

Algebra - Factorising

Factorising algebraic expressions can be tricky at first. It can be hard to remember what factorising actually means. The clue is in the name - to factorise an expression you pull out the common factors of all the terms in your expression (a common factor is something that will go into all of the terms). You put these common factors outside of a bracket. The remnants of your expression then goes inside the bracket. When factorising an expression your answer will always include brackets.

Worked example:

Factorise the following expression:

$$2x + 6$$

Step 1 - find the highest common factor of both terms in your expression. In this case $2x$ and 6 are the terms, so the highest common factor is 2 . Place the 2 on the outside of a set of brackets...

$$2(\quad + \quad)$$

Step 2 - next you need to work out what goes inside the bracket. To do this you need to think about what you need to multiply 2 by to get $2x$ (this will be your first term in the bracket), and what you need to multiply 2 by to get 6 (this will be your second term in the bracket). You know that the first term is x (because 2 multiplied by x gives you $2x$) and the second term is 3 (because 3 multiplied by 2 gives you 6). So your final answer is:

$$2(x + 3)$$

Factorising is basically going in the opposite direction to multiplying out brackets (see our separate guide on expanding brackets if you're unsure about this). So, you can always check you have the correct answer by multiplying out the brackets of your answer. If you get the same expression as the original question then you know you're correct!

Letters as common factors

Common factors can be letters as well as numbers. If you have the same letter in each of the terms in your expression then you can pull that letter out as a common factor as well.

Worked example:

Factorise the following expression:

$$3xy - 9x$$

Step 1 - Again look for the highest common factor of the numbers, which in this case is 3 . Also look for common letters in both terms - in this case the x . Place the 3 and the x on the outside of a set of brackets...

$$3x(\quad - \quad)$$

Step 2 - Do the same process as above to work out what is left in the brackets. So the answer is...

$$3x(y - 3)$$

Practice Questions

Factorise the following expressions:

1. $4x + 12$

2. $3a - 15$

3. $5b + 30$

4. $14 - 7y$

5. $16 - 8x$

6. $6xy - 12y$

7. $2ab + 8b$

8. $3xyz + 21xy$

9. $20ab - 25ab$

10. $7xy + 42x$