Chapter 6: The Dairy Farm

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Exercise 6.1 — Let Us Think — Shape puzzles and Buttermilk Arrangements (p. 70–71)

Q1 The given shapes stand for numbers between 1 and 24. The same shape denotes the same number across all problems. Find the numbers hiding in all the shapes.
a) blue rectangle x pink circle = purple triangle
b) blue rectangle x blue rectangle = white rectangle
c) yellow parallelogram x orange diamond = purple triangle
d) orange diamond x green pentagon = orange diamond
e) yellow parallelogram x pink circle = blue crescent
f) blue crescent x blue rectangle = yellow parallelogram x purple triangle

SOLUTION

Start with clue (d): orange diamond x green pentagon = orange diamond.
This means green pentagon = 1.

From (a): blue rectangle x pink circle = purple triangle.
From (c): yellow parallelogram x orange diamond = purple triangle.
So: blue rectangle x pink circle = yellow parallelogram x orange diamond.

Try blue rectangle = 4, pink circle = 3, so purple triangle = 4 x 3 = 12.
From (c): yellow parallelogram x orange diamond = 12. Try yellow parallelogram = 6, orange diamond = 2: 6 x 2 = 12. ✓
From (b): blue rectangle x blue rectangle = 4 x 4 = 16 = white rectangle.
From (e): yellow parallelogram x pink circle = 6 x 3 = 18 = blue crescent.
From (f): blue crescent x blue rectangle = 18 x 4 = 72; yellow parallelogram x purple triangle = 6 x 12 = 72. ✓

All values are between 1 and 24. ✓

Answer: Blue rectangle = 4, pink circle = 3, purple triangle = 12, yellow parallelogram = 6, orange diamond = 2, blue crescent = 18, white rectangle = 16, green pentagon = 1.

Q2 Place the digits 2, 5, and 3 appropriately to get a product close to 100. Share your reasoning in class.

SOLUTION

We have digits 2, 5, 3 to form a 2-digit number x 1-digit number.
Possible arrangements:
25 x 3 = 75
32 x 5 = 160
35 x 2 = 70
52 x 3 = 156
53 x 2 = 106
23 x 5 = 115

Closest to 100: 53 x 2 = 106 (only 6 away) or 23 x 5 = 115 (15 away).
Best answer: 53 x 2 = 106.

Answer: 53 x 2 = 106 is closest to 100. (Accept any well-reasoned arrangement.)

Q3 A dairy has packed buttermilk pouches in the following manner. Find the number of pouches kept in each arrangement. One is done for you.
Arrangement 1: 30 x 2 = 60 (given)
Arrangement 2: ___ x ___ = 60
Arrangement 3: ___ x ___ = 60
Arrangement 4: ___ x ___ = 60
What other groups can you make?

SOLUTION

All arrangements show 60 pouches in different rectangular groupings.
From the pictures (reading rows x columns from the PDF images):
Arrangement 1 (given): 30 x 2 = 60
Arrangement 2: groups of 3 pouches, 20 groups: 20 x 3 = 60
Arrangement 3: 6 blocks of 10 pouches: 6 x 10 = 60
Arrangement 4: 5 rows of 12 pouches: 5 x 12 = 60

Other groups possible (all factor pairs of 60):
1 x 60, 2 x 30, 3 x 20, 4 x 15, 5 x 12, 6 x 10, 10 x 6, 12 x 5, 15 x 4, 20 x 3, 60 x 1

Answer: Arrangement 2: 20 x 3 = 60. Arrangement 3: 6 x 10 = 60. Arrangement 4: 5 x 12 = 60. (Other valid factor pairs of 60 are also acceptable.)

Q4 Which number am I?
I am a two-digit number. Find me with the help of the following clues.
(a) I am greater than 8.
(b) I am not a multiple of 4.
(c) I am a multiple of 9.
(d) I am an odd number.
(e) I am not a multiple of 11.
(f) I am less than 50.
(g) My ones digit is even.
(h) My tens digit is odd.
Did you use all the clues to find the number? Which clues did not help you?

SOLUTION

Two-digit multiples of 9: 18, 27, 36, 45, 54, 63, 72, 81, 90, 99.

Apply clue (b) not multiple of 4: remove 36 and 72.
Remaining: 18, 27, 45, 54, 63, 81, 90, 99.

Apply clue (e) not multiple of 11: remove 99.
Remaining: 18, 27, 45, 54, 63, 81, 90.

Apply clue (f) less than 50: keep 18, 27, 45.

Apply clue (g) ones digit is even: 18 has ones digit 8 (even). ✓
27: ones digit 7 (odd). ✗ 45: ones digit 5 (odd). ✗

Apply clue (h) tens digit is odd: 18 has tens digit 1 (odd). ✓

18 satisfies clues (a), (b), (c), (e), (f), (g), (h).
Clue (d) says 'odd' — 18 is even, so clue (d) does not help here.
The number is 18, and clue (d) is the one that did not help.

Answer: The number is 18. Clue (d) did not help find the number.

Q5 Make your own numbers.
Choose any two numbers and one operation from the grid (numbers: 100, 25, 5, 10, 2, 36, 12, 4, 3; operations: -, x, +, ÷) to make all numbers between 0 and 20. For example, 2 can be formed as 4 - 2.
Which numbers could you not make? Which numbers between 0-20 can you get in more than one way?

SOLUTION

This is an open exploration. Here is one set of solutions using two numbers and one operation:
0: 10 - 10 (or 5 - 5, or 100 ÷ 100... but only one operation on two DIFFERENT grid numbers: 4 - 4 not allowed; try 12 - 12 — same issue; 10 x 0? 0 not in grid. Use: 36 ÷ 36 — not two different. Best: 5 - 5... same number. So 0 may need three numbers: 5 - 3 - 2 = 0)
1: 5 - 4
2: 4 - 2
3: 3 (single; or 12 ÷ 4)
4: 4 (single; or 12 ÷ 3, or 2 + 2)
5: 5 (single; or 10 ÷ 2, or 25 ÷ 5)
6: 2 + 4, or 12 ÷ 2
7: 12 - 5
8: 4 + 4, or 2 x 4, or 10 - 2
9: 3 x 3, or 12 - 3
10: 10, or 2 x 5
11: not easily with single op; try 5 + 4 + 2 = 11 (three numbers), or 36 ÷ 3 = 12 — no; 11 needs three numbers.
12: 12, or 4 x 3
13: 25 - 12
14: 2 x 4 + ... needs three numbers; or 100 ÷ ... hard. Try: 4 + 10 = 14.
15: 3 x 5, or 25 - 10
16: 4 x 4
17: 5 + 12
18: 2 x 9? 9 not in grid. 3 x 4 + 2 x 3 — needs three numbers. 36 ÷ 2 = 18.
19: 4 + 15? 15 not in grid; needs three numbers (e.g. 4 x 5 - 1 — 1 not in grid). Hard.
20: 4 x 5, or 100 ÷ 5

Some numbers like 0, 11, 19 need three numbers or two operations — explore in class.

Answer: Many numbers (1-10, 12-18, 20) can be made with two grid numbers and one operation. Numbers like 0, 11, 19 are harder and may need three numbers. Numbers like 4, 5, 10, 12 can be made in more than one way. Discuss your methods in class.

Exercise 6.2 — Order of Numbers in Multiplication (p. 72)

Q1 Daljeet Kaur has arranged butter packets in the following ways. Find the number of butter packets in each case and notice the pattern.

a) 2 x 3 = ___ and 3 x 2 = ___

b) 8 x 5 = ___ and 5 x 8 = ___

e) 10 x 5 = ___ and 5 x 10 = ___

f) 8 x 20 = ___ and 20 x 8 = ___

g) 12 x 9 = ___ and 9 x 12 = ___

(Also: 6 x 13 = ___ and 13 x 6 = __)

What is 9 x 0? 0 x 9?

SOLUTION

a) 2 x 3 = 6; 3 x 2 = 6. Same total.

b) 8 x 5 = 40; 5 x 8 = 40. Same total.

e) 10 x 5 = 50; 5 x 10 = 50. Same total.

f) 8 x 20 = 160; 20 x 8 = 160. Same total.

g) 12 x 9 = 108; 9 x 12 = 108. Same total.

6 x 13 = 78; 13 x 6 = 78. Same total.

Pattern: swapping the number of groups and the group size gives the same total.

This is always true: the order of multiplication does not change the product.

9 x 0 = 0; 0 x 9 = 0.

Multiplying any number by 0 gives 0.

Answer: a) 6 b) 40 e) 50 f) 160 g) 108 6x13=78. The product stays the same when the two numbers swap. 9 x 0 = 0 and 0 x 9 = 0.

Exercise 6.3 — Patterns in Multiplication by 10s and 100s — Q1 (p. 72)

Q1 Let us revise multiplication by 10s and 100s. Fill in the blanks.

a) 4 x 10 = ___

b) 20 x 10 = ___

c) 10 x 40 = ___

d) 10 x 10 = 100 (given)

e) 20 x 50 = ___

f) 80 x 10 = ___

g) 3 x 100 = 100 x 3 = 300 (given)

h) 8 x 100 = ___ = ___

i) 10 x 100 = ___ = ___

SOLUTION

Rule: multiplying by 10 adds one zero; multiplying by 100 adds two zeros.

a) 4 x 10 = 40

b) 20 x 10 = 200

c) 10 x 40 = 400

d) 10 x 10 = 100 (given)

e) 20 x 50 = 1,000 (2 x 5 = 10, then two zeros => 1,000)

f) 80 x 10 = 800

g) 3 x 100 = 300 (given)

h) 8 x 100 = 100 x 8 = 800

i) 10 x 100 = 100 x 10 = 1,000

Answer: a) 40 b) 200 c) 400 e) 1,000 f) 800 h) 800 i) 1,000

Exercise 6.4 — Patterns in Multiplication by 10s and 100s — Q2 Tables (p. 73)

Q1 Find answers to the following. Fill in the place-value tables and describe the pattern.
100 x 90 = __,000
400 x 10 = ___
60 x 50 = ____
30 x 20 = 600 (given)
700 x 4 = _,_00
10 x 45 = ____
Also fill in the tables for:
60 x 50 = ___ | 220 x 20 = ___ | 11 x 300 = ___
80 x 90 = ___ | 10 x 63 = ___ | 40 x 12 = ___

SOLUTION

100 x 90 = 9,000
400 x 10 = 4,000
60 x 50 = 3,000 (6 x 5 = 30, two zeros => 3,000)
30 x 20 = 600 (given)
700 x 4 = 2,800
10 x 45 = 450

Second table:
60 x 50 = 3,000
220 x 20 = 4,400
11 x 300 = 3,300
80 x 90 = 7,200
10 x 63 = 630
40 x 12 = 480

Pattern: multiply the non-zero parts of the numbers, then attach the combined zeros.
E.g. 30 x 20 = (3 x 2) x (10 x 10) = 6 x 100 = 600.

Answer: 100x90=9,000; 400x10=4,000; 60x50=3,000; 700x4=2,800; 10x45=450. Table 2: 60x50=3,000; 220x20=4,400; 11x300=3,300; 80x90=7,200; 10x63=630; 40x12=480.

Q2 Fill in the place-value table for multiplying by 1,000.
2 x 1,000 = ___ | 20 x 100 = ___ | 40 x 500 = ___
5 x 1,000 = ___ | 60 x 300 = ___ | 600 x 30 = ___
10 x 1,000 = ___ | 80 x 900 = ___ | 70 x 600 = ___
20 x 1,000 = ___ | 3 x 5,000 = ___
8 x 3,000 = ___ | 5 x 7,000 = ___

SOLUTION

2 x 1,000 = 2,000
20 x 100 = 2,000

40 x 500 = 20,000
5 x 1,000 = 5,000
60 x 300 = 18,000
600 x 30 = 18,000
10 x 1,000 = 10,000
80 x 900 = 72,000
70 x 600 = 42,000
20 x 1,000 = 20,000
3 x 5,000 = 15,000
8 x 3,000 = 24,000
5 x 7,000 = 35,000

Answer: 2x1,000=2,000; 20x100=2,000; 40x500=20,000; 5x1,000=5,000; 60x300=18,000; 600x30=18,000; 10x1,000=10,000; 80x900=72,000; 70x600=42,000; 20x1,000=20,000; 3x5,000=15,000; 8x3,000=24,000; 5x7,000=35,000.

Exercise 6.5 — Doubling and Halving (p. 75)

Q1 (b) Solve 22 x 5 by doubling and halving.
(c) Solve the following problems by doubling and halving:
14 x 3 = ___
38 x 5 = ___
16 x 4 = ___
35 x 14 = ___
(d) Find the product by halving and doubling either the multiplier or the multiplicand:
1) 5 x 18
2) 50 x 28
3) 15 x 22
4) 25 x 12
5) 12 x 45
6) 16 x 45
(e) Give 5 examples of multiplication problems where halving and doubling will help. Find the products.

SOLUTION

(b) 22 x 5: halve 22 to get 11, double 5 to get 10.
11 x 10 = 110.

(c) 14 x 3: halve 14 = 7, double 3 = 6. So 7 x 6 = 42.
38 x 5: halve 38 = 19, double 5 = 10. So 19 x 10 = 190.
16 x 4: halve 16 = 8, double 4 = 8. So 8 x 8 = 64.
35 x 14: double 35 = 70, halve 14 = 7. So 70 x 7 = 490.

(d)
1) 5 x 18: double 5 = 10, halve 18 = 9. 10 x 9 = 90.
2) 50 x 28: halve 50 = 25, double 28 = 56. 25 x 56 = 1,400.
3) 15 x 22: halve 22 = 11, double 15 = 30. 30 x 11 = 330.
4) 25 x 12: double 25 = 50, halve 12 = 6. 50 x 6 = 300.
5) 12 x 45: halve 12 = 6, double 45 = 90. 6 x 90 = 540.
6) 16 x 45: halve 16 = 8, double 45 = 90. 8 x 90 = 720.

(e) Example problems where halving and doubling work well (when one number is even or a multiple of 5):
4 x 25: halve 4 = 2, double 25 = 50. 2 x 50 = 100.
6 x 15: halve 6 = 3, double 15 = 30. 3 x 30 = 90.
8 x 125: halve 8 = 4, double 125 = 250; halve again: 2 x 500 = 1,000.
18 x 5: halve 18 = 9, double 5 = 10. 9 x 10 = 90.
14 x 25: halve 14 = 7, double 25 = 50. 7 x 50 = 350.

Answer: (b) 110 (c) 14x3=42; 38x5=190; 16x4=64; 35x14=490 (d) 1)90 2)1,400 3)330 4)300 5)540 6)720 (e) Examples: 4x25=100, 6x15=90, 18x5=90, 14x25=350.

Exercise 6.6 — Nearest Multiple (p. 76)

Q1 (c) Give 5 examples of problems where you can use the nearest multiple to find the product easily. Find the products.
(d) Find the products by finding the nearest multiple:
1) 7 x 52
2) 12 x 28
3) 75 x 31
4) 99 x 15
5) 8 x 25
6) 22 x 42

SOLUTION

(c) Nearest-multiple examples:

5 x 19 = 5 x 20 - 5 = 100 - 5 = 95
6 x 31 = 6 x 30 + 6 = 180 + 6 = 186
4 x 49 = 4 x 50 - 4 = 200 - 4 = 196
8 x 21 = 8 x 20 + 8 = 160 + 8 = 168
7 x 29 = 7 x 30 - 7 = 210 - 7 = 203

(d)

1) 7 x 52 = 7 x 50 + 7 x 2 = 350 + 14 = 364
2) 12 x 28 = 12 x 30 - 12 x 2 = 360 - 24 = 336
3) 75 x 31 = 75 x 30 + 75 = 2,250 + 75 = 2,325
4) 99 x 15 = 100 x 15 - 1 x 15 = 1,500 - 15 = 1,485
5) 8 x 25 = 200 (exact, no nearest-multiple needed)
6) 22 x 42 = 22 x 40 + 22 x 2 = 880 + 44 = 924

Answer: (c) Examples: 5x19=95, 6x31=186, 4x49=196, 8x21=168, 7x29=203. (d) 1)364 2)336 3)2,325 4)1,485 5)200 6)924.

Exercise 6.7 — Let Us Solve — Flexible Strategies (p. 77)

Q1 A school has an auditorium with 35 rows, with 42 seats in each row. How many people can sit in this auditorium?

SOLUTION

Total seats = 35 x 42.
35 x 42 = 35 x 40 + 35 x 2 = 1,400 + 70 = 1,470.

Answer: 1,470 people.

Q2 Priya jogs 4 kilometres every day. How many kilometres will she jog in 31 days?

SOLUTION

Total = 4 x 31 = 4 x 30 + 4 = 120 + 4 = 124 km.

Answer: 124 km.

Q3 A school has received 36 boxes of books with 48 books in each box. How many total books did the school receive?

SOLUTION

Total = 36 x 48.
36 x 48 = 36 x 50 - 36 x 2 = 1,800 - 72 = 1,728.

Answer: 1,728 books.

Q4 Priya uses 16 metres of cloth to make 4 kurtas. How much cloth would she need to make 8 kurtas?

SOLUTION

Cloth for 1 kurta = 16 / 4 = 4 metres.
Cloth for 8 kurtas = 8 x 4 = 32 metres.

Answer: 32 metres.

Q5 Gollappa has 29 cows on his farm. Each cow produces 5 litres of milk per day. How many litres of milk do the cows produce in total, each day?

SOLUTION

Total = 29 x 5 = 30 x 5 - 5 = 150 - 5 = 145 litres.

Answer: 145 litres.

Q6 Maska Cow Farm has 297 cows. Each cow requires 18 kg of fodder per day. How much total fodder is needed to feed 297 cows every day?

SOLUTION

Total = 297 x 18.
= 300 x 18 - 3 x 18
= 5,400 - 54
= 5,346 kg.

Answer: 5,346 kg.

Exercise 6.8 — Waste and Composting (p. 77–78)

Q1 A family of 4 produces around 35 kg of kitchen waste in a month. How much waste will the family produce in a year?

SOLUTION

Waste in 12 months = 12 x 35 kg.
12 x 35 = 12 x 30 + 12 x 5 = 360 + 60 = 420 kg.
(Nida's grid: 10x30=300, 10x5=50, 2x30=60, 2x5=10; total=300+50+60+10=420.)

Answer: 420 kg.

Q2 The family regularly composts the collected waste. They get around 150 kg of compost each year, which they use in their garden. 1 kg of compost is often sold in the market at Rs 24. By creating their own compost, how much money have they saved in a year?

SOLUTION

Savings = 24 x 150 = Rs?
150 x 24 = 150 x 20 + 150 x 4
= 3,000 + 600
= 3,600.

Answer: Rs 3,600.

Exercise 6.9 — Let Us Do — Multiply Using Nida, Kanti, John Methods (p. 79–80)

Q1 Solve the following problems like Nida did (using a grid/box method).

a) 78 x 4

b) 83 x 9

c) 67 x 28

d) 53 x 37

SOLUTION

a) 78 x 4: split 78 = 70 + 8.
4 x 70 = 280; 4 x 8 = 32; total = 280 + 32 = 312.

b) 83 x 9: split 83 = 80 + 3.
9 x 80 = 720; 9 x 3 = 27; total = 720 + 27 = 747.

c) 67 x 28: split 67 = 60 + 7; 28 = 20 + 8.
20 x 60 = 1,200; 20 x 7 = 140; 8 x 60 = 480; 8 x 7 = 56.
Total = 1,200 + 140 + 480 + 56 = 1,876.

d) 53 x 37: split 53 = 50 + 3; 37 = 30 + 7.
30 x 50 = 1,500; 30 x 3 = 90; 7 x 50 = 350; 7 x 3 = 21.
Total = 1,500 + 90 + 350 + 21 = 1,961.

Answer: a) 312 b) 747 c) 1,876 d) 1,961.

Q2 Solve the following problems like Kanti (vertical partial products, each part on its own line).

a) 94 x 5

b) 49 x 6

c) 37 x 53

d) 28 x 79

SOLUTION

a) 94 x 5 = (90 + 4) x 5:
5 x 4 = 20
5 x 90 = 450
Total = 450 + 20 = 470.

b) 49 x 6 = (40 + 9) x 6:
6 x 9 = 54
6 x 40 = 240
Total = 240 + 54 = 294.

c) 37 x 53 = (30 + 7) x (50 + 3):
3 x 7 = 21
3 x 30 = 90
50 x 7 = 350
50 x 30 = 1,500

Total = 1,500 + 350 + 90 + 21 = 1,961.

d) 28 x 79 = (20 + 8) x (70 + 9):
9 x 8 = 72
9 x 20 = 180
70 x 8 = 560
70 x 20 = 1,400
Total = 1,400 + 560 + 180 + 72 = 2,212.

Answer: a) 470 b) 294 c) 1,961 d) 2,212.

Q3 Solve the following problems like John (group partial products by each digit of multiplier).
a) 86 x 3
b) 72 x 7
c) 94 x 36
d) 66 x 22

SOLUTION

a) 86 x 3 = (80 + 6) x 3:
3 x 86 = 3 x 80 + 3 x 6 = 240 + 18 = 258.

b) 72 x 7 = 7 x 70 + 7 x 2 = 490 + 14 = 504.

c) 94 x 36 = (30 + 6) x 94:
6 x 94 = 6 x 90 + 6 x 4 = 540 + 24 = 564
30 x 94 = 30 x 90 + 30 x 4 = 2,700 + 120 = 2,820
Total = 2,820 + 564 = 3,384.

d) 66 x 22 = (20 + 2) x 66:
2 x 66 = 132
20 x 66 = 1,320
Total = 1,320 + 132 = 1,452.

Answer: a) 258 b) 504 c) 3,384 d) 1,452.

Q4 Solve the following word problems:
(a) A movie theater has 8 rows of seats, and each row has 12 seats. If half the seats are filled, how many people are watching the movie? If 3 more rows get filled, how many total people will be there?
(b) In a test match between India and West Indies, the Indian team hit twenty-four 4s and eighteen 6s across the two innings. How many runs were scored in 4s and 6s each? 234 runs were made by running between the wickets. If 23 runs were extras, how many runs were scored by the Indian team in the two innings?
(c) Anjali buys 15 bulbs and 12 tube lights from Sudha Electricals. Each bulb costs Rs 25 and each tube light costs Rs 34. How much money should Anjali give to the shopkeeper?
(d) A shopkeeper sold 28 bags of rice. Each bag costs Rs 350. How much money did he earn by selling rice bags?
(e) A school library has 86 shelves and each shelf has 162 books. Find the number of books in the library.

SOLUTION

(a) Total seats = 8 x 12 = 96.
Half filled = 96 / 2 = 48 people watching.
3 more rows filled = 3 x 12 = 36 more people.
Total = 48 + 36 = 84 people.

(b) Runs in 4s = 24 x 4 = 96.
Runs in 6s = 18 x 6 = 108.
Total = 96 + 108 + 234 + 23 = 461 runs.

(c) Cost of bulbs = 15 x 25 = 375.
Cost of tube lights = 12 x 34 = 408.
Total = 375 + 408 = Rs 783.

(d) Earnings = 28 x 350 = 28 x 300 + 28 x 50 = 8,400 + 1,400 = Rs 9,800.

(e) Total books = 86 x 162.
86 x 162 = 86 x 100 + 86 x 60 + 86 x 2
= 8,600 + 5,160 + 172 = 13,932.

Answer: (a) 48 watching; 84 total after 3 more rows. (b) 96 in 4s, 108 in 6s, total 461 runs. (c) Rs 783. (d) Rs 9,800. (e) 13,932 books.

Exercise 6.10 — Dairy Cooperative (p. 81–83)

Q1 A dairy cooperative in a small town gets its milk from 268 villagers. Each villager has at least 4 milk-giving cows. What is the minimum number of cows the dairy cooperative gets its milk from?

SOLUTION

Minimum cows = 268 x 4.
268 = 200 + 60 + 8.
4 x 8 = 32
4 x 60 = 240
4 x 200 = 800
Total = 800 + 240 + 32 = 1,072.

Answer: At least 1,072 cows.

Q2 Among the villagers, there are 453 Gir cows. Each of these cows gives 13 litres of milk each day. How many litres of milk does the dairy cooperative receive from Gir cows every day?

SOLUTION

Milk = 453 x 13.
453 = 400 + 50 + 3; 13 = 10 + 3.
3 x 3 = 9
3 x 50 = 150
3 x 400 = 1,200
Row for 3 x 453 = 1,200 + 150 + 9 = 1,359.

10 x 3 = 30
10 x 50 = 500
10 x 400 = 4,000
Row for 10 x 453 = 4,000 + 500 + 30 = 4,530.

Total = 1,359 + 4,530 = 5,889 litres.

Answer: 5,889 litres of milk every day.

Q3 The dairy cooperative sells 1 kg cow ghee for Rs 574. The cooperative is able to produce around 125 kg of ghee in a month. How much do they earn by selling ghee in a month?

SOLUTION

Earnings = 574 x 125.
574 = 500 + 70 + 4; 125 = 100 + 20 + 5.
5 x 574 = 5 x 500 + 5 x 70 + 5 x 4 = 2,500 + 350 + 20 = 2,870.
20 x 574 = 20 x 500 + 20 x 70 + 20 x 4 = 10,000 + 1,400 + 80 = 11,480.
100 x 574 = 57,400.
Total = 2,870 + 11,480 + 57,400 = 71,750.

Answer: Rs 71,750.

Exercise 6.11 — Let Us Solve — Large Multiplication Practice (p. 83–84)

Q1 Solve the following problems like Nida.

a) 548 x 6

b) 682 x 3

c) 324 x 18

d) 507 x 23

e) 190 x 65

SOLUTION

a) 548 x 6: 6 x 8 = 48; 6 x 40 = 240; 6 x 500 = 3,000. Total = 3,000 + 240 + 48 = 3,288.

b) 682 x 3: 3 x 2 = 6; 3 x 80 = 240; 3 x 600 = 1,800. Total = 1,800 + 240 + 6 = 2,046.

c) 324 x 18: 324 = 300+20+4; 18 = 10+8.
8x4=32; 8x20=160; 8x300=2,400 => 8x324=2,592.
10x324=3,240.
Total = 3,240 + 2,592 = 5,832.

d) 507 x 23: 507=500+7; 23=20+3.
3x7=21; 3x500=1,500 => 3x507=1,521.
20x507=10,140.
Total = 10,140 + 1,521 = 11,661.

e) 190 x 65: 190=100+90; 65=60+5.
5x90=450; 5x100=500 => 5x190=950.
60x190=11,400.
Total = 11,400 + 950 = 12,350.

Answer: a) 3,288 b) 2,046 c) 5,832 d) 11,661 e) 12,350.

Q2 Solve the following problems like John.

a) 123 x 84

b) 368 x 32

c) 159 x 324

d) 239 x 401

e) 592 x 5

f) 101 x 22

SOLUTION

a) 123 x 84: 4x123=492; 80x123=9,840. Total=9,840+492=10,332.

b) 368 x 32: 2x368=736; 30x368=11,040. Total=11,040+736=11,776.

c) 159 x 324: 4x159=636; 20x159=3,180; 300x159=47,700. Total=47,700+3,180+636=51,516.

d) 239 x 401: 1x239=239; 400x239=95,600. Total=95,600+239=95,839.

e) 592 x 5: 5x592=5x500+5x90+5x2=2,500+450+10=2,960.

f) 101 x 22: 2x101=202; 20x101=2,020. Total=2,020+202=2,222.

Answer: a) 10,332 b) 11,776 c) 51,516 d) 95,839 e) 2,960 f) 2,222.

Q3 Use Mili's father's method (standard algorithm with place values) to solve the following.
(a) 807 x 5
(b) 143 x 28
(c) 309 x 9
(d) 450 x 38
(e) 584 x 23
(f) 302 x 13
(g) 604 x 54
(h) 112 x 23
(i) 237 x 19

SOLUTION

(a) 807 x 5 = 4,035.
(b) 143 x 28: 8x143=1,144; 20x143=2,860. Total=1,144+2,860=4,004.
(c) 309 x 9 = 2,781.
(d) 450 x 38: 8x450=3,600; 30x450=13,500. Total=3,600+13,500=17,100.
(e) 584 x 23: 3x584=1,752; 20x584=11,680. Total=1,752+11,680=13,432.
(f) 302 x 13: 3x302=906; 10x302=3,020. Total=906+3,020=3,926.
(g) 604 x 54: 4x604=2,416; 50x604=30,200. Total=2,416+30,200=32,616.
(h) 112 x 23: 3x112=336; 20x112=2,240. Total=336+2,240=2,576.
(i) 237 x 19: 9x237=2,133; 10x237=2,370. Total=2,133+2,370=4,503.

Answer: (a) 4,035 (b) 4,004 (c) 2,781 (d) 17,100 (e) 13,432 (f) 3,926 (g) 32,616 (h) 2,576 (i) 4,503.

Exercise 6.12 — Check, Check! — Find and Fix Errors (p. 85)

Q1 Check if each child's solution is correct. If incorrect, find the error and correct it.

a) Asma's solution for 46 x 59:
46 x 59: 2,000 + 300 + 360 + 54 = 2,714

b) Pankaj's solution for 203 x 54:
203 x 54: 80 + 12 = 92; 100 + 15 = 115; total = 135

c) Lado's solution for 38 x 150:
38 x 150: 1,500 + 400 = 1,900; 3,000 + 800 = 3,800; total = 5,700

d) Kira's solution for 193 x 272:
193 x 272: 200+180+6=386; 700+630+21=1,351; 20,000+18,000+600=38,600; total=40,337

e) Asher's solution for 626 x 323 using the standard algorithm showing partial rows 1878, 1252, 1878 summing to 5,018

SOLUTION

a) Asma for 46 x 59: 46=(40+6), 59=(50+9).
40x50=2,000; 40x9=360; 6x50=300; 6x9=54.
2,000+360+300+54=2,714.
Correct! 46 x 59 = 2,714.

b) Pankaj for 203 x 54:
203=(200+3), 54=(50+4).
4x3=12, 4x200=800 => 4x203=812.
50x3=150, 50x200=10,000 => 50x203=10,150.
Correct total = 812 + 10,150 = 10,962.
Pankaj got 135, which is WRONG.
His error: he wrote 80+12=92 (confused digits) and 100+15=115 (used wrong place values). He did not account for the zeros when multiplying by 50 and 200.

c) Lado for 38 x 150:
38=(30+8), 150=(100+50).
Correct partial products: 8x100=800, 8x50=400, 30x100=3,000, 30x50=1,500.
Row for 8: 800+400=1,200 (Lado wrote 1,900 — WRONG).
Row for 30: 3,000+1,500=4,500 (Lado wrote 3,800 — WRONG).
Lado's total: 1,900+3,800=5,700. Correct total = 1,200+4,500=5,700.
The final answer 5,700 is correct, but the individual step totals are wrong (Lado swapped the partial products in each row). The total happens to be the same because the four partial products are the same numbers, just added in a different grouping.

d) Kira for 193 x 272:
193=(100+90+3), 272=(200+70+2).
Row for 2: 2x100=200, 2x90=180, 2x3=6 => 386. ✓
Row for 70: 70x100=7,000, 70x90=6,300, 70x3=210 => 13,510.
Kira wrote 700+630+21=1,351 — WRONG (missing the zero: 70x100=7,000 not 700).
Row for 200: 200x100=20,000, 200x90=18,000, 200x3=600 => 38,600. ✓

Correct total = 386 + 13,510 + 38,600 = 52,496.
Kira got 40,337 — INCORRECT.

e) Asher for 626 x 323:
626=(600+20+6), 323=(300+20+3).
3x626=1,878. ✓
20x626=12,520 (Asher's second row shows 1,252 — missing the zero for multiplying by 20, should be 12,520).
300x626=187,800.
Correct total = 1,878 + 12,520 + 187,800 = 202,198.
Asher's error: wrote 1,252 instead of 12,520 for the 20x row (dropped the trailing zero). Answer 5,018 is INCORRECT.

Answer: a) Asma CORRECT: 2,714. b) Pankaj INCORRECT: correct answer is 10,962 (he lost place values). c) Lado: final answer 5,700 is correct, but individual row sums are wrong (swapped partial products). d) Kira INCORRECT: 70x193=13,510 not 1,351; correct answer is 52,496. e) Asher INCORRECT: 20x626=12,520 not 1,252; correct answer is 202,198.

Exercise 6.13 — Let Us Do — Same-Answer Identification and Easy Multiplication (p. 86)

Q1 Identify the problems that have the same answer as the one given at the top of each box. Do not calculate.
12 x 17: options — 11 x 18, 6 x 34
26 x 11: options — (26 x 10 and 26 x 1), (20 x 11 and 6 x 11)
18 x 4: options — 9 x 8, 20 x 4 - 8
55 x 9: options — (50 x 9 and 5 x 9), 54 x 10, 55 x 10 - 55
101 x 42: options — (100 x 42 and 100), (100 x 42 and 42)
247 x 8: options — 250 x 8 - 24, 247 x 10 - 247
1001 x 5: options — 1,000 x 6, (1,000 x 5 and 5)
1999 x 2: options — 2,000 x 2 - 4, 2,000 x 2 - 2

SOLUTION

12 x 17 = 204.
11 x 18 = 198 (different). 6 x 34 = 204 (SAME: 6x34=6x2x17=12x17). => 6 x 34 ✓

26 x 11 = 286.
26x10 + 26x1 = 260+26=286 (SAME). 20x11 + 6x11 = 220+66=286 (SAME). => Both ✓

18 x 4 = 72.
9 x 8 = 72 (SAME). 20x4-8 = 80-8=72 (SAME). => Both ✓

55 x 9 = 495.
50x9+5x9=450+45=495 (SAME). 54x10=540 (different). 55x10-55=550-55=495 (SAME). => First and last ✓

101 x 42 = 4,242.
100x42+100=4,300 (different). 100x42+42=4,242 (SAME). => Second ✓

247 x 8 = 1,976.
250x8-24=2,000-24=1,976 (SAME). 247x10-247=2,470-247=2,223 (different). => First ✓

1001 x 5 = 5,005.
1,000x6=6,000 (different). 1,000x5+5=5,005 (SAME). => Second ✓

1999 x 2 = 3,998.
2,000x2-4=3,996 (different). 2,000x2-2=3,998 (SAME). => Second ✓

Answer: 12x17: 6x34 ✓. 26x11: both ✓. 18x4: both ✓. 55x9: (50x9 and 5x9) and (55x10-55) ✓. 101x42: (100x42 and 42) ✓. 247x8: 250x8-24 ✓. 1001x5: (1,000x5 and 5) ✓. 1999x2: 2,000x2-2 ✓.

Q2 Find easy ways of solving these problems.
(a) 16 x 25
(b) 12 x 125
(c) 24 x 250
(d) 36 x 25
(e) 28 x 75
(f) 300 x 15
(g) 50 x 78
(h) 199 x 63
(i) 128 x 35

SOLUTION

(a) 16 x 25: 16 = 4 x 4; 4 x 25 = 100; 4 x 100 = 400.
(b) 12 x 125: 8 x 125 = 1,000; 12 x 125 = 1,000 + 4 x 125 = 1,000 + 500 = 1,500.
(c) 24 x 250: halve twice: 6 x 1,000 = 6,000.
(d) 36 x 25: 36 / 4 = 9; 9 x 100 = 900.
(e) 28 x 75: 28 = 4 x 7; 4 x 75 = 300; 7 x 300 = 2,100.
(f) 300 x 15: 3 x 15 = 45; x100 = 4,500.
(g) 50 x 78: 78 x 100 / 2 = 7,800 / 2 = 3,900.
(h) 199 x 63: 200 x 63 - 63 = 12,600 - 63 = 12,537.
(i) 128 x 35: double and halve: 64 x 70 = 4,480.

Answer: (a) 400 (b) 1,500 (c) 6,000 (d) 900 (e) 2,100 (f) 4,500 (g) 3,900 (h) 12,537 (i) 4,480.

Q3 Write 5 other examples for which you can find easy ways of getting products.

SOLUTION

Here are 5 examples using the strategies learned:
1. 4 x 25 = 100 (4 x 25 is one quarter of 100 x 4... or simply 4 groups of 25 = 100).
2. 8 x 125 = 1,000 (8 x 125 = 1,000 because 8 x 125 = 1,000).
3. 5 x 34 = 170 (halve 34 = 17, double 5 = 10: 10 x 17 = 170).
4. 99 x 8 = 100 x 8 - 8 = 800 - 8 = 792 (nearest multiple).
5. 50 x 46 = 2,300 (46 x 100 / 2 = 4,600 / 2 = 2,300).

Answer: Example: 4x25=100, 8x125=1,000, 5x34=170, 99x8=792, 50x46=2,300. (Any 5 valid examples with clear strategy are acceptable.)

Q4 Find the answers to the following questions based on the given information.

(a) 17 x 23 = 391 (given)

(b) 17 x 24 = ___

(c) 17 x 22 = ___

(d) 16 x 23 = ___

(e) 8 x 9 = 72 (given)

(f) 18 x 9 = ___

(g) 28 x 9 = ___

(h) 108 x 9 = ___

(i) 18 x 23 = ___

SOLUTION

(b) 17 x 24 = 17 x 23 + 17 = 391 + 17 = 408.
(Adding one more group of 17 because the multiplier went up by 1.)

(c) 17 x 22 = 17 x 23 - 17 = 391 - 17 = 374.

(d) 16 x 23 = 17 x 23 - 23 = 391 - 23 = 368.
(Removing one group of 23 because the multiplier went down by 1.)

(f) 18 x 9: 18 = 8 + 10. So 18 x 9 = 8 x 9 + 10 x 9 = 72 + 90 = 162.

(g) 28 x 9: 28 = 18 + 10. 28 x 9 = 18 x 9 + 10 x 9 = 162 + 90 = 252.

(h) 108 x 9: 108 = 100 + 8. 108 x 9 = 100 x 9 + 8 x 9 = 900 + 72 = 972.

(i) 18 x 23: 18 = 17 + 1. 18 x 23 = 17 x 23 + 23 = 391 + 23 = 414.

Answer: (b) 408 (c) 374 (d) 368 (f) 162 (g) 252 (h) 972 (i) 414.

Exercise 6.14 — Let Us Think — Coloured Box Puzzles and Estimation (p. 87–88)

Q1 Find the possible values of the coloured boxes in each of the following problems. The same colour indicates the same number in a problem. Some problems can have more than one answer.
a) [A][A] x 3 = [B][B] (2-digit same-digit x 3 = 2-digit same-digit)
b) [A][A][A] x 3 = [B][B][B]
c) [A][A][A][A] x 3 = [B][B][B][B]
d) [A][B] x 5 = 1[C]0 (result starts with 1, ends with 0)
e) [A][B][C] x 5 = [D][D]0 (result has two same digits then 0)
f) [A][B][B][A] x 5 = 1[C][C]0
g) [A][A][A] x 9 = [B][C][D][E] (3-digit with same digits, x 9)
h) [A][B][C] x [C] = 5,999
i) [A][B] x [C] = 2,000

SOLUTION

a) AA x 3 = BB: AA = 11k, 11k x 3 = 33k = BB.
k=1: 11 x 3 = 33. k=2: 22 x 3 = 66. k=3: 33 x 3 = 99.
Answers: 11x3=33, 22x3=66, 33x3=99.

b) AAA x 3 = BBB: 111k x 3 = 333k.
k=1: 111x3=333. k=2: 222x3=666. k=3: 333x3=999.
Answers: 111x3=333, 222x3=666, 333x3=999.

c) AAAA x 3 = BBBB: 1111k x 3 = 3333k.
k=1: 1111x3=3333. k=2: 2222x3=6666. k=3: 3333x3=9999.
Answers: 1111x3=3333, 2222x3=6666, 3333x3=9999.

d) AB x 5 = 1C0: result is between 100 and 190, ending in 0.
AB must be even (to end in 0 after x5). Try: 22x5=110, 24x5=120, 26x5=130, 28x5=140, 30x5=150, 32x5=160, 34x5=170, 36x5=180, 38x5=190.
Many answers possible. Simplest: 22 x 5 = 110.

e) ABC x 5 = DD0: result first two digits same, last digit 0.
110x5=550, 132x5=660, 154x5=770, 176x5=880, 198x5=990.
Answers: e.g. 110x5=550, 132x5=660.

f) ABBA x 5 = 1CC0: 4-digit palindrome x 5 gives result starting 1 and ending 0.
2002x5=10010, 2222x5=11110, 2442x5=12210, 2662x5=13310, 2882x5=14410.
Answers: e.g. 2222x5=11110.

g) AAA x 9 (any digit 1-9): 111x9=999, 222x9=1,998, 333x9=2,997, 444x9=3,996, 555x9=4,995, 666x9=5,994, 777x9=6,993, 888x9=7,992, 999x9=8,991.
All are valid. Discuss the pattern.

h) ABC x C = 5,999: find ABC and C such that the units digit of ABC equals C.
857 x 7 = 5,999. (Units digit of 857 = 7 = C. Check: 857 x 7 = 5,999 ✓)

i) AB x C = 2,000: two-digit x one-digit = 2,000.
Max two-digit x one-digit = 99 x 9 = 891 < 2,000. Not possible with single-digit multiplier.

If C is two-digit: 25 x 80 = 2,000 or 40 x 50 = 2,000.
Explore and discuss in class.

Answer: a) 11x3=33, 22x3=66, 33x3=99. b) 111x3=333, 222x3=666, 333x3=999. c) 1111x3=3333, 2222x3=6666, 3333x3=9999. d) e.g. 22x5=110. e) e.g. 132x5=660. f) e.g. 2222x5=11110. g) 111x9=999 through 999x9=8,991. h) 857x7=5,999. i) Not possible with a single-digit C; with two digits: 25x80=2,000.

Q2 Estimate the products on the left and match them to the numbers given on the right.
25 x 31 -> ?
132 x 19 -> ?
101 x 11 -> ?
248 x 49 -> ?
12 x 25 -> ?
Options: 2,600 | 12,500 | 300 | 750 | 1,000

SOLUTION

25 x 31: round to 25 x 30 = 750. Matches 750.
132 x 19: round to 130 x 20 = 2,600. Matches 2,600.
101 x 11: round to 100 x 10 = 1,000. Matches 1,000.
248 x 49: round to 250 x 50 = 12,500. Matches 12,500.
12 x 25: 12 x 25 = 300 (exact). Matches 300.

Answer: 25x31 -> 750; 132x19 -> 2,600; 101x11 -> 1,000; 248x49 -> 12,500; 12x25 -> 300.

Exercise 6.15 — The King's Reward (p. 88–89)

Q1 A king offered three ministers their choice:
Choice 1: Start with 5 gold coins, double every day for 7 days.
Choice 2: Start with 3 gold coins, triple every day for 7 days.
Choice 3: Start with 1 gold coin, multiply by 5 every day for 7 days.
Which choice gives the most coins? Calculate how many gold coins each minister received after 7 days.

SOLUTION

The king gave the coins on Day 1 and the doubling/tripling happens each day after that.

Minister 1 (starts with 5, doubles every day):
Day 1: 5. Day 2: 10. Day 3: 20. Day 4: 40.
Day 5: 80. Day 6: 160. Day 7: 320.
After 7 days: 320 coins.

Minister 2 (starts with 3, triples every day):
Day 1: 3. Day 2: 9. Day 3: 27. Day 4: 81.
Day 5: 243. Day 6: 729. Day 7: 2,187.
After 7 days: 2,187 coins.

Minister 3 (starts with 1, multiplies by 5 every day):
Day 1: 1. Day 2: 5. Day 3: 25. Day 4: 125.
Day 5: 625. Day 6: 3,125. Day 7: 15,625.
After 7 days: 15,625 coins.

Minister 3 received the most gold coins.

Answer: Minister 1: 320 coins. Minister 2: 2,187 coins. Minister 3: 15,625 coins. Minister 3 wins.

Exercise 6.16 — Multiplication Patterns (p. 89–90)

Q1 Notice how the multiplier, multiplicand, and products are changing. What is the relationship of the new product with the original product?

a) 16 x 44 = 704 (given), 8 x 88 = 704 (given), 8 x 22 = 176 (given)

3) 16 x 22 = ___

4) 32 x 44 = ___

b) 12 x 32 = 384 (given)

1) 6 x 16 = ___

2) 24 x 16 = ___

3) 24 x 64 = ___

4) 12 x 16 = ___

SOLUTION

a) Original: 16 x 44 = 704.

8 x 88 = 704 (halve one, double other — same product).

8 x 22 = 176 (both halved — product is 1/4 of 704 = 176).

3) 16 x 22: keep 16, halve 44 => product is halved = 704/2 = 352.

4) 32 x 44: double 16, keep 44 => product is doubled = 704 x 2 = 1,408.

b) Original: 12 x 32 = 384.

1) 6 x 16: both halved => 384/4 = 96.

2) 24 x 16: double one, halve other => same product = 384.

3) 24 x 64: double one, double other => 384 x 4 = 1,536.

4) 12 x 16: keep 12, halve 32 => 384/2 = 192.

Answer: a-3) 352 a-4) 1,408. b-1) 96 b-2) 384 b-3) 1,536 b-4) 192.

Q2 Observe and complete the given patterns.

(i) 1x1=1; 11x11=121; 111x111=12,321; 1111x1111=___

(ii) 5x5=25; 15x15=225; 25x25=625; 35x35=1,225; 45x45=___; 55x55=___

(iii) 11x12=132; 11x34=374; 11x56=616; 11x78=858; 11x54=___; 11x82=___

(iv) 1x9+1=10; 12x9+2=110; 123x9+3=1,110; 1234x9+4=___

(v) Number pairs grid: 8,35,75 / 32,62,13 / 66,11,14. Find the adjacent pair with the smallest product and the pair with the largest product.

SOLUTION

(i) Pattern: 1,121,12321,1234321,...

1111 x 1111 = 1,234,321.

(ii) Pattern: (N x 10 + 5)^2 = N x (N+1) x 100 + 25.

45 x 45 = 2,025.

55 x 55 = 3,025.

(iii) 11 x AB: result has digits A, (A+B), B (when A+B < 10).

11 x 54: 5, 5+4=9, 4 => 594.

11 x 82: 8, 8+2=10, 2 => carry: 9, 0, 2 => 902.

(iv) Pattern: 1,234...N x 9 + N = 1,11...10 (N+1 digits).
1234 x 9 + 4 = 11,106 + 4 = 11,110.

(v) Grid (adjacent = sharing a side or column):
Row 1: 8,35,75; Row 2: 32,62,13; Row 3: 66,11,14.
Adjacent pairs and products:
Smallest product: 11 x 14 = 154 (bottom row).
Largest product: 35 x 75 = 2,625 (top row) — but check all: 32x62=1,984, 35x62=2,170, 35x75=2,625.
Largest: 35 x 75 = 2,625.

Answer: (i) 1,234,321. (ii) 45x45=2,025; 55x55=3,025. (iii) 11x54=594; 11x82=902. (iv) 11,110. (v) Smallest: 11x14=154. Largest: 35x75=2,625.

Exercise 6.17 — Let Us Solve — Final Word Problems (p. 91)

Q1 Mala went to a book exhibition and bought 18 books. The shop was selling 3 books for Rs 150. After buying the books, she still had Rs 20 left. How much money did Mala have at the beginning?

SOLUTION

Number of sets of 3 books = 18 / 3 = 6 sets.
Cost = 6 x Rs 150 = Rs 900.
She had Rs 20 left, so she started with Rs 900 + Rs 20 = Rs 920.

Answer: Rs 920.

Q2 A village sports club organises a women's football tournament.
They sold 57 tickets for Rs 115 each.
They had 3 teams joining, each paying a participation fee of Rs 1,599.
The teams paid Rs 1,750 to rent the football ground and Rs 1,129 for food and water.
(a) How much money did the club collect in total from ticket sales and team participation fees?
(b) What were the total expenses on renting the ground and food and water?

SOLUTION

(a) Ticket sales = 57 x 115.
57 x 115 = 57 x 100 + 57 x 15 = 5,700 + 855 = 6,555.
Participation fees = 3 x 1,599 = 3 x 1,600 - 3 = 4,800 - 3 = 4,797.
Total collected = 6,555 + 4,797 = 11,352.

(b) Total expenses = 1,750 + 1,129 = 2,879.

Answer: (a) Rs 11,352. (b) Rs 2,879.

Q3 Ananya is watching Republic Day celebrations on the city's public ground. There are 12 rows of students sitting in front of her and 17 rows behind her. There are 18 students to her right and 22 students to her left.
(a) How many rows of students are there in total?
(b) How many students are there in Ananya's row?
(c) What is the total number of students on the ground?

SOLUTION

(a) Total rows = 12 (in front) + 1 (Ananya's row) + 17 (behind) = 30 rows.

(b) Students in Ananya's row = 18 (right) + 1 (Ananya) + 22 (left) = 41 students.

(c) Total students = 30 rows x 41 students per row = 1,230.

Answer: (a) 30 rows. (b) 41 students. (c) 1,230 students.

Q4 Multiply.
(a) 67 x 78
(b) 34 x 56
(c) 45 x 263
(d) 86 x 542
(e) 432 x 107
(f) 310 x 120

SOLUTION

(a) 67 x 78 = 67 x 80 - 67 x 2 = 5,360 - 134 = 5,226.
(b) 34 x 56 = 34 x 50 + 34 x 6 = 1,700 + 204 = 1,904.
(c) 45 x 263: 45 x 200 = 9,000; 45 x 60 = 2,700; 45 x 3 = 135. Total = 9,000+2,700+135 = 11,835.
(d) 86 x 542: 86 x 500 = 43,000; 86 x 40 = 3,440; 86 x 2 = 172. Total = 43,000+3,440+172 = 46,612.
(e) 432 x 107: 432 x 100 = 43,200; 432 x 7 = 3,024. Total = 43,200+3,024 = 46,224.
(f) 310 x 120: 310 x 100 = 31,000; 310 x 20 = 6,200. Total = 31,000+6,200 = 37,200.

Answer: (a) 5,226 (b) 1,904 (c) 11,835 (d) 46,612 (e) 46,224 (f) 37,200.

Q5 If 67 x 67 = 4,489, without multiplication find 67 x 68.

SOLUTION

67 x 68 = 67 x 67 + 67 = 4,489 + 67 = 4,556.
(Adding one more group of 67 because the multiplier increased by 1.)

Answer: 4,556.

Q6 If 99 x 100 = 9,900, without multiplication find 99 x 99.

SOLUTION

99 x 99 = 99 x 100 - 99 = 9,900 - 99 = 9,801.
(Removing one group of 99 because the multiplier decreased by 1.)

Answer: 9,801.