Factorising: fact sheet

Algebra · Planner week 8 · Work out which type it is, follow the example

1 Take out a number

Factorise $6x - 15$

×	$2x$	-5
3	$6x$	-15

1. What is the **biggest number** that goes into 6 and 15? write 3( )
2. What do I times 3 by to get $6x$? **$2x$**. What do I times 3 by to get -15? **-5**
3. = **$3(2x - 5)$**. Check: expand it back

Use this when: the terms share a number

2 Factorise fully

Factorise fully $9x^2 + 6x$

×	$3x$	$+2$
$3x$	$9x^2$	$6x$

1. What is the biggest number that goes into 9 and 6? **3**. Is there a letter in every term? **x**. Write $3x$( )
2. What do I times $3x$ by to get $9x^2$? **$3x$**. To get $6x$? **2**
3. = **$3x(3x + 2)$**

Use this when: "factorise **fully**", or every term has a letter

3 Quadratics

Factorise $x^2 + 4x + 3$

multiply to **3**: 1×3

add to **4**: $1 + 3$

1. Which two numbers **multiply** to make 3?
2. Do they **add** to make 4? 1 and 3: yes
3. = **$(x + 1)(x + 3)$**

Use this when: there is an x^2, an x and a number

The big question

Is there a **bracket** to multiply out (**expand**), or do I need to put a bracket **back in** (**factorise**)?

Draw a **grid** every time: the number outside goes on the side, the terms inside go on top.

Watch out

- Not taking out the **biggest** factor: $3(3x^2 + 2x)$ is not fully factorised.
- Leaving a term out of the bracket.
- Mixing up the signs inside the bracket.
- Always check by expanding your answer.

Key words

- **Factorise**: put the brackets back in
- **Factor**: divides in exactly
- **HCF**: the biggest factor they share

Exam tips

- Find the **HCF** of the numbers first.
- "Fully": is there a **letter** in every term too?
- Quadratics: two numbers that **multiply** to the number and **add** to the x number.