

Factorising

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Factorise $12x + 18$

Step 1 · Find HCF of 12 and 18

$$\text{HCF}(12, 18) = 6$$

Step 2 · Divide each term by 6

$$12x \div 6 = 2x \quad 18 \div 6 = 3$$

Step 3 · Write with factor outside bracket

$$6(2x + 3)$$

Step 4 · Check by expanding

$$6 \times 2x + 6 \times 3 = 12x + 18 \checkmark$$

Answer: $6(2x + 3)$

Check: $6(2x+3) = 12x+18 \checkmark$

2. Now try one with the steps

Factorise $x^2 + 2x - 15$

Step 1 · Find two numbers that $\times$ to -15 and $+$ to 2

Step 2 · Check: $5 \times (-3) = -15 \checkmark$ and $5 + (-3) = 2 \checkmark$

Step 3 · Write

Step 4 · Verify

Answer:

3. Practice

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

1. Factorise: $8x + 12$ [1]

2. Factorise: $15a - 10$ [1]

3. Factorise: $x^2 + 7x + 12$ [2]

4. Factorise: $x^2 - 5x + 6$ [2]

5. Factorise: $x^2 - 16$ [2]

6. Factorise: $x^2 + 3x - 10$ [2]

7. Factorise: $5x + 20$ [1]

8. Factorise: $x^2 + 4x$ [1]

9. Factorise: $6y - 9$ [1]

10. Factorise: $x^2 + 8x + 15$ [2]

11. Factorise fully: $12a^2 + 8a$ [2]

12. Factorise: $x^2 - 2x - 8$ [2]

13. Factorise: $x^2 - 49$ [2]

14. Factorise: $x^2 - 10x + 25$ [2]

15. Factorise fully: $3x^2 - 12$ [3]

16. Factorise fully: $2x^2 + 14x + 24$ [3]

4. Before you hand it in

Factorising $6x + 9$ as $3(2x + 3)$ (not dividing both terms by HCF)

Both terms inside must be divided by the HCF. $6x \div 3 = 2x$ and $9 \div 3 = 3$. So $6x + 9 = 3(2x + 3)$. Always check by expanding.

For $x^2 + 5x + 6$, writing $(x + 2)(x + 3)$ but not checking

Always expand your factorisation to verify: $(x+2)(x+3) = x^2+3x+2x+6 = x^2+5x+6$ ✓. Expanding is the check.

$x^2 - 9 = (x - 3)^2$ or $(x - 3)(x - 3)$

$x^2 - 9 = x^2 - 3^2 = (x+3)(x-3)$. Note one bracket has + and the other has -. $(x-3)^2 = x^2 - 6x + 9$, which is different.