

WA8MNAA3

Algebraic techniques

Core + Challenge

Factorising with a Common Factor

I can factorise expressions by taking out the highest common factor, including negative factors, and check by expanding.

Name: _____ Date: _____ Score: _____ / 58

Key idea

Factorising is the reverse of expanding: write the expression as a product. $6x + 15 = 3(2x + 5)$

Find the HCF of the numbers and pronumerals, and write it outside. $8a^2 + 12ab$: HCF $4a$, so $4a(2a + 3b)$

Check by expanding: $4a(2a + 3b) = 8a^2 + 12ab$ ✓. Always take out the **highest** common factor.

Negative common factor: if the first term is negative, take out a negative. $-6m - 9 = -3(2m + 3)$

A

Fluency *practise the skill*

/ 16 marks

Q1–4: find the highest common factor. Q5–15: factorise fully. Q16: fill the box. 1 mark each.

1. HCF of 12 and 18 _____

9. $x^2 + 7x$ _____

2. HCF of $8x$ and 20 _____

10. $6p^2 - 9p$ _____

3. HCF of $6a^2$ and $9a$ _____

11. $4ab + 10a$ _____

4. HCF of $10mn$ and $15n^2$ _____

12. $12xy - 18y^2$ _____

5. $3x + 12$ _____

13. $-5k - 15$ _____

6. $5a - 20$ _____

14. $-8x + 12$ _____

7. $8m + 12$ _____

15. $9a^2 + 6ab - 3a$ _____

8. $14 - 21y$ _____

16. $6x + 15 = 3(\square + 5)$ _____

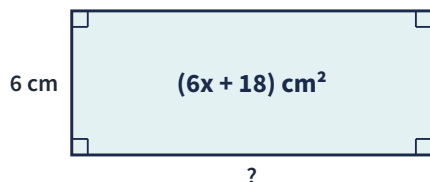
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B

Core *apply the skill to problems*

/ 22 marks

- 1 This rectangle has area $(6x + 18) \text{ cm}^2$ and width 6 cm. Factorise the area to find its length. [2 marks]



Answer: _____

- 2 Factorise fully $20a - 30b + 10$ [2 marks]

Answer: _____

- 3 Factorise $7m^2 - 14mn$, then check your answer by expanding. [2 marks]

Answer: _____

- 4 Use factorising to calculate $17 \times 23 + 17 \times 77$ without a calculator. [2 marks]

Answer: _____

- 5 A netball club buys 12 adult tickets at \$a each and 12 child tickets at \$c each. Write the total cost, factorise it, and explain what the bracket means. [2 marks]

Answer: _____

- 6 Factorise fully, taking out a negative factor: $-12x^2 - 8x$ [2 marks]

Answer: _____

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- 7 A rectangle has area $(15a^2 + 10ab) \text{ cm}^2$. One side is $5a \text{ cm}$. Find the other side, then write a simplified expression for the perimeter. [3 marks]

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Answer: _____

- 8 Fill in the brackets: $18pq - 24p = 6p(\square - \square)$ [2 marks]

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Answer: _____

- 9 The outside surface area of a closed cylinder is $2\pi r^2 + 2\pi rh$. Factorise this expression fully. [2 marks]

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Answer: _____

- 10 The perimeter of a rectangular garden bed is $(8x + 14) \text{ m}$. Factorise the perimeter, and use it to write the sum of the length and the width. [3 marks]

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Answer: _____

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Kayla factorised $12x + 16$ as $2(6x + 8)$. Explain why this is not fully factorised, and give the correct answer. [2 marks]

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- 2 Sam says $3x(2x - 5)$ is the factorised form of $6x^2 - 15$. Check by expanding, and give the correct factorisation. [2 marks]

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- 3 True or false: $-2a + 8 = -2(a - 4)$. Explain. [2 marks]

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- 4 Explain why $x^2 + 5x$ can be factorised using a common factor, but $x^2 + 5$ cannot. [3 marks]

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D Challenge *multi-step and problem-solving*

/ 11 marks

- 1 Factorise by taking out a common bracket: (a) $a(b + 3) + 5(b + 3)$ (b) $2x(y - 1) - 3(y - 1)$ [3 marks]

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Answer: _____

- 2 Evaluate $999 \times 47 + 47$ without a calculator. [2 marks]

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Answer: _____

- 3 Use factorising to show that (a) the sum of any three consecutive whole numbers is a multiple of 3, and (b) the sum of any five consecutive odd numbers is a multiple of 5. [3 marks]

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Answer: _____

- 4 Factorise fully $24a^3b^2 - 36a^2b^3 + 12a^2b^2$ [3 marks]

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Answer: _____

How did I go?Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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