

## Section 3: Inequalities and indices

### Crucial points

1. **Be careful when writing an inequality the other way round**

Make sure that you reverse the inequality sign if you want to write the inequality the other way round.

**✗ Wrong:**  $3 < 2x + 1$   
 $2x + 1 < 3$  ✗

**✓ Right:**  $3 < 2x + 1$   
 $2x + 1 > 3$  ✓

2. **Be careful when multiplying an inequality**

Make sure that you reverse the inequality sign if you multiply by a negative number.

**✗ Wrong:**  $-x < 3 - 2x$   
 $x < -3 + 2x$  ✗

**✓ Right:**  $-x < 3 - 2x$   
 $x > -3 + 2x$  ✓

Multiply both sides by -1

Multiply both sides by -1  
and reverse the inequality

3. **Be careful when dividing an inequality**

Make sure that you reverse the inequality sign if you divide by a negative number.

**✗ Wrong:**  $-2x \geq 6x + 4$   
 $x \geq -3 - 2$  ✗

**✓ Right:**  $-2x \geq 6x + 4$   
 $x \leq -3 - 2$  ✓

Divide both sides by -2

Divide both sides by -2 and  
reverse the inequality

4. **Sketching a graph or using a number line can help solve inequalities**

When dealing with a quadratic inequality, always sketch a graph or a number line so that you can be sure that you are selecting the correct part as the solution.

## AQA FM Further algebra 3 Crucial points

### 5. Make sure that the solution is the correct range of values!

With quadratic inequalities, make sure that you express the solution set correctly as either one range of values or two.

If the solution is all values between  $-2$  and  $1$ :

**✗ Wrong:**  $-2 < x \text{ or } x < 1$  ✗

This is wrong, as both must be true

**✓ Right:**  $-2 < x < 1$  ✓

If the solution is all values less than  $-2$  or greater than  $1$ :

**✗ Wrong:**  $1 < x < -2$  ✗

This is wrong as there are no values greater than  $1$  and less than  $-2$ !

**✓ Right:**  $x < -2 \text{ or } x > 1$  ✓

### 6. Make sure you use the law of indices in appropriate situations

Remember you cannot apply the laws of indices to the sum or difference of two expressions involving indices (although you may be able to simplify in another way.)

**✗ Wrong**  $a^2 + a^5 = a^7$  ✗

**✓ Right**  $a^2 + a^5 = a^2(1 + a^3)$  ✓

### 7. Look at the base

Make sure that you only apply the first two laws of indices to expressions with the same base

**✗ Wrong**  $2^2 \times 3^5 = 6^7$  ✗

**✓ Right**  $2^2 \times 2^5 = 2^7$  ✓

### 8. Remember the value of $a^0$

$a^0$  is always  $1$ , for any value of  $a$

### 9. When evaluating expressions, don't make it harder than necessary

When working out an expression like  $4^{\frac{5}{2}}$ , which involves taking the square root and raising to the power  $5$ , make it easy by working out the square root first. If you work out  $4$  to the power of  $5$  first (without a calculator), then you will waste a lot of time and probably be unable to then find the square root.