = 63.
If 5 more sit in each: 9 × 5 = 45 more. Remaining: 63 − 45 = 18.
If 2 more sit in each: 9 × 2 = 18. Remaining: 18 − 18 = 0.
Total per boat = 5 + 5 + 2 = 12 people.
Check: 9 × 12 = 108. Correct.
Each boat carries 12 people.

## Exercise 9.16 — Patterns in Division

**Q1** 30 shared equally among 3 children — how much each?

SOLUTION

30 ÷ 3 = 10.

Each child gets 10.

**Q2** 900 shared equally among 3 children — how much each?

SOLUTION

900 ÷ 3 = 300.

Notice: 900 is 30 times 30, and 300 is 30 times 10 — the quotient also scales by the same factor.

Each child gets 300.

**Q3** Observe and complete the patterns. Set A: 3÷3, 30÷3, 300÷3. Set B: 9÷3, 90÷3, 900÷3. Set C: 15÷3, 150÷3, 300÷3. Set D: 5÷5, 50÷5, 500÷5. Set E: 8÷4, 80÷4, 800÷4. Set F: 4÷2, 20÷2, 100÷2.

SOLUTION

Set A: 3÷3=1, 30÷3=10, 300÷3=100.

Set B: 9÷3=3, 90÷3=30, 900÷3=300.

Set C: 15÷3=5, 150÷3=50, 300÷3=100.

Set D: 5÷5=1, 50÷5=10, 500÷5=100.

Set E: 8÷4=2, 80÷4=20, 800÷4=200.

Set F: 4÷2=2, 20÷2=10, 100÷2=50.

Pattern: when the dividend is multiplied by 10 (or 100), the quotient is also multiplied by 10 (or 100), provided the divisor stays the same.

**Q4** A load carrying truck has 6 tyres. Chippi sees 60 tyres. How many trucks?

SOLUTION

Number of trucks = 60 ÷ 6 = 10 trucks.

**Q5** Chippi sees 80 wheels in a car parking space. How many cars?

SOLUTION

Each car has 4 wheels. Number of cars = 80 ÷ 4 = 20 cars.

Q6 Chippi sees 600 legs of ants walking towards the anthill. How many ants?

SOLUTION

Each ant has 6 legs. Number of ants = 600 ÷ 6 = 100 ants.

Q7 A fancy shop has packed 800 rubber bands in packets of 4 each. How many packets?

SOLUTION

Number of packets = 800 ÷ 4 = 200 packets.

## Exercise 9.17 — Let Us Solve — Final Mixed Problems

Q1 A school hires 7 buses to take 245 children to the transport museum. Each bus carries the same number of children. How many children are traveling in each bus?

SOLUTION

Children per bus = 245 ÷ 7.
30 × 7 = 210. Remaining: 245 − 210 = 35.
5 × 7 = 35. Remaining: 35 − 35 = 0.
Total per bus = 30 + 5 = 35 children.
Check: 7 × 35 = 245. Correct.

Q2 The Darjeeling Himalayan Railway (Toy Train) runs 88 km daily. How much distance does it travel in a week?

SOLUTION

Distance in a week = 88 × 7.
Split 88 = 80 + 8.
80 × 7 = 560. 8 × 7 = 56.
88 × 7 = 560 + 56 = 616 km.

Q3 VentureOut company took 259 people for river rafting. Each raft can take 7 people. How many rafts did it take?

SOLUTION

Number of rafts = 259 ÷ 7.
30 × 7 = 210. Remaining: 259 − 210 = 49.
7 × 7 = 49. Remaining: 49 − 49 = 0.
Total rafts = 30 + 7 = 37 rafts.
Check: 37 × 7 = 259. Correct.

Q4 Anu saves 45 every month. (a) How much money will Anu save in 6 months? (b) She distributes the total among 6 friends — how much each? (c) If she distributes among 3 friends — how much each?

SOLUTION

(a) Total savings in 6 months = 45 × 6 = 270. Anu saves 270.
(b) 270 shared among 6 friends = 270 ÷ 6 = 45 each.
(c) 270 shared among 3 friends = 270 ÷ 3 = 90 each.

Q5 Raju drives an auto and makes 8 trips in a day. Which questions can be exactly calculated with only this information? (a) Money earned per day? (b) Trips in 7 days? (c) Time per trip? (d) Trips in 4 weeks?

SOLUTION

(a) Money per day — CANNOT be calculated. The fare per trip is not given.
(b) Trips in 7 days = 8 × 7 = 56. CAN be calculated.
(c) Time per trip — CANNOT be calculated. Duration of each trip is not given.
(d) Trips in 4 weeks: 4 weeks = 4 × 7 = 28 days. Trips = 8 × 28 = 224. CAN be calculated.

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Q6 Solve: (a) 45 × 9, (b) 507 × 7, (c) 94 ÷ 4, (d) 778 ÷ 6, (e) 94 × 5, (f) 396 × 4, (g) 83 ÷ 3, (h) 635 ÷ 5.

SOLUTION

(a) 45 × 9: 40×9 + 5×9 = 360 + 45 = 405.
(b) 507 × 7: 500×7 + 7×7 = 3500 + 49 = 3549.
(c) 94 ÷ 4: 20×4=80, remainder 14; 3×4=12, remainder 2. Quotient = 23, remainder 2.
(d) 778 ÷ 6: 100×6=600, remainder 178; 20×6=120, remainder 58; 9×6=54, remainder 4. Quotient = 129, remainder 4.
(e) 94 × 5: 90×5 + 4×5 = 450 + 20 = 470.
(f) 396 × 4: 300×4 + 90×4 + 6×4 = 1200 + 360 + 24 = 1584.
(g) 83 ÷ 3: 27×3=81, remainder 2. Quotient = 27, remainder 2.
(h) 635 ÷ 5: 100×5=500, remainder 135; 27×5=135, remainder 0. Quotient = 127.

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Q7 Tick (√) Always True / Never True / Sometimes True for each statement: (a) Multiplying by 10 gives 0 in the ones digit. (b) Multiplying a number by 2 gives an odd number. (c) Multiplying a number by 5 gives a number with 5 in the ones digit. (d) The number immediately after an odd number is an even number. (e) Halving any number gives an even number. (f) Adding 0 to a number increases the number by 1.

SOLUTION

(a) Multiplying by 10 gives 0 in the ones digit — ALWAYS TRUE. Any whole number × 10 ends in 0.
(b) Multiplying a number by 2 gives an odd number — NEVER TRUE. Doubling always gives an even number.
(c) Multiplying a number by 5 gives a number with 5 in the ones digit — SOMETIMES TRUE. Only odd numbers × 5 give ones digit 5 (e.g. 3×5=15); even numbers × 5 give ones digit 0 (e.g. 4×5=20).
(d) The number immediately after an odd number is an even number — ALWAYS TRUE. Odd and even numbers alternate.
(e) Halving any number gives an even number — SOMETIMES TRUE. Half of 12 is 6 (even); half of 10 is 5 (odd).
(f) Adding 0 to a number increases the number by 1 — NEVER TRUE. Adding 0 leaves the

number unchanged.