

WA7MNAA4

Algebraic techniques

Core + Challenge

Writing Algebraic Expressions — Marking Key

I can use a letter (variable) to represent an unknown number and write algebraic expressions for real situations.

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: 23 Section C Reasoning: 9 Section D Challenge: 10 **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	$x + 5$	5 more than $x \rightarrow x + 5$
2	$y - 7$	7 less than $y \rightarrow y - 7$
3	$2n$	double $n \rightarrow 2n$
4	$6n + 1$	n multiplied by 6, then add 1 $\rightarrow 6n + 1$
5	$\frac{a}{3}$	a divided by 3 $\rightarrow \frac{a}{3}$
6	$p + q$	the sum of p and $q \rightarrow p + q$
7	$4k$	the product of 4 and $k \rightarrow 4k$
8	$3m - 10$	10 less than 3 times $m \rightarrow 3m - 10$
9	$\frac{t}{2}$	half of $t \rightarrow \frac{t}{2}$
10	d^2	the square of $d \rightarrow d^2$
11	$12b$	the cost of b books at \$12 each $\rightarrow 12b$
12	$w^2 + 3$	w squared, plus 3 $\rightarrow w^2 + 3$
13	$4c + 2h$	total legs on c cows and h hens $\rightarrow 4c + 2h$
14	$\frac{(x+y)}{2}$	the average of x and $y \rightarrow \frac{(x+y)}{2}$
15	$4s$	perimeter of a square with side $s \rightarrow 4s$
16	$ab - 5$	5 less than the product of a and $b \rightarrow ab - 5$

B

Core *answers, working and marks*

/ 23 marks

Q	Answer	Working / sample response	Marks
1	(a) $3g + m$ (b) $g - m$ (c) $\frac{(5g+2m)}{4}$	Translate each phrase in order <i>1 mark each</i>	3
2	$2k + 4$ (dollars)	$\$2 \times k$ plus $\$4$ <i>1 mark: $2k$</i> <i>1 mark: $+ 4$</i>	2
3	(a) $e + 3$, $3e$ (b) $5e + 3$	$e + (e + 3) + 3e = 5e + 3$ <i>1 mark: $e + 3$</i> <i>1 mark: $3e$</i> <i>1 mark: $5e + 3$</i>	3
4	$P = 2l + 2w$; $A = lw$	Add all four sides; multiply length by width <i>1 mark each</i>	2
5	$25 + 0.1t$	10 cents = $\$0.10$ <i>1 mark: $0.1t$</i> <i>1 mark: $25 + 0.1t$</i>	2
6	e.g. 5 packets of x stickers plus 3 loose stickers	Any situation with 5 equal groups plus 3 <i>1 mark: 5 groups of x</i> <i>1 mark: plus 3</i>	2
7	$\frac{60}{n} + 2$	Share: $60 \div n$; then add 2 <i>1 mark: $\frac{60}{n}$</i> <i>1 mark: $+ 2$</i>	2
8	$115 - (l + w + d)$	Subtract the total from 115 <i>1 mark: $l + w + d$</i> <i>1 mark: $115 - (...)$</i>	2
9	$2a + 3c$	$2 \times a + 3 \times c$ <i>1 mark each term</i>	2
10	(a) $n + 1$, $n + 2$ (b) $3n + 3$	$n + (n + 1) + (n + 2) = 3n + 3$ <i>1 mark: (a)</i> <i>1 mark: sum</i> <i>1 mark: $3n + 3$</i>	3

C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	Juxtaposition means multiply	In algebra, a number next to a letter is multiplied: if $a = 4$, $3a = 12$, not 34. <i>1 mark: meaning</i> <i>1 mark: example</i>	2
2	Yes; No	Addition is commutative: order doesn't matter. Subtraction is not: if $n = 8$, $8 - 5 = 3$ but $5 - 8 = -3$. <i>1 mark each</i> <i>1 mark: example</i>	3
3	$x - 4$	Start with x and take 4 away. e.g. 4 less than 10 is $6 = 10 - 4$. <i>1 mark: explanation</i> <i>1 mark: $x - 4$</i>	2
4	25 vs 10	$a^2 = a \times a = 25$; $2a = a + a = 10$ <i>1 mark each</i>	2

D

Challenge *solutions and marking criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	Always 3	$n \rightarrow 2n \rightarrow 2n + 6 \rightarrow n + 3 \rightarrow n + 3 - n = 3$ <i>1 mark: $2n + 6$</i> <i>1 mark: $n + 3$</i> <i>1 mark: result 3</i>	3
2	$7w + d$; $168w + 24d$	$24 \times (7w + d) = 168w + 24d$ <i>1 mark each</i>	2
3	$5x$	Triangle adds 2 outside sides, square adds 3: 5 sides of length x <i>1 mark: counts sides</i> <i>1 mark: $5x$</i>	2
4	$4n + 2$	$2n + 2n + 2 = 4n + 2$ — always 2 more than a multiple of 4. <i>1 mark: $4n + 2$</i> <i>2 marks: explanation</i>	3