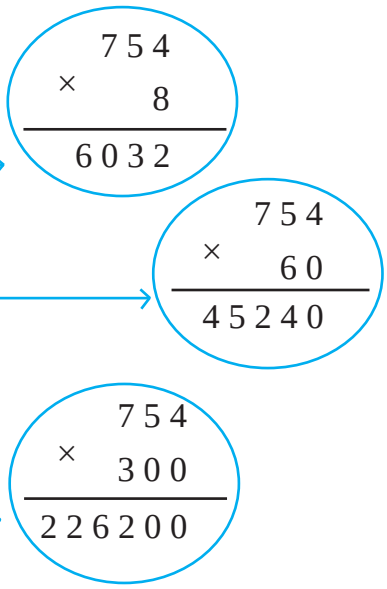
4. Multiplication and Division

❒ Multiplication

Multiplying a given number by a three-digit number

Example (1) There are 754 students in a school. If one child's uniform costs 368 rupees, what will be the cost of the uniforms for all the children in the school ?

```
   754
 ×  368
 ------
  6032   ------ Multiplying by 8 units
+ 45240   ------ Multiplying by 6 tens
+226200   ------ Multiplying by 3 hundreds
 ------
 277472
 ------
```



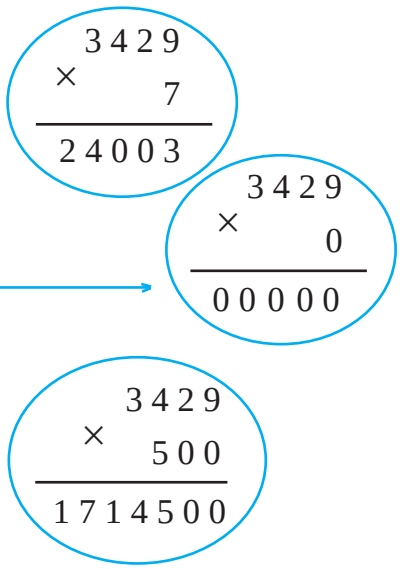
The total cost of the uniforms is ₹ 2,77, 472.

Here, 754 is the multiplicand, 368 is the multiplier and 2,77,472 is the product.

Note : We could have also found out the total cost of the uniforms by taking 368 754 times and adding it up. However, it takes less time and effort to find the answer by multiplication.

Example (2) 3429 × 507 = How many ?

```
   3429
 ×  507
 ------
 24003   ------ Multiplying by 7 units
+ 00000   ------ Multiplying by 0 tens
+1714500   ------ Multiplying by 5 hundreds
 ------
1738503
 ------
```

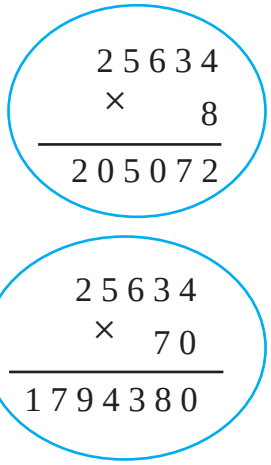


Example (3) Write a multiplication word problem using the two numbers 25,634 and 78.

Solve the problem.

A shopkeeper bought 78 TV sets for ₹25,634 each. What is their total cost ?

	25634	------	Cost of one TV set
×	78	------	Number of TV sets
	205072	------	Multiplying by 8 units
+	1794380	------	Multiplying by 7 tens
	19,99,452		



The total cost is ₹19,99,452.

Make a habit of holding the carried over numbers in your mind.

Problem Set 14

1. Multiply.

(1) 327 × 92	(2) 807 × 126	(3) 567 × 890	(4) 4317 × 824
(5) 6092 × 203	(6) 1177 × 99	(7) 456 × 187	(8) 6543 × 79
(9) 2306 × 832	(10) 6429 × 509	(11) 4,321 × 678	(12) 20,304 × 87

2. As part of the 'Avoid Plastic' campaign, each of 745 students made 25 paper bags. What was the total number of paper bags made ?

3. In a plantation, saplings of 215 medicinal trees have been planted in each of the 132 rows of trees. How many saplings are there in the plantation altogether ?

4. One computer costs 27,540 rupees. How much will 18 such computers cost ?

5. Under the 'Inspire Awards' scheme, 5000 rupees per student were granted for the purchase of science project materials. If 154 students in a certain taluka were covered under the scheme, find the total amount granted to that taluka.

6. If a certain two-wheeler costs 53,670 rupees, how much will 35 such two-wheelers cost ?

7. One hour has 3,600 seconds. How many seconds do 365 hours have ?

8. Frame a multiplication word problem with the numbers 5473 and 627 and solve it.

9. Find the product of the biggest three-digit number and the biggest four-digit number.

10. One traveller incurs a cost of 7,650 rupees for a certain journey. What will be the cost for 26 such travellers ?

❒ Pairing off objects from two groups in different ways

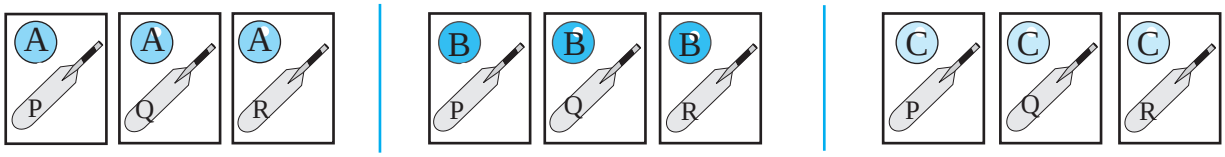
(1) Ajay wants to travel light. So he took with him three shirts – one red, one green and one blue and two pairs of trousers – one white and one black. How many different ways does he have of pairing off a shirt with trousers?

Writing 'S' for shirt and 'T' for trousers, the possible different pairs are:

(Red S, Black T), (Green S, Black T), (Blue S, Black T)
(Red S, White T), (Green S, White T), (Blue S, White T)

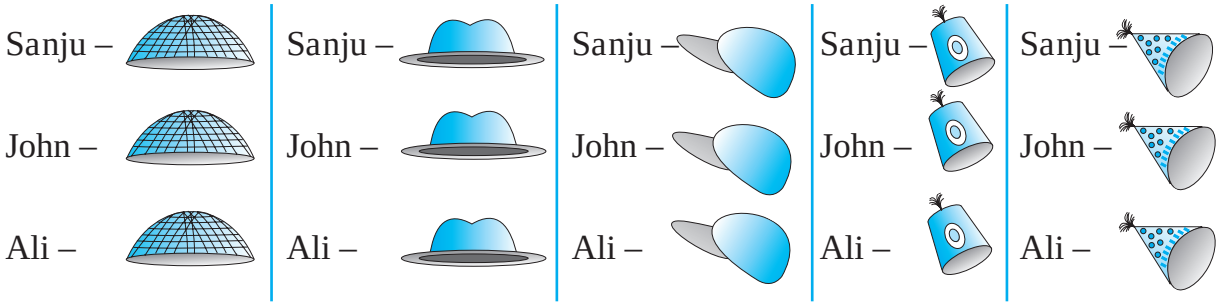
Altogether 6 different pairs.

(2) Suresh has three balls of different colours marked A, B and C and three bats marked P, Q and R. He wishes to take only one bat and one ball to the playground. In how many ways can he pair off a ball and a bat to take with him?



How many different pairs have been shown here?

(3) The three friends, Sanju, John and Ali went to the fair. A shop there, had five different types of hats. Each of the boys had photos taken of himself, wearing every type of hat, in turn. Find how many photographs were taken in all.



How many different pairs were formed? That is, how many photos were taken?

✦ Take two collections, each containing the given number of objects. Make as many different pairs as possible, taking one object from each collection every time. Thus, complete the table below.

Objects in one collection	Objects in the other collection	How many ways to form pairs?
3	2	
5	2	
2	4	
3	4	

What does this table tell us?

The number of different pairs formed by pairing off objects from two groups is equal to the product of the number of objects in the two groups.

❒ Division

Teacher : You have learnt some things about division. For example, we know that division means making equal parts of a given number, or, subtracting a number repeatedly from a given number. What else do you know?

Shubha : We know that we get two divisions from one multiplication.

From 9 × 4 = 36, we get the divisions 36 ÷ 4 = 9 and 36 ÷ 9 = 4.

Teacher : Very good! Right now, there's nothing new to learn about division. Only the number of digits in the dividend and the divisor will grow. Tell me what is 354 ÷ 6 ?

Sarang : 354 = 300 + 54. 300 divided by six is 50. And 54 ÷ 6 = 9. Hence the quotient is 50 + 9 = 59.

Teacher : Right! Now let's learn, step by step, how to divide a four-digit number by a one-digit number. So now, divide 4925 by 7 and tell me the quotient and the remainder.

Shubha : We cannot divide 4 thousands by 7 into whole thousands. Now, 4 Th = 40 H. So let us instead take the 40 hundreds together with 9 hundreds and divide 49 hundreds. 49 ÷ 7 = 7. So, everyone gets 7 hundreds. Now, we cannot divide 2T equally among 7 people. So we must write 0 in the tens place in the quotient. Then on dividing 25 by seven, we get quotient 3 and the remainder is 4. Thus, the answer is quotient 703, remainder 4.

Teacher : Very good! Now divide 7439 by 9.

Sarang : It's difficult to do this mentally. I'll write it down on paper.

The quotient is 826 and the remainder, 5.

```
    0826
 9) 7439
  - 0
  ----
    74
  - 72
  ----
     23
   - 18
   ----
      59
    - 54
    ----
       5
```

Teacher : We use the same method to divide a four-digit number by a two-digit number. If necessary, we can prepare the table of the divisor before we start.

Study the solved examples shown below.

Example (1)

```
     0170
25)  4254
   - 0
   ----
     42
   - 25
   ----
     175
   - 175
   -----
     0004
   - 0000
   ------
     0004
```

25 × 1 = 25
25 × 2 = 50
25 × 3 = 75
25 × 4 = 100
25 × 5 = 125
25 × 6 = 150
25 × 7 = 175

Quotient 170, Remainder 4

Example (2)

```
     0305
32)  9783
   - 0
   ----
     97
   - 96
   ----
      18
    - 00
    ----
      183
    - 160
    -----
       23
```

32 × 1 = 32
32 × 2 = 64
32 × 3 = 96
32 × 4 = 128
32 × 5 = 160
32 × 6 = 192

Quotient 305, Remainder 23

Example (3) Divide. 9842 ÷ 45

```
     0218
45) 9842
   −90
    084
   − 45
     392
   − 360
     032
```

We can prepare the 45 times table to do this division.

But when the divisor is a big number, we can solve the example by first guessing what the quotient will be. Let us see how to do that.

We have 0 in the thousands place in the quotient.

Now, to guess the quotient when dividing 98 by 45, look at the first digits in both – the dividend and the divisor. These are 9 and 4, respectively.

Dividing 9 by 4, we will get 2 in the quotient. Let us see if 2 times 45 can be subtracted from 98. 45 × 2 = 90. 90 < 98. So, we write 2 in the hundreds place in the quotient.

Next, dividing 84 by 45 we can easily see that as 90 > 84, we have to write 1 in the tens place in the quotient.

Now, we have to divide 392 by 45. As 3 < 4, let us look at 39, the number formed by the first 2 digits, to guess the next digit in the quotient.

4 × 9 = 36 and 36 < 39. Let us check if the next digit can be 9. 45 × 9 = 405 and 405 > 392. Therefore, 9 cannot be the next digit in the quotient.

Let us check for 8. 45 × 8 = 360. 360 < 392. So, we write 8 in the units place of the quotient.

We subtract 8 × 45 from 392 and complete the division.

The quotient is 218 and the remainder, 32.

Example (4) If 35 kilograms of wheat cost 910 rupees, what is the rate of wheat per kg?

Weight of wheat in kg × rate of wheat per kg = cost of wheat

Hence, 35 × rate of wheat per kg = 910

Therefore, when we divide 910 by 35, we will get the per kg rate of wheat.

```
     26
35) 910
   − 70
    210
   − 210
      000
```

The rate per kilogram of wheat is 26 rupees.

Problem Set 15

1. Solve the following and write the quotient and remainder.

(1) 1284 ÷ 32 (2) 5586 ÷ 87 (3) 1207 ÷ 27

(4) 8543 ÷ 41 (5) 2304 ÷ 43 (6) 56,741 ÷ 26

2. How many hours will it take to travel 336 km at a speed of 48 km per hour?

3. Girija needed 35 cartons to pack 1400 books. There are an equal number of books in every carton. How many books did she pack into each carton?

4. The contribution for a picnic was 65 rupees each. Altogether, 2925 rupees were collected. How many had paid for the picnic?

5. Which number, on being multiplied by 56, gives a product of 9688?

6. If 48 sheets are required for making one notebook, how many notebooks at the most will 5880 sheets make and how many sheets will be left over?

7. What will the quotient be when the smallest five-digit number is divided by the smallest four-digit number?

Mixed examples

✦ A farmer brought 140 trays of chilli seedlings. Each tray had 24 seedlings. He planted all the seedlings in his field, putting 32 in a row. How many rows of chillies did he plant?

Let us find out the total number of seedlings when there were 24 seedlings in each of the 140 trays. We shall multiply 140 and 24.

```
  140
×  24
 560
+2800
 3360
```

Total number of seedlings 3,360.

To find out how many rows were planted with 32 seedlings in each row, we shall divide 3,360 by 32.

```
      105
32) 3360
   −32
    016
   − 00
     160
   − 160
     000
```

The quotient is 105.

Therefore, the number of rows is 105.

Carry out the multiplication of 105 × 32 and verify your answer.

Problem Set 16

1. From a total of 10,000 rupees, Anna donated 7,000 rupees to a school. The remaining amount was to be divided equally among six students as the 'all-round student' prize. What was the amount of each prize ?

2. An amount of 260 rupees each was collected from 50 students for a picnic. If 11,450 rupees were spent for the picnic, what is the amount left over ?

3. A shopkeeper bought a sack of 50kg of sugar for 1750 rupees. As the price of sugar fell, he had to sell it at the rate of 32 rupees per kilo. How much less money did he get than he had spent ?

4. A shopkeeper bought 7 pressure cookers at the rate of 1870 rupees per cooker. He sold them all for a total of 14,230 rupees. Did he get less or more money than he had spent?

5. Fourteen families in a Society together bought 8 sacks of wheat, each weighing 98 kilos. If they shared all the wheat equally, what was the share of each family?

6. The capacity of an overhead water tank is 3000 litres. There are 16 families living in this building. If each family uses 225 litres every day, will the tank filled to capacity be enough for all the families? If not, what will the daily shortfall be?

✦✦✦