

## Section 2: Composite and inverse functions

### Crucial points

1. **For composite functions, make sure you are applying the functions in the right order**

Be careful to apply functions in the correct order when finding composite functions. Remember that the function  $fg$  means “first apply  $g$ , then apply  $f$  to the result”.

2. **Remember: only a one-to-one function has an inverse function**

Sometimes you can define a function with a restricted domain so that it does have an inverse function: for example,  $f(x) = x^2$  is a many-to-one function for  $x \in \mathbb{R}$ , and so does not have an inverse, but if the domain is restricted to  $x \geq 0$ , then the function is one-to-one and the inverse function  $f^{-1}(x) = \sqrt{x}$

3. **When finding the domain or range for  $f^{-1}$ , look at the limits of the original function**

Notice that the domain of an inverse function  $f^{-1}$  is the same as the range of  $f$ , and the range of  $f^{-1}$  is the same as the domain of  $f$ .