

Identities and Algebraic Arguments

For AQA GCSE Mathematics (8300) • Foundation tier

Name _____

Total marks: **25**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method.

- 1** $5(x + 2) \equiv 5x + 10$ is an identity.
Tick **one** box.

[1 mark]

	Tick
It is true for all values of x	☐
It is true for some values of x	☐
It is true for no values of x	☐

- 2** Tick **one** box for each row.

[3 marks]

	Identity	Equation
$2(x + 4) = 2x + 8$	☐	☐
$2x + 4 = 10$	☐	☐
$5x - x = 4x$	☐	☐
$x^2 = 9$	☐	☐

- 3 Show that $4(2x + 3) - 2(x - 1) \equiv 2(3x + 7)$

[2 marks]

- 4 Here is an identity.

$$12x - 30 \equiv a(bx - 5)$$

Work out the values of a and b .

[2 marks]

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$$

- 5 Here is an identity.

$$a(x + 2) + 5(x - b) \equiv 8x - 4$$

Work out the values of a and b .

[3 marks]

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$$

6 Show that $(x + 3)^2 - (x - 3)^2 \equiv 12x$

[3 marks]

7 n is an integer.

(a) Show that the sum of n and the next two integers is always a multiple of 3

[2 marks]

(b) Show that the sum of the integer before n and the integer after n is always even.

[2 marks]

8 Kim thinks of a whole number.
She doubles it and then adds 1

Show that the answer must be an odd number.

[2 marks]

- 9 Priya says,
‘When you add two square numbers, the answer is never a square number.’

Is Priya correct?
Show working to support your answer.

[1 mark]

- 10 Leo says,
 $(a + b)^2 \equiv a^2 + b^2$

Is Leo correct? Tick a box.
Give a reason for your answer.

[1 mark]

☐ Yes

☐ No

- 11** Here is the term-to-term rule for a sequence.

Multiply the previous term by 3 and then add 2

The first term of the sequence is n , where n is a whole number.

- (a) Show that the third term is $9n + 8$

[2 marks]

- (b) Show that the difference between the third term and the first term is always a multiple of 8

[1 mark]