



KS3.M-A4 Introduction to Algebraic Notation

AQA KS3.M-A4 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Write down the algebraic expression for each sentence.

(a) A number x increased by 5. (1)

(b) Three times a number n . _____ (1)

(c) The product of 6 and a number m . _____ (1)

(d) A number p divided by 4. _____ (1)

2 Write each expression in the simplest form by collecting like terms.

(a) $2x + 3x$ (1)

(b) $7y - 2y$ (1)

3 State the coefficient of the letter in each expression.

(a) Coefficient of x in $4x$. (1)

(b) Coefficient of a in $10a + 3$. (1)

(c) Coefficient of t in $-2t + 7$. (1)

4 Use algebraic notation to write each description. Pay attention to multiplication convention.

(a) The product of 4 and the number k . (2)

(b) Two lots of a number n (2)

.....

5 Identify the term type in each expression. Choose 'term' for each separate part separated by $+$ or $-$.

(a) In $5x + 2$, what are the terms? (2)

(b) In $3a - 4b + 7$, list the three terms. (2)

6 Calculate each value by substituting the given number into the expression.

(a) Find the value of $5x$ when $x = 3$. (1)

(b) Find the value of $2a + 4$ when $a = 5$. (1)

7 Simplify each expression by collecting like terms. Show any simple arithmetic used.

(a) Simplify $4x + 2x + 3$. (2)

(b) Simplify $8y - 3y - 2$. (1)

8 Work out the value of each expression when the given letter has the value shown. Include negative values where indicated.

(a) If $a = -2$, find the value of $3a + 5$. (1)

(b) If $b = 4$, find the value of $2b - 3$. (1)

(c) If $c = 0$, find the value of $7c + 2$. (1)

9 Write an algebraic expression for each situation, using standard compact notation where appropriate.

(a) The total cost for n identical pens each costing 7 pounds. (1)

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(b) A number x increased by 12 gives the total weight in kilograms. (1)

.....

(c) Twice a number t minus 5. (1)

.....

10 Identify the coefficient and the constant term in each expression.

(a) In $9x + 6$, state the coefficient of x and the constant term. (1)

(b) In $-3p - 2$, state the coefficient of p and the constant term. (1)

11 Translate each short word problem into an algebraic expression.

(a) Sam saves 5 pounds each week. After w weeks he has saved some money. (1)
Write an expression for the amount saved.

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(b) A taxi charges a flat fee of 3 pounds plus 2 pounds per mile. For m miles, (1)
write an expression for the total fare.

.....

(c) A garden has length l and width 4. Write an expression for its perimeter. (1)

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12 Stretch question. Compare two expressions and decide which is larger for given values. Give a reason for your answer.

- (a) Which is greater when $x = 5$: $3x + 2$ or $2x + 8$? Show your working and give a reason. (4)

Mark scheme · KS3.M-A4 Introduction to Algebraic Notation

Question 1

- (a) **B1** $x + 5$ cao
- (a) Answer: **$x + 5$**
- (b) **B1** $3n$ cao
- (b) Answer: **$3n$**
- (c) **B1** $6m$ cao
- (c) Answer: **$6m$**
- (d) **B1** $p/4$ cao
- (d) Answer: **$p/4$**

Question 2

- (a) **B1** $5x$ cao
- (a) Answer: **$5x$**
- (b) **B1** $5y$ cao
- (b) Answer: **$5y$**

Question 3

- (a) **B1** 4 cao
- (a) Answer: **4**
- (b) **B1** 10 cao
- (b) Answer: **10**
- (c) **B1** -2 cao
- (c) Answer: **-2**

Question 4

- (a) **M1** uses multiplication notation such as $4k$ or $4 \times k$
- (a) **A1** $4k$ cao
- (a) Answer: **$4k$**
- (b) **M1** recognises 'two lots of' means 2 times n
- (b) **A1** $2n$ cao
- (b) Answer: **$2n$**

Question 5

- (a) **M1** identifies both parts as separate terms
- (a) **A1** $5x$ and 2 cao
- (a) Answer: **$5x$ and 2**
- (b) **M1** identifies three separate terms
- (b) **A1** $3a$, $-4b$ and 7 cao
- (b) Answer: **$3a$, $-4b$ and 7**

Question 6

- (a) **B1** 15 cao
- (a) Answer: **15**
- (b) **B1** 14 cao
- (b) Answer: **14**

Question 7

- (a) **M1** adds like terms $4x$ and $2x$ to get $6x$
- (a) **A1** $6x + 3$ cao
- (a) Answer: **$6x + 3$**
- (b) **B1** $5y - 2$ cao
- (b) Answer: **$5y - 2$**

Question 8

- (a) **B1** -1 cao
- (a) Answer: **-1**
- (b) **B1** 5 cao
- (b) Answer: **5**
- (c) **B1** 2 cao
- (c) Answer: **2**

Question 9

- (a) **B1** $7n$ cao
- (a) Answer: **$7n$**
- (b) **B1** $x + 12$ cao
- (b) Answer: **$x + 12$**
- (c) **B1** $2t - 5$ cao
- (c) Answer: **$2t - 5$**

Question 10

- (a) **B1** coefficient 9 and constant 6 cao
- (a) Answer: **coefficient 9 , constant 6**
- (b) **B1** coefficient -3 and constant -2 cao
- (b) Answer: **coefficient -3 , constant -2**

Question 11

- (a) **B1** $5w$ cao
- (a) Answer: **$5w$**
- (b) **B1** $3 + 2m$ or $2m + 3$ cao
- (b) Answer: **$3 + 2m$**
- (c) **B1** $2l + 8$ cao
- (c) Answer: **$2l + 8$**

Question 12

- (a) **M1** substitutes $x = 5$ into both expressions correctly ($3x + 2 = 17$ and $2x + 8 = 18$ or equivalent working)
- (a) **A1** states $2x + 8$ is greater cao
- (a) **A1** gives correct reason: $18 > 17$, so $2x + 8$ is larger when $x = 5$
- (a) **A1** arithmetic correct and clear cao
- (a) Answer: **$2x + 8$ is greater**