

Expanding Factorising Quadratics

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Expand and simplify $(x + 3)(x + 5)$.

Step 1 · Four products

$$x^2, 5x, 3x, 15$$

Step 2 · Collect like terms

$$x^2 + 8x + 15$$

Answer: $x^2 + 8x + 15$

Check: $x = 1$: $4 \times 6 = 24$ and $1 + 8 + 15 = 24$ ✓

2. Now try one with the steps

Factorise $x^2 + 2x - 15$.

Step 1 · Multiply to -15 and add to $+2$

Step 2 · Write the brackets

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Expand $3(x + 4)$. [1]

2. Factorise $6x + 9$. [1]

3. Expand and simplify $(x + 3)(x + 5)$. [2]

4. Expand and simplify $(x - 4)(x + 2)$. [2]

5. Expand and simplify $(x + 6)^2$. [2]

6. Factorise $x^2 + 7x + 12$. [2]

7. Factorise $x^2 - 5x - 14$. [2]

8. Factorise $x^2 - 8x + 16$. [2]

9. Factorise $x^2 - 25$. [1]

10. Factorise $x^2 + 5x$. [1]

11. Expand and simplify $(2x - 3)(x + 4)$. [2]

12. Factorise fully $2x^2 + 10x + 12$. [3]

13. Factorise $6x^2 + 11x + 3$. [3]

14. Factorise $4x^2 - 9$. [2]

15. Factorise $3x^2 - 10x - 8$.

[3]

4. Before you hand it in

$(x + 3)^2 = x^2 + 9$

$(x + 3)^2 = (x + 3)(x + 3) = x^2 + 6x + 9$. There is a middle term $2 \times 3x$.

$x^2 + 2x - 15 = (x - 5)(x + 3)$

Expanding gives $x^2 - 2x - 15$. The pair must ADD to +2: +5 and -3, so $(x + 5)(x - 3)$. Always expand to check.

$x^2 + 25 = (x + 5)(x - 5)$

$(x + 5)(x - 5) = x^2 - 25$. $x^2 + 25$ does not factorise.

$2x^2 + 10x + 12 = (2x + 4)(x + 3)$

That is correct but not FULLY factorised: $2x + 4 = 2(x + 2)$, so the answer is $2(x + 2)(x + 3)$.