Unit 14. Commutative and Non-commutative Properties of x and ÷

National Curriculum Requirement

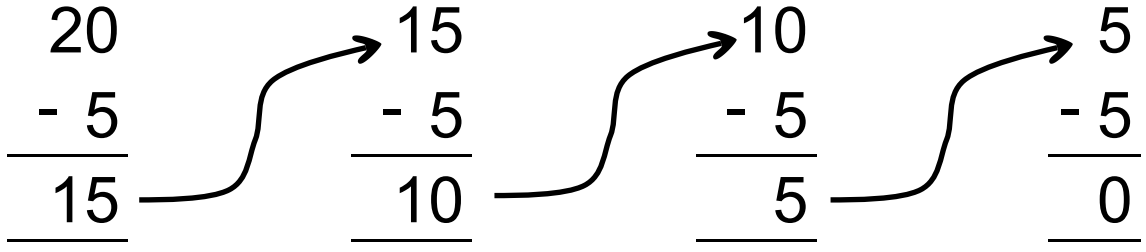
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Notes

This is definitely a topic that needs explaining. Pupils need to remember that the position of a pair of numbers multiplied together does not matter - e.g. 2 x 5 = 5 x 2. But this is not the case with division and 6 ÷ 2 ≠ 2 ÷ 6.

For many pupils simply saying that this is the case will probably suffice as an explanation. But it doe give the opportunity to talk about multiplication being repeated addition - e.g. 3 x 2 = 2 + 2 + 2 and division being repeated subtraction e.g. 6 ÷ 2 = 3 and the 3 is the number of times that 2 can be subtracted from 6.

The latter of these two processes does give pupils a method of doing division. Suppose, for example, a pupil wanted to do the division 20 ÷ 5, they could find the answer by repeatedly subtracting 5 from 20 until they reached zero.



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Here are the 2 and 5 times tables. These show that:

$$5 \times 2 = 2 \times 5$$

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10
6 x 2 = 12
7 x 2 = 14
8 x 2 = 16
9 x 2 = 18
10 x 2 = 20

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25
6 x 5 = 30
7 x 5 = 35
8 x 5 = 40
9 x 5 = 45
10 x 5 = 50

In the same way, complete the two values on the next two pages that show that when you multiply (times), numbers can change positions.

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Here are the 2 and 10 times tables. These show that:

_____

can change their position but still give the same answer

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10
6 x 2 = 12
7 x 2 = 14
8 x 2 = 16
9 x 2 = 18
10 x 2 = 20

1 x 10= 10
2 x 10 = 20
3 x 10 = 30
4 x 10= 40
5 x 10 = 50
6 x 10 = 60
7 x 10 = 70
8 x 10 = 80
9 x 10 = 90
10 x 10 = 100

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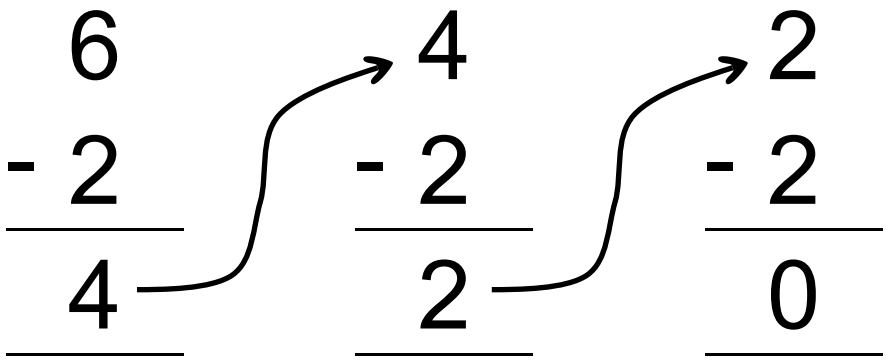
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8 x 10 = 80
9 x 10 = 90
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When we divide, we really are finding the number of times the number which we are dividing by can be taken away from the number into which we are dividing. If we divide 6 by 3, for example we get:

$$6 \div 2 = 3$$

The answer of 3 is the number of times which we can take 2 away from 6.



As we can see, we can take 2 away from 6 three (3) times. This shows that $6 \div 2 = 3$.

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But if we were to change the positions of the 6 and the 2 like this:

$$2 \div 6$$

we do not get the answer 3.

We can see that it is impossible to take 6 away from 2 three (3) times.

$$\begin{array}{r} 2 \\ -\ 6 \\ \hline \\ \hline \end{array}$$

It does not matter about the position of the numbers when we multiply (times).

$$2 \times 5 = 5 \times 2$$

But this is not true when we divide and for example, $6 \div 2$ is NOT THE SAME as $2 \div 6$

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