

GCSE Maths: The language of algebra (Higher): answers

GCSE Maths - Algebra Basics - Higher - Lesson 7.1

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch07-algebra-basics/higher/the-language-of-algebra/

Exercise 7A Notation and vocabulary Non-calculator

1 Write each in algebraic notation (simplest form).

(a) $a \times b$

Answer: ab

(b) $3 \times c$

Answer: $3c$

(c) $d + d + d + d$

Answer: $4d$

(d) $p \times p$

Answer: p^2

(e) $4 \times m \times n$

Answer: $4mn$

(f) $w \div 7$

Answer: $\frac{w}{7}$

2 Write each of these out in full, using only $\times$ signs and no indices.

(a) a^3

Answer: $a \times a \times a$

(b) $5b^2$

Answer: $5 \times b \times b$

(c) x^2y

Answer: $x \times x \times y$

(d) $3(a + b)$

Answer: $3 \times (a + b)$

(e) $\frac{p}{q}$

Answer: $p \div q$

3 Write each of these with a fraction as the coefficient, not a decimal.

(a) $0.5x$

Answer: $\frac{x}{2}$

(b) $0.25y$

Answer: $\frac{y}{4}$

(c) $1.5a$

Answer: $\frac{3a}{2}$

(d) $0.2m$

Answer: $\frac{m}{5}$

4 Here is an expression: $7x^2 + 3x - 9$.

(a) How many terms does it have?

Answer: 3

(b) What is the coefficient of x^2 ?

Answer: 7

(c) What is the coefficient of x ?

Answer: 3

(d) What is the constant term?

Answer: -9

(e) Is it an expression, an equation or a formula?

Answer: An expression

5 Write whether each one is an expression, an equation, a formula, an identity or an inequality.

(a) $5x + 2$

Answer: Expression

(b) $3x + 2 = 11$

Answer: Equation

(c) $P = 2l + 2w$

Answer: Formula

(d) $2(x + 3) \equiv 2x + 6$

Answer: Identity

(e) $x > 4$

Answer: Inequality

(f) $7a - 3b$

Answer: Expression

6 Write an algebraic expression for each of these.

(a) 7 more than x

Answer: $x + 7$

(b) 5 less than y

Answer: $y - 5$

(c) 4 times n

Answer: $4n$

(d) m divided by 3

Answer: $\frac{m}{3}$

(e) double p , then add 1

Answer: $2p + 1$

(f) 3 less than the product of a and b

Answer: $ab - 3$

7 A pencil costs p pence. Write an expression, in pence, for the cost of (a) 6 pencils (b) 6 pencils and a ruler that costs 40 pence (c) the change from 500 pence after buying the 6 pencils.

(a) 6 pencils

Answer: $6p$

(b) 6 pencils and a ruler that costs 40 pence

Answer: $6p + 40$

(c) the change from 500 pence after buying the 6 pencils

Answer: $500 - 6p$

8 A taxi charges £3 plus £2 for every mile. (a) Write a formula for the cost C pounds of a journey of m miles. (b) Use your formula to find the cost of a 5 mile journey.

(a) Write a formula for C .

Answer: $C = 3 + 2m$

(b) Find the cost of a 5 mile journey.

Answer: £13

9 The rectangle has length l and width w . Write a formula for (a) its perimeter P (b) its area A .



- (a) the perimeter P

Answer: $P = 2l + 2w$

- (b) the area A

Answer: $A = lw$

- 10** Amy is a years old. Ben is 5 years older than Amy. Cara is twice as old as Ben. Write an expression for (a) Ben's age (b) Cara's age.

- (a) Ben's age

Answer: $a + 5$

- (b) Cara's age

Answer: $2(a + 5)$

- 11** Zoe says that $4a$ means the same as $4 + a$. Use $a = 3$ to show that she is wrong, and explain what $4a$ really means.

Answer: $4a = 12$ but $4 + a = 7$, so they are different. $4a$ means $4 \times a$.

- 12** Decide whether each statement is true or false for **all** values of the letters. Give a reason using numbers.

- (a) $a + a = 2a$

Answer: True

- (b) $a \times a = 2a$

Answer: False

- (c) $3a = a^3$

Answer: False

- (d) $a \div b = b \div a$

Answer: False

- 13** Is $3x + 1 = 13$ an identity? Show that $x = 4$ is a solution, show that $x = 5$ is not, and use this to explain your answer.

Answer: No. It is true when $x = 4$ but not when $x = 5$, so it is an equation, not an identity.

- 14** n is a whole number. Write an expression for (a) the next whole number after n (b) an even number (c) an odd number (d) the next even number after $2n$ (e) three consecutive whole numbers, with n the smallest.

- (a) the next whole number after n

Answer: $n + 1$

(b) an even number

Answer: $2n$

(c) an odd number

Answer: $2n + 1$

(d) the next even number after $2n$

Answer: $2n + 2$

(e) three consecutive whole numbers, with n the smallest

Answer: $n, n + 1, n + 2$

15 A two-digit number has tens digit t and units digit u . Write an expression for the sum of the number and the number with its digits swapped. Check your expression with the number 62.

Answer: $11t + 11u$

16 Write down the expression for the perimeter of a rectangle with length l and width w , written as $2(l + w)$. Explain why this is the same as $2l + 2w$ by using $l = 7$ and $w = 4$.

Answer: Both equal 22