

AQA Level 2 Further mathematics Number & algebra

Section 1: Basic number and algebra

Crucial points

1. **Make sure you are confident in basic number work**

In particular, you need to be able to work with fractions, decimals, percentages and ratio fluently. Fractions in particular are very important, as understanding of numerical fractions is key to successful work with algebraic fractions, which are covered in the next section.

2. **Make sure that you are not making basic errors**

Errors in algebra are very common. Sometimes these are just careless mistakes, but sometimes you may make errors because you have not understood a technique correctly. If you have problems with any technique in this section of work, read the worked examples very carefully and make sure that you understand each step. If you are not sure, make sure that you consult a teacher.

3. **When multiplying out brackets, make sure that you know how many terms there should be**

You can find out how many by multiplying together the number of terms in each bracket, so that you know that you have not missed any.

4. **Make sure you can write surds in their simplest form**

Try to get into the habit of writing surds in terms of the simplest surd possible whenever you can – it usually makes them easier to work with.

e.g. write $\sqrt{8}$ as $2\sqrt{2}$
write $\sqrt{12}$ as $2\sqrt{3}$

5. **Be careful when multiplying surds**

Remember that when you are multiplying two expressions involving surds together, you must use brackets and treat them in the same way as you would an algebraic expression – each term in one bracket must be multiplied by each term in the other.

✗ Wrong $(1 + \sqrt{2})(3 - \sqrt{2}) = 3 - (\sqrt{2})^2$
 $= 3 - 2$
 $= 1$ **✗**

✓ Right $(1 + \sqrt{2})(3 - \sqrt{2}) = 3 - \sqrt{2} + 3\sqrt{2} - (\sqrt{2})^2$
 $= 3 + 2\sqrt{2} - 2$
 $= 1 + 2\sqrt{2}$ **✓**

AQA FM Number and algebra 1 Crucial points

6. Take care when rationalising the denominator

Remember that when you are rationalising a denominator you must multiply top and bottom by the same expression.

✗ Wrong

$$\frac{2+\sqrt{3}}{1-\sqrt{2}} = \frac{(2+\sqrt{3})(2-\sqrt{3})}{(1-\sqrt{2})(1+\sqrt{2})} \quad \text{✗}$$

✓ Right

$$\frac{2+\sqrt{3}}{1-\sqrt{2}} = \frac{(2+\sqrt{3})(1+\sqrt{2})}{(1-\sqrt{2})(1+\sqrt{2})} \quad \text{✓}$$

This cannot be right because you have multiplied the top and bottom by different things, so the RHS of the equation cannot equal the LHS.

Here the top and bottom are both multiplied by the same thing, which is the same as multiplying by 1, so the RHS still equals the LHS and the equation still holds