13. Multiplication : Part 2

Seven students of Std IV received a scholarship of ₹ 315 each. What was the total amount of the scholarship received by the students ?

We can find the total scholarship amount by multiplying 315 by 7. Let us multiply using the lattice method, keeping in mind that 315 = 300 + 10 + 5.

×	300	10	5
7	2100	70	35

	2100
+	70
+	35
	2205

The total scholarship amount received by the students is ₹ 2205.

Nandu : Tai, last year we learned a different method of multiplying two-digit numbers vertically. Can we use that method here?

Tai : Yes. Let us find 315 × 7 using that method.

Th	H	T	U
	1	3	
	3 ×	1	5 7
2 ←	(2)2	(1)0	(3)5

First, we multiply 5 units by 7 units. The product is 35 units. 35 units = 3 tens + 5 units.

Write these 3T in the carried over tens place.

Now, 1 T × 7 = 7 T. To this, we add the 3 carried over tens. The sum is 10 tens. 10 tens are equal to 1 H + 0 T. Write 0 in the tens place and 1H above the hundreds place.

3 H × 7 = 21 H and 1 H carried over makes 22 H.

22 H = 2 Th + 2 H. Put the 2 Th in the thousands place. Now the digits in the Th, H, T, U places are 2, 2, 0, 5 in that order. The answer is 2205.

Salma : We had to make a thousands place to write this multiplication.

Exercise

Multiply the following.

(1)

Th	H	T	U
	7	4	3
	×		5

(2)

Th	H	T	U
	4	0	9
	×		4

(3)

Th	H	T	U
	3	5	4
	×		9

Amit : We can also multiply two two-digit numbers using this vertical method!

Tai : Yes, you can. Let me show you an example using both methods.

38 × 24

×	30	8
20	600	160
4	120	32

600
+ 160
+ 120
+ 32
912

H	T	U	
1			Carried over after multiplying by tens
	3		Carried over after multiplying by units
	× 3	8	
	2	4	
1	5	2	
+ 7	6	0	
9	1	2	

Sonu : I understood that 38 × 4 = 152. But, I didn't understand how we got the 0 when multiplying by 2 tens.

Tai : That's simple. Multiplying 8 units by 2 tens, we get 16 tens.
16 T = 1 H + 6 T. 6 tens stay in the tens place and 1 hundred is carried over to the next place. Multiplying any number with a ten, the product is always in whole tens. Therefore, we write a 0 in the units place.

Nandu : Tai, I have realized something after studying both methods. In the vertical arrangement, multiplying 38 by 4 units gives us 152; in the lattice method, multiplying 30 and 8 by 4 gives us 120 and 32. The sum of 120 and 32 is also 152!

Tai : Excellent! Did you find out anything else?

Sonu : In the lattice method, we carried out four small multiplications and added them. In the vertical method, we solved two slightly bigger multiplications and added the products. That took less time.

Exercise

1. Multiply.

(1)

Th	H	T	U
		3	7
		× 2	7

(2)

Th	H	T	U
		6	7
		× 9	2

(3)

Th	H	T	U
		6	0
		× 2	4

(4)

Th	H	T	U
		3	8
		× 2	5

(5)

Th	H	T	U
		6	7
		× 9	4

(6)

Th	H	T	U
		6	0
		× 3	4

2. Multiply.

(1) 223 × 3 (2) 127 × 8 (3) 85 × 17 (4) 31 × 26 (5) 26 × 31

3. Solve the problems given below.

(1) Find out the total cost of 3 shirts costing ₹495 each.

(2) Aminabai bought 6 crates of apples, each costing ₹325. How much did she pay altogether?

(3) In a mango grove, there are 45 rows, with 32 trees in each row. How many mango trees are there in the grove?

(4) If one book costs ₹80, how much do 25 such books cost?

(5) Seema bought 2 dresses for ₹695 each. How much did she pay in all ?

(6) If one sack of wheat weighs 53 kilograms, how much do 19 such sacks weigh ?

(7) A car travels a distance of 16 km on one litre of petrol. How many kilometres will it travel on 35 litres?

(8) If 365 trees can be planted on 1 hectare of an orchard, how many trees can be planted on 8 hectares?

Sonu : We can use the vertical arrangement to multiply three-digit numbers by two-digit numbers, can't we?

Tai : Of course, we can. In fact, we can use this method to multiply any number by any number no matter how many digits they have. Let me show you one example. Watch carefully and tell me whether or not you understand.

TTh	Th	H	T	U
		3	5	
		7 ×	0 4	9 6
+ 2	4 8	2 3	5 6	4 0
3	2	6	1	4

Carry over

Nandu : Tai, I understood the entire multiplication. The only new part is that we had to make a place for ten thousands.

Sonu : Just like the last example, when multiplying by 4 tens, we put a 0 in the units place.

Salma : Tai, I have a doubt.

Tai : It is good to have questions in your mind and to ask them. Go ahead.

Salma : Just like this, we can multiply three-digit or four-digit numbers by three-digit numbers. However, carrying over numbers will become more and more difficult.

Tai : Yes. The solution to this is to avoid writing the carried over numbers in the table. Instead, keep the number in your mind and forget it as soon as you have added it. Repeat this with the next number to be carried over. Once you make this a habit you need to write less and you can work faster.

◆ **Multiply 453 × 78.**

4 5 3
× 7 8
3 6 2 4
+ 3 1 7 1 0
3 5 3 3 4

Exercise

1. Multiply.
   (1) 125 × 52 (2) 234 × 65 (3) 598 × 51
   (4) 375 × 40 (5) 650 × 28 (6) 447 × 59
2. Solve the problems given below.
   (1) There are 18 sacks of rice in a van. If each sack weighs 105 kg, what is the total weight of all the sacks ?
   (2) If the cost of 1 chair is ₹750, what is the cost of 24 such chairs?
   (3) Make a two-digit and three-digit number using the digits 5, 6, 7, 8 and 9 only once. Multiply one with the other.