

WA8MNAA3

Algebraic techniques

Core + Challenge

Expanding Brackets — Marking Key

I can use the distributive law to expand brackets, including negative multipliers, and then collect like terms.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 11 **Total: 58**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A

Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	$3x + 12$	$3 \times x + 3 \times 4$
2	$5a - 10$	$5 \times a - 5 \times 2$
3	$6m + 14$	$2 \times 3m + 2 \times 7$
4	$8y - 20$	$4 \times 2y - 4 \times 5$
5	$x^2 + 6x$	$x \times x + x \times 6$
6	$3a - a^2$	$a \times 3 - a \times a$
7	$2p^2 + 8p$	$2p \times p + 2p \times 4$
8	$-2k - 10$	$-2 \times k + (-2) \times 5$
9	$-4n + 12$	$-4 \times n - (-4) \times 3$
10	$-x + 7$	$-1 \times x - (-1) \times 7$
11	$6a^2 - 3ab$	$3a \times 2a - 3a \times b$
12	$-10y^2 + 5y$	$-5y \times 2y - (-5y) \times 1$
13	$2x + 11$	$2x + 6 + 5$
14	$7a - 4$	$4a - 4 + 3a$
15	$8x + 11$	$6x + 3 + 2x + 8$
16	$2m + 13$	$5m + 10 - 3m + 3$

B

Core answers, working and marks

/ 22 marks

Q	Answer	Working / sample response	Marks
1	$4(x + 3) = 4x + 12$	Whole rectangle: $4 \times (x + 3)$ Two parts: $4x + 12$ <i>1 mark: $4(x + 3)$</i> <i>1 mark: $4x + 12$</i>	2
2	$6a^2 + 15a$	$3a \times 2a = 6a^2$ $3a \times 5 = 15a$ <i>1 mark each term</i>	2
3	686	$7 \times (100 - 2) = 700 - 14$ $= 686$ <i>1 mark: method</i> <i>1 mark: 686</i>	2
4	$9a + 23$	$12a + 8 - 3a + 15$ $= 9a + 23$ <i>1 mark: expansion</i> <i>1 mark: $9a + 23$</i>	2
5	$3x^2 + x$	$x^2 + 3x + 2x^2 - 2x$ $= 3x^2 + x$ <i>1 mark: expansion</i> <i>1 mark: $3x^2 + x$</i>	2
6	$\$(5m + 14)$	$5(m + 2) + 4$ $= 5m + 10 + 4 = 5m + 14$ <i>1 mark: $5(m + 2) + 4$</i> <i>1 mark: $5m + 14$</i>	2
7	$P = (4x + 16) \text{ cm}; A = (10x + 15) \text{ cm}^2$	$P = 2(2x + 3) + 2 \times 5 = 4x + 6 + 10 = 4x + 16$ $A = 5(2x + 3) = 10x + 15$ <i>1 mark: perimeter set-up</i> <i>1 mark: $4x + 16$</i> <i>1 mark: $10x + 15$</i>	3
8	$-y^2 - 2y$	$-6y^2 + 8y + 5y^2 - 10y$ $= -y^2 - 2y$ <i>1 mark: expansion</i> <i>1 mark: $-y^2 - 2y$</i>	2
9	14	$6a + 12 - 6a + 2$ The a terms cancel: 14 <i>1 mark: expansion</i> <i>1 mark: 14 shown</i>	2

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Q	Answer	Working / sample response	Marks
10	$\$(30p - 17)$	$8(3p - 4) + 3(2p + 5)$ $= 24p - 32 + 6p + 15$ $= 30p - 17$ <i>1 mark: set-up</i> <i>1 mark: expansion</i> <i>1 mark: $30p - 17$</i>	3

C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	$-3x + 12$	$-3 \times (-4) = +12$. He did not change the sign of the second term. <i>1 mark: explains error</i> <i>1 mark: $-3x + 12$</i>	2
2	$5(x + 2) = 5x + 10$	A 5 by $(x + 2)$ rectangle splits into a 5 by x part ($5x$) and a 5 by 2 part (10). The 5 multiplies both terms, so the area is $5x + 10$. <i>1 mark: area model</i> <i>1 mark: $5x + 10$</i>	2
3	True	$2a + 2b - a + b$ $= a + 3b$ <i>1 mark: expansion</i> <i>1 mark: true</i>	2
4	282	$23 = 20 + 3$, and the 4 multiplies each part: $4(20 + 3) = 80 + 12 = 92$ $6 \times 47 = 6(40 + 7) = 240 + 42 = 282$ <i>1 mark: explanation</i> <i>1 mark: $6(40 + 7)$</i> <i>1 mark: 282</i>	3

D

Challenge *solutions and marking criteria*

/ 11 marks

Q	Answer	Working / sample response	Marks
1	$2x^2 - x - 15$	$6x^2 - 8x - 3x^2 + 6x - 15 + x - x^2$ $x^2: 6 - 3 - 1 = 2; x: -8 + 6 + 1 = -1$ $= 2x^2 - x - 15$ <i>1 mark: expansion</i> <i>1 mark: collecting</i> <i>1 mark: answer</i>	3
2	$a = 2, b = 5$	$12x + 4a - bx + 2b$ x terms: $12 - b = 7$, so $b = 5$ numbers: $4a + 10 = 18$, so $a = 2$ <i>1 mark: expansion</i> <i>1 mark: $b = 5$</i> <i>1 mark: $a = 2$</i>	3

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Q	Answer	Working / sample response	Marks
3	Always n	$4(n + 3) - 2n - 12 = 4n + 12 - 2n - 12 = 2n$ $2n \div 2 = n$ <i>1 mark: expression</i> <i>1 mark: simplifies to n</i>	2
4	$(3x + 22) \text{ m}^2$; 40 m^2	$5(x + 4) - 2(x - 1)$ $= 5x + 20 - 2x + 2 = 3x + 22$ $x = 6: 18 + 22 = 40$ <i>1 mark: set-up</i> <i>1 mark: $3x + 22$</i> <i>1 mark: 40</i>	3