

## FACTORS

Every number has factors. The following examples show what is meant by factors.

What are the **factors of 6**?

6 can be made up of  $1 \times 6$  and  $2 \times 3$

So, we say that 1, 2, 3 and 6 are the factors of 6.

What are the **factors of 42**?

$$1 \times 42$$

$$2 \times 21$$

$$3 \times 14$$

$$6 \times 7$$

So, we say that 1, 2, 3, 6, 7, 14, 21 and 42 are the factors of 42.

What are the **factors of 60**?

$$1 \times 60$$

$$2 \times 30$$

$$3 \times 20$$

$$4 \times 15$$

$$5 \times 12$$

$$6 \times 10$$

So, we say that 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, and 60 are the factors of 60.

### Remember

A number is a factor of another number if it divides into that number without a remainder.

If you have an **even** number, 2 will divide into it without a remainder. If the number ends in 0 or 5, then 5 will divide into it (without a remainder, of course).

## MULTIPLES

If we look at the multiples of 3, we see that they are:-

3, 6, 9, 12, 15, 18, 21 ...

The multiples of 5 are:-

5, 10, 15, 20, 25, 30 ...

If you work out the multiples of the numbers from 2 to 10, you have, in fact, drawn a multiplication table!

**Exercise 1**

Please put in the correct number where the ? appears.

1	2	3	4	5	6	7	8	9	10
2	4	?	8	10	12	?	16	18	20
3	?	9	12	15	18	21	?	27	30
4	8	12	16	?	24	28	32	36	?
5	10	15	?	25	30	35	?	45	50
6	?	18	24	?	36	42	48	?	60
7	14	21	28	35	?	49	?	63	?
8	?	?	32	?	?	56	?	?	?
9	18	?	36	45	?	?	?	?	90
10	20	?	?	?	?	?	?	?	?

**PRIME NUMBERS**

The following are prime numbers:-

2, 3, 5, 7, 11, 13, 17, 19 .....

There are MANY MORE!

2 is the only even prime number

So, a prime number can be described as a number which can only be divided by 1 and itself.

**Example 1**

$$\begin{array}{r} 7 \overline{)7} \\ 1 \end{array}$$

and

$$\begin{array}{r} 2 \overline{)2} \\ 1 \end{array}$$

Seven goes into seven once

two goes into two once

BUT

$$\begin{array}{r} 2 \overline{)14} \\ 7 \overline{)7} \\ 1 \end{array}$$

14 can be divided by 2 and 7  
so 14 is not a prime number

**Exercise 2**

Write down which of these you think are prime numbers;

- |    |    |    |    |    |
|----|----|----|----|----|
| 3  | 9  | 12 | 15 | 17 |
| 20 | 21 | 23 | 27 | 29 |

Breaking down numbers into prime factors

Keep looking at your list of prime numbers!

### Example 2

Express 12 as a product of its primes. (When you reach 1, you have finished).

$$\begin{array}{r} 2 \overline{) 12} \\ 2 \overline{) 6} \\ 3 \overline{) 3} \\ \underline{\quad} 1 \end{array} \quad \text{Therefore, } 12 = 2 \times 2 \times 3$$

Or we say that 12 is a product of 2, 2 and 3.

If a number is multiplied by itself once, we say that the number is “SQUARED”, so the answer here could also be:-

$$12 = 2^2 \times 3$$

You will be shown how to do this type of question in the pack on INDICES.

### Example 3

Express 132 as the product of its primes

$$\begin{array}{r} 2 \overline{) 132} \\ 2 \overline{) 66} \\ 3 \overline{) 33} \\ 11 \overline{) 11} \\ \underline{\quad} 1 \end{array} \quad \begin{array}{l} \text{OR} \\ \text{OR} \end{array} \quad \begin{array}{l} 132 = 2 \times 2 \times 3 \times 11 \\ 132 \text{ is the product of } 2, 2, 3 \text{ and } 11 \\ 132 = 2^2 \times 3 \times 11 \end{array}$$

### Example 4

Express 210 as the product of its primes

$$\begin{array}{r} 2 \overline{) 210} \\ 3 \overline{) 105} \\ 5 \overline{) 35} \\ 7 \overline{) 7} \\ \underline{\quad} 1 \end{array} \quad \begin{array}{l} \text{Therefore,} \\ \text{OR} \end{array} \quad \begin{array}{l} 210 = 2 \times 3 \times 5 \times 7 \\ 210 \text{ is the product of } 2, 3, 5 \text{ and } 7 \end{array}$$

Now try these (using the same method).

### Exercise 3

1. 24
2. 36
3. 50
4. 100
5. 144

## ANSWERS

### MULTIPLES

#### Exercise 1

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

### PRIME NUMBERS

#### Exercise 2

3            17            23            29

### EXPRESSING A NUMBER AS A PRODUCT OF ITS PRIMES

#### Exercise 3

1.  $2 \times 2 \times 2 \times 3$
2.  $2 \times 2 \times 3 \times 3$
3.  $2 \times 5 \times 5$
4.  $2 \times 2 \times 5 \times 5$
5.  $2 \times 2 \times 2 \times 2 \times 3 \times 3$