



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Expressions, Substitution & Simplifying · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Expressions, Substitution & Simplifying

Total marks available: 102

● Expressions, Substitution & Simplifying

✓ $(n + 4)(n - 1)$

Q1 · ● Developing · 3 marks

METHOD

Find two numbers that multiply to -4 and add to 3 : 4 and -1

Answer: $(n + 4)(n - 1)$

✓ $20y^2 + 11y - 3$

Q2 · ● Developing · 4 marks

METHOD

$$\begin{aligned} &= 5 \times 4y^2 + 5 \times 3y - 1 \times 4y - 1 \times 3 \\ &= 20y^2 + 15y - 4y - 3 \\ &= 20y^2 + 11y - 3 \end{aligned}$$

✓ $(b - 7)(b - 7)$

Q3 · ● Developing · 3 marks

METHOD

Find two numbers that multiply to 49 and add to -14 : -7 and -7

Answer: $(b - 7)(b - 7)$

✓ $(n + 1)(n + 3)$

Q4 · ● Developing · 3 marks

METHOD

Find two numbers that multiply to 3 and add to 4 : 1 and 3

Answer: $(n + 1)(n + 3)$

✓ $16y^2 - 12y + 2$

Q5 · ● Developing · 4 marks

METHOD

$$\begin{aligned} &= 4 \times 4y^2 - 4 \times 1y - 2 \times 4y + 2 \times 1 \\ &= 16y^2 - 4y - 8y + 2 \\ &= 16y^2 - 12y + 2 \end{aligned}$$

$$\checkmark 15a^2 + 35a + 20$$

Q6 · ● Developing · 4 marks

METHOD

$$= 5 \times 3a^2 + 5 \times 4a + 5 \times 3a + 5 \times 4$$

$$= 15a^2 + 20a + 15a + 20$$

$$= 15a^2 + 35a + 20$$

$$\checkmark (b + 8)(b + 7)$$

Q7 · ● Developing · 3 marks

METHOD

Find two numbers that multiply to 56 and add to 15: 8 and 7

Answer: $(b + 8)(b + 7)$

$$\checkmark (y + 9)(y - 3)$$

Q8 · ● Developing · 3 marks

METHOD

Find two numbers that multiply to -27 and add to 6: 9 and -3

Answer: $(y + 9)(y - 3)$

$$\checkmark 8x^2 + 6x - 2$$

Q9 · ● Developing · 4 marks

METHOD

$$= 2 \times 4x^2 - 2 \times 1x + 2 \times 4x - 2 \times 1$$

$$= 8x^2 - 2x + 8x - 2$$

$$= 8x^2 + 6x - 2$$

$$\checkmark (n + 4)(n + 4)$$

Q10 · ● Developing · 3 marks

METHOD

Find two numbers that multiply to 16 and add to 8: 4 and 4

Answer: $(n + 4)(n + 4)$

✓5/2

Q11 · ● Secure · 3 marks

METHOD

$$5n - 20 = 5(n - 4)$$

$$2n - 8 = 2(n - 4)$$

The common factor $(n - 4)$ cancels, leaving $5/2$

✓5/2

Q12 · ● Secure · 3 marks

METHOD

$$5a + 25 = 5(a + 5)$$

$$2a + 10 = 2(a + 5)$$

The common factor $(a + 5)$ cancels, leaving $5/2$

✓ $3a^2 + 27a + 54$

Q13 · ● Secure · 4 marks

METHOD

$$(a + 6)(a + 3) = a^2 + 9a + 18$$

$$3 \times (a^2 + 9a + 18) = 3a^2 + 27a + 54$$

✓ $4x^2 + 12x - 16$

Q14 · ● Secure · 4 marks

METHOD

$$(x - 1)(x + 4) = x^2 + 3x - 4$$

$$4 \times (x^2 + 3x - 4) = 4x^2 + 12x - 16$$

✓2/5

Q15 · ● Secure · 3 marks

METHOD

$$2a + 10 = 2(a + 5)$$

$$5a + 25 = 5(a + 5)$$

The common factor $(a + 5)$ cancels, leaving $2/5$

✓ 3/5

Q16 · ● Secure · 3 marks

METHOD

$$3b - 18 = 3(b - 6)$$

$$5b - 30 = 5(b - 6)$$

The common factor $(b - 6)$ cancels, leaving $3/5$

✓ 5/2

Q17 · ● Secure · 3 marks

METHOD

$$5a - 10 = 5(a - 2)$$

$$2a - 4 = 2(a - 2)$$

The common factor $(a - 2)$ cancels, leaving $5/2$

✓ $4x^2 - 8x - 12$

Q18 · ● Secure · 4 marks

METHOD

$$(x + 1)(x - 3) = x^2 - 2x - 3$$

$$4 \times (x^2 - 2x - 3) = 4x^2 - 8x - 12$$

✓ $4b^2 - 32b + 48$

Q19 · ● Secure · 4 marks

METHOD

$$(b - 6)(b - 2) = b^2 - 8b + 12$$

$$4 \times (b^2 - 8b + 12) = 4b^2 - 32b + 48$$

✓ 5/2

Q20 · ● Secure · 3 marks

METHOD

$$5b - 5 = 5(b - 1)$$

$$2b - 2 = 2(b - 1)$$

The common factor $(b - 1)$ cancels, leaving $5/2$

$$\checkmark (n + 2)(n - 2)$$

Q21 · ● Greater Depth · 3 marks

METHOD

$$n^2 - 4 = (n)^2 - 2^2 = (n + 2)(n - 2)$$

$$\checkmark (x + 3)(5x + 3)$$

Q22 · ● Greater Depth · 4 marks

METHOD

$$5x^2 + 18x + 9 = (x + 3)(5x + 3)$$

$$\checkmark (x - 3)(4x + 5)$$

Q23 · ● Greater Depth · 4 marks

METHOD

$$4x^2 - 7x - 15 = (x - 3)(4x + 5)$$

$$\checkmark (3y + 1)(3y - 1)$$

Q24 · ● Greater Depth · 3 marks

METHOD

$$9y^2 - 1 = (3y)^2 - 1^2 = (3y + 1)(3y - 1)$$

$$\checkmark (3y + 7)(3y - 7)$$

Q25 · ● Greater Depth · 3 marks

METHOD

$$9y^2 - 49 = (3y)^2 - 7^2 = (3y + 7)(3y - 7)$$

$$\checkmark (b + 3)(3b + 1)$$

Q26 · ● Greater Depth · 4 marks

METHOD

$$3b^2 + 10b + 3 = (b + 3)(3b + 1)$$

✓ $(3y + 5)(3y - 5)$

Q27 · ● Greater Depth · 3 marks

METHOD

$$9y^2 - 25 = (3y)^2 - 5^2 = (3y + 5)(3y - 5)$$

✓ $(b + 5)(b - 5)$

Q28 · ● Greater Depth · 3 marks

METHOD

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

✓ $(y + 2)(3y - 5)$

Q29 · ● Greater Depth · 4 marks

METHOD

$$3y^2 + y - 10 = (y + 2)(3y - 5)$$

✓ $(2x + 1)(2x - 1)$

Q30 · ● Greater Depth · 3 marks

METHOD

$$4x^2 - 1 = (2x)^2 - 1^2 = (2x + 1)(2x - 1)$$