GCSE Maths – Algebra

Simplifying Expressions

Notes

WORKSHEET

Simplifying Expressions

This topic uses our knowledge that we have gathered from previous subtopics such as **collecting terms** and **rules of indices** to help us to simplify expressions.

Whenever there are complicated expressions:

- First have a look at the expression and **make a mental note of the different terms involved**. This will help with **collection of like terms** after simplification.

- **BIDMAS** must be followed so you must deal with things in this order:

Brackets, Indices, Division, Multiplication, Addition, Subtraction

Example: Simplify the expression $32ab^2 + 2a - 4 \times 3 \times b \times a$

1. **Identify** the different terms that the expression contains.

2. Simplify the expression using **BIDMAS**.

   $32ab^2 + 2a - 4 \times 3 \times b \times a$ can be simplified to $32ab^2 + 2a - 12ab$. It is standard to write the algebra in alphabetical order - so we write $12ab$ rather than $12ba$.

   $32ab^2 + 2a - 12ab$ **cannot** be **simplified** any further than this because there are no terms which we can combine.

Example: Simplify the expression $82 - 4cd - 8d \times c + 72abc \times c^4 \times d$

1. **Identify** the different terms that the expression contains.

2. Simplify the expression using **BIDMAS**.

   $82 - 4cd - 8d \times c + 72abc \times c^4 \times d$ can be simplified to $82 - 4cd - 8cd + 72abc^5d$

   In the step above, we multiplied the $-8d$ with c to get $-8cd$.

   The term $+ 72abc \times c^4 \times d$ *becomes* $+72abc^5d$ as we ADD powers if they have the same base. So, we use $c \times c^4 = c^{1+4} = c^5$.
   See **Law of Indices Revision Notes** for help with this.

   $82 - 4cd - 8cd + 72abc^5d$ **CAN** actually be further simplified…

3. **Collect** like terms.

$$82 - 4cd - 8cd + 72abc^5d = \mathbf{82 - 12cd + 72abc^5d}$$

Simplifying Expressions – Practice Questions

1. Simplify the following expressions:

   a) $34pq + 6 - 4p \times q + q^2$

   b) $79 + 97kl \times m + 5m^5 + 101klm$

   c) $62 + 22w - 82z - 113 + \left(\frac{16w^3}{4w^2}\right) + 51$

   d) $50g^4 + 82efg + \left(\frac{39g^3 \times g^2}{13g}\right) - 16eg \times f - 85 + 17 + 6$

   e) $52s^4 + \left(\frac{16s^4t^3}{4t^3}\right) + 256s^3 + \left(\frac{84s^5z^6}{6z^6}\right) + 97s^5 - 91 + 12345s^2 \times s \times s + 1$

Worked solutions for the practice questions can be found amongst the worked solutions for the corresponding worksheet file.