



Year 7 higher topic 2

Number skills

What careers would use these skills?

Banking, accounting, engineering, scientist, aeronautical science, medical engineering, microbiologist, sports analyst, travel agent, astronomer, formula 1 teams

Multiples

The result of multiplying a number by an integer. The **times tables** of a number.

The first five multiples of 7 are: 7, 14, 21, 28, 35

Factors

A number that **divides exactly** into another number without a remainder it is useful to write factors in pairs.

The factors of 18 are: 1, 2, 3, 6, 9, 18

The factor pairs are: 1 & 18, 2 & 9, 3 & 6

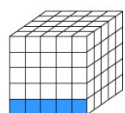
Square numbers

A number which can be represented in the shape of a square and a number that results from multiplying an integer by itself.

$4 = 2^2$ or $2 \times 2 = 4$
 $9 = 3^2$ or $3 \times 3 = 9$
 $16 = 4^2$ or $4 \times 4 = 16$

Cube numbers

A number raised to the third power which is indicated by a small 3 to its upper-right.



EXAMPLES: $2^3 = 2 \times 2 \times 2 = 8$
 $5 \times 5 \times 5 = 125$
 so $5^3 = 125$

Multiplying

Multiply by the digit in:

$$\begin{array}{r} 43864 \\ \times 423 \\ \hline 131592 \\ 877280 \\ 17545600 \\ \hline 18554472 \end{array}$$

Zero or blank space may be used as placeholders.

Add the results $43,864 \times 423 = 18,554,472$

Numbers are written underneath each other according to their place value. The numbers are multiplied vertically, starting with the ones column then moving left column by column.

The multiplication lines are then added together to give the final answer.

Dividing

$$\begin{array}{r} 37 \overline{)85434} \\ 74000 = 2000 \times \\ 11434 \\ 7400 = 200 \times \\ 4034 \\ 3700 = 100 \times \\ 334 \\ 296 = 8 \times \\ 38 \\ 37 = 1 \times \\ \hline 2309 \text{ r } 1 \end{array}$$

Powers and roots

The number of times a base number is multiplied by itself indicated by a small number to its upper-right e.g. $10^5 = 10 \times 10 \times 10 \times 10 \times 10$, read as 10 to the power of 5. The small number is called a power, an exponent, an index or order.

$5^4 = 5 \times 5 \times 5 \times 5 = 625$
 base power, index, exponent or order expanded value

BIDMAS

An acronym for the **order** you should do calculations in.

BIDMAS stands for 'Brackets, Indices, Division, Multiplication, Addition and Subtraction'.

Indices are also known as 'powers' or 'orders'.

Eg. $5^2 = 25$ where the 2 is the index/power

$6 + 3 \times 5 = 21$ not 45

Prime numbers

A number with **exactly two factors**. A number that can only be divided by itself and one. The number 1 is **not prime**, as it only has one factor, not two. The first ten prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Using negative numbers



Addition (+) Use the larger number and its sign, subtract

Positive + Positive = Positive

Negative + Negative = Negative

Positive + Negative or Negative + Positive

Subtraction (-) Use the larger number and its sign, subtract

Negative - Positive = Negative

Positive - Negative = Positive

Negative - Negative = Negative + Positive

Multiplication (x) Change double negatives to a positive

Positive x Positive = Positive

Negative x Negative = Positive

Negative x Positive = Negative

Positive x Negative = Negative

Division (÷) Change double negatives to a positive

Positive ÷ Positive = Positive

Negative ÷ Negative = Positive

Negative ÷ Positive = Negative

Positive ÷ Negative = Negative

Lowest Common Multiple (LCM)

The **smallest** number that is in the **times tables** of each of the numbers given. The LCM of 3, 4 and 5 is 60 because it is the smallest number in the 3, 4 and 5 times tables.

Highest Common Factor (HCF)

The **biggest** number that **divides exactly** into two or more numbers.

The HCF of 6 and 9 is 3 because it is the biggest number that divides into 6 and 9 exactly.

Prime factors

A factor which is a prime number.

The prime factors of 18 are: 2, 3

Finding out which **prime numbers multiply** together to make the **original** number.

Use a **prime factor tree**.—also known as 'prime factorisation'.

