



ACHIEVE ACADEMY

GCSE Maths — Foundation Tier

Show That (Algebraic Arguments) · 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.

Show That (Algebraic Arguments)

Total marks available: 84

● Show That (Algebraic Arguments)

✓ Shown: $4x + 12$

Q1 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 3x + 4 + x + 8 \\ &= 3x + x + 4 + 8 \\ &= 4x + 12, \text{ as required.} \end{aligned}$$

✓ Shown: $6y + 50$

Q2 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 6(y + 8) + 2 \\ &= 6y + 48 + 2 \\ &= 6y + 50, \text{ as required.} \end{aligned}$$

✓ Shown: $3x + 14$

Q3 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 3(x + 4) + 2 \\ &= 3x + 12 + 2 \\ &= 3x + 14, \text{ as required.} \end{aligned}$$

✓ Shown: $6p + 28$

Q4 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 4(p + 5) + 2(p + 4) \\ &= 4p + 20 + 2p + 8 \\ &= 6p + 28, \text{ as required.} \end{aligned}$$

✓ Shown: $8y + 17$

Q5 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 3(y + 4) + 5(y + 1) \\ &= 3y + 12 + 5y + 5 \\ &= 8y + 17, \text{ as required.} \end{aligned}$$

✓ Shown: $9x + 45$

Q6 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 5(x + 5) + 4(x + 5) \\ &= 5x + 25 + 4x + 20 \\ &= 9x + 45, \text{ as required.} \end{aligned}$$

✓ Shown: $5m + 10$

Q7 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 3m + 4 + 2m + 6 \\ &= 3m + 2m + 4 + 6 \\ &= 5m + 10, \text{ as required.} \end{aligned}$$

✓ Shown: $6m + 8$

Q8 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 2(m + 4) + 4m \\ &= 2m + 8 + 4m \\ &= 6m + 8, \text{ as required.} \end{aligned}$$

✓ Shown: $11m + 6$

Q9 · ● Developing · 2 marks

METHOD

$$\begin{aligned} & 7m + 8 + 4m - 2 \\ &= 7m + 4m + 8 - 2 \\ &= 11m + 6, \text{ as required.} \end{aligned}$$

✓ Shown: $9p + 12$

Q10 · ● Developing · 2 marks

METHOD

$$\begin{aligned} &5p + 4 + 4p + 8 \\ &= 5p + 4p + 4 + 8 \\ &= 9p + 12, \text{ as required.} \end{aligned}$$

✓ Shown: $5x + 6$

Q11 · ● Secure · 3 marks

METHOD

$$\begin{aligned} \text{Perimeter} &= \text{sum of the three sides} \\ (x + 5) + (x + 3) + (3x - 2) \\ &= x + x + 3x + 5 + 3 - 2 \\ &= 5x + 6, \text{ as required.} \end{aligned}$$

✓ Shown: $11y + 6$

Q12 · ● Secure · 3 marks

METHOD

$$\begin{aligned} &6(y + 6) + 5(y - 6) \\ &= 6y + 36 + 5y - 30 \\ &= 11y + 6, \text{ as required.} \end{aligned}$$

✓ Shown: $5m + 9$

Q13 · ● Secure · 3 marks

METHOD

$$\begin{aligned} \text{Expression added} &= \text{result} - 5(m + 5) \\ 10m + 34 - 5(m + 5) \\ &= 10m + 34 - 5m - 25 \\ &= 5m + 9, \text{ as required.} \end{aligned}$$

✓ Shown: $2x + 12$

Q14 · ● Secure · 3 marks

METHOD

Perimeter = $2 \times \text{length} + 2 \times \text{width}$

$$2(x + 2) + 2 \times 4$$

$$= 2x + 4 + 8$$

$$= 2x + 12, \text{ as required.}$$

✓ Shown: $6a + 2$

Q15 · ● Secure · 3 marks

METHOD

$$(8a + 1) - (2a - 1)$$

$$= 8a + 1 - 2a + 1$$

$$= 6a + 2, \text{ as required.}$$

✓ Shown: $2y + 26$

Q16 · ● Secure · 3 marks

METHOD

$$4(y + 5) - 2(y - 3)$$

$$= 4y + 20 - 2y + 6$$

$$= 2y + 26, \text{ as required.}$$

✓ Shown: $a + 22$

Q17 · ● Secure · 3 marks

METHOD

$$3(a + 6) - 2(a - 2)$$

$$= 3a + 18 - 2a + 4$$

$$= a + 22, \text{ as required.}$$

✓ Shown: $y + 16$

Q18 · ● Secure · 3 marks

METHOD

$$3(y + 2) - 2(y - 5)$$

$$= 3y + 6 - 2y + 10$$

$$= y + 16, \text{ as required.}$$

✓ Shown: $3n + 6$

Q19 · ● Secure · 3 marks

METHOD

Perimeter = sum of the three sides

$$(n + 1) + (n + 7) + (n - 2)$$

$$= n + n + n + 1 + 7 - 2$$

$$= 3n + 6, \text{ as required.}$$

✓ Shown: $5m + 3$

Q20 · ● Secure · 3 marks

METHOD

Expression added = result - $2(m + 3)$

$$7m + 9 - 2(m + 3)$$

$$= 7m + 9 - 2m - 6$$

$$= 5m + 3, \text{ as required.}$$

✓ Shown: $y(y + 4)$

Q21 · ● Greater Depth · 4 marks

METHOD

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

$$= y^2 + y + 3y + 3 - 3$$

$$= y^2 + 4y$$

$$= y(y + 4), \text{ as required.}$$

✓ Shown: $a^2 - 4a - 5$

Q22 · ● Greater Depth · 3 marks

METHOD

$$(a + 1)(a - 5)$$

$$= a^2 - 5a + a - 5$$

$$= a^2 - 4a - 5, \text{ as required.}$$

✓ Shown: $y^2 + 14y + 49$

Q23 · ● Greater Depth · 3 marks

METHOD

Area = side $\times$ side

$$(y + 7)(y + 7)$$

$$= y^2 + 7y + 7y + 49$$

$$= y^2 + 14y + 49, \text{ as required.}$$

✓ Shown: $2(3x - 4)$

Q24 · ● Greater Depth · 4 marks

METHOD

$$2(9x - 8) - 4(3x - 2)$$

$$= 18x - 16 - 12x + 8$$

$$= 6x - 8$$

$$= 2(3x - 4), \text{ as required.}$$

✓ Shown: $n^2 + 4n + 4$

Q25 · ● Greater Depth · 3 marks

METHOD

Area = side $\times$ side

$$(n + 2)(n + 2)$$

$$= n^2 + 2n + 2n + 4$$

$$= n^2 + 4n + 4, \text{ as required.}$$

✓ Shown: $n^2 + 3n + 2$

Q26 · ● Greater Depth · 3 marks

METHOD

$$(n + 1)(n + 2)$$

$$= n^2 + 2n + n + 2$$

$$= n^2 + 3n + 2, \text{ as required.}$$

✓ Shown: $n(n + 9)$

Q27 · ● Greater Depth · 4 marks

METHOD

$$\begin{aligned}(n + 3)(n + 6) - 18 \\&= n^2 + 6n + 3n + 18 - 18 \\&= n^2 + 9n \\&= n(n + 9), \text{ as required.}\end{aligned}$$

✓ Shown: $3(3p - 2)$

Q28 · ● Greater Depth · 4 marks

METHOD

$$\begin{aligned}3(7p + 8) - 6(2p + 5) \\&= 21p + 24 - 12p - 30 \\&= 9p - 6 \\&= 3(3p - 2), \text{ as required.}\end{aligned}$$

✓ Shown: $y^2 + 8y + 15$

Q29 · ● Greater Depth · 3 marks

METHOD

$$\begin{aligned}(y + 5)(y + 3) \\&= y^2 + 3y + 5y + 15 \\&= y^2 + 8y + 15, \text{ as required.}\end{aligned}$$

✓ Shown: $n^2 + 15n + 56$

Q30 · ● Greater Depth · 3 marks

METHOD

$$\begin{aligned}\text{Area} &= \text{length} \times \text{width} \\(n + 8)(n + 7) \\&= n^2 + 7n + 8n + 56 \\&= n^2 + 15n + 56, \text{ as required.}\end{aligned}$$