CHAPTER 02

Whole Numbers

Other properties of whole numbers:

COMMUTATIVE PROPERTY

Consider any two whole numbers for example 15 and 51.

When we add these two numbers, we get 66, which is also a whole number.

Let us try changing the order of addition,

51 + 15 again we get the answer 66.

Another **example**,

When we add these two numbers, we get 32 which is also a whole number.

Let us try changing the order of addition,

21 + 11 give us 32 again.

From both these examples, we can see that irrespective of the order we get the same answer.

COMMUTATIVE PROPERTY ON MULTIPLICATION

We can check the same for multiplication too.

Let 10 and 24 be a pair of whole numbers.

Product = 10 x 24 = 240

Or

24 x 10 = 240

Similarly,

6 x 18 = 108 or 18 x 6 = 108

25 x 5 = 125 and 5 x 25 = 125

We can visualize this better with this diagram,

When the sum of two whole numbers remains the same whatever the order they are added, then we say commutative property on addition is satisfied or COMMUTATIVE PROPERTY HOLD GOOD FOR ADDITION.

Hence commutative property on multiplication hold good.

Associative Properties of Addition and multiplication

Consider the example,

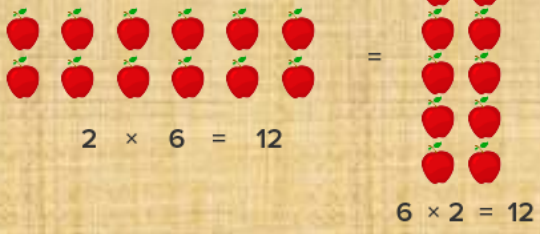
5 + 7 + 2.

I add these numbers in 2 different ways,

Method 1

First, I can add 5 and 7 to get the answer 12.

Then I can 2 to this to get 14.



Method 2

Now I can add 7 and 2 to get a 9 then add 5 to this to get the answer 14.

Whichever way we group these numbers and add them, in both the cases, we get the same answer.

This is called associative property of addition for whole numbers.

Associative property of multiplication

The associative property of whole numbers holds good even for multiplication.

3 x 4 x 5, we can group them in two ways again

(3 x 4) x 5 =12 x 5 = 60 or

3 x (4 x 5) = 3 x 20 = 60

We can another example, 7 x 8 x 9

Method 1

(7 x 8) x 9 = 56 x 9 = 504

Method 2

7 x (8 x 9) = 7 x 72 = 504

This is associative property of multiplication for whole numbers.

We shall now see how these two properties can be applied while solving problems.

Example 1

Find 96 + 27 + 4.

Solution:

We can group 27 and 4, to begin with

That gives 96 + (4 + 27) we have applied the commutative property in this case.

Now we will be applying the associative property.

96 + 4 + 27.

Now it is 100 + 27 answer is 127.

Example 2:

Find the product of 2 x 3 x 5 x 6 x 5.

Solution:

2 x 3 x 5 x 7 x 6 x 5.

We can regroup by applying commutative property, so we can write as,

= (2 x 5) x 3 x (6 x 5) x 7

= 10 x 3 x 30 x 7

= 30 x 210

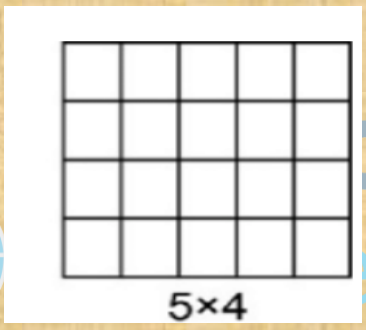
= 6300

DISTRIBUTIVE PROPERTY

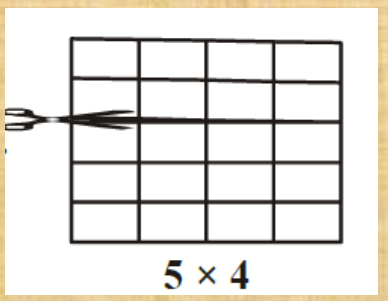
DISTRIBUTIVE PROPERTY OF MULTIPLICATION OVER ADDITION

Before we dive into this, let us do a simple activity that will help us understand the property,

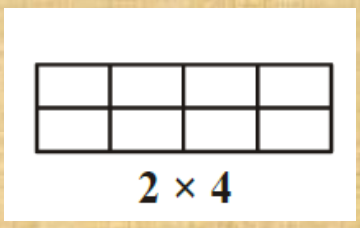
For the activity, we will need a grid paper of five rows and 4 columns and scissors.

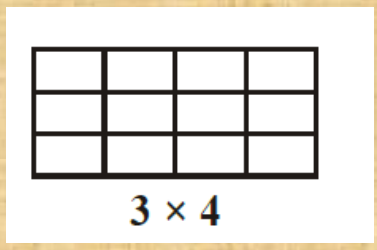


Cut the grid at the second row.

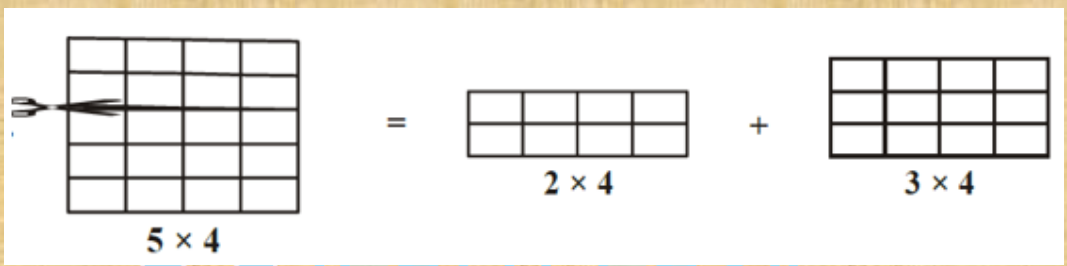


Now we get two parts of this grid paper.





We got these two pieces from the original sheet.



How can represent this as an arithmetic expression?

Let us see,

We can write the left-hand side of the equal sign also in a different way.

We get to answer 20 again.

Let us try another example,

(2 + 5) x 8 = 7 x 8 = 56

2 x 8 + 5 x 8 = 16 + 40 = 56

This property is called as distributed property of multiplication over addition. Here the number 8 is being distributed.

Example 3

Find 10 x 15 using the distributive property.

Identity for addition and multiplication.

When you add 8 and 5, you get a new whole number that is 13. The addition of two whole number gives a new whole number. But is this always so for all whole numbers?

8 + 5 = 13, a whole number.

Observe the table,

2	+	0	=	2
11	+	0	=	11
0	+	15	=	15
0	+	66	=	66

When we add zero to any other whole number in all these examples, we get the original whole number and not a new number.

Hence ZERO IS CALLED THE ADDITIVE IDENTITY OF WHOLE NUMBERS.

Similarly, how can we find the multiplicative identity? Such that if we multiply two whole numbers, we should get back the original number. You can check with these examples.

We can see 1 is the multiplicative identity for whole numbers.

Hence 1 IS THE MULTIPLICATIVE IDENTITY for WHOLE NUMBERS.

6	X	1	=	6
21	X	1	=	21
1	X	15	=	15
1	X	66	=	66