eClassroom

GCSE Mathematics

Algebraic Notation & Substitution

Questions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation

Worked Examples

[Fluency]

Find the value of 3x + 2 when x = 4.

$3(4) + 2 = 12 + 2 = \mathbf{14}$

[Reasoning]

A rectangle has length (2x+3) cm and width x cm. Write an expression for the perimeter.

$P = 2(2x + 3) + 2x = 4x + 6 + 2x = \mathbf{6x + 6}$ cm

[Problem Solving]

Find the value of 4(x–1)² when x = –2.

$4(-2 - 1)^2 = 4 \times (-3)^2 = 4 \times 9 = \mathbf{36}$

[Fluency]

1. Find the value of 3x + 2 when x = 4.

(1 mark)

[Fluency]

2. Find the value of $x^2 + 3x - 1$ when x = 3.

(2 marks)

[Fluency]

3. Find the value of 2a + 3b when a = 5 and b = –2.

(2 marks)

[Fluency]

4. Write an expression for the perimeter of a rectangle with sides 3x cm and (2x+1) cm.

(2 marks)

[Fluency]

5.

The nth term of a sequence is 3n + 2.

(a) Find the 10th term. (1)

(b) Is 50 a term in this sequence? Show how you decide. (2)

(3 marks)

[Reasoning]

6.

Write an expression for the area of this shape.

A rectangle has length (x + 5) cm and width 3 cm.

(2 marks)

[Reasoning]

7. Find the value of $4(x - 1)^2$ when $x = -2$.

(2 marks)

[Reasoning]

8.

Here is a formula: $v = u + at$

Find v when u = 5, a = 3 and t = 4.

(2 marks)

[Problem Solving]

9.

A square has side length (x + 3) cm.

Write and simplify an expression for:

(a) the perimeter (1)

(b) the area (2)

(3 marks)

[Problem Solving]

10.

Here are two expressions: $A = 2n + 1$ $B = n^2 - 4$

Find the value of A × B when n = 5.

(3 marks)

Section B — Higher

Worked Examples

[Fluency]

f(x) = x² – 2x + 1. Find f(3) and f(–1).

$f(3) = 9 - 6 + 1 = \mathbf{4}$ $f(-1) = 1 + 2 + 1 = \mathbf{4}$

[Reasoning]

Find the value of (2x+1)/(x–3) when x = 7.

$\frac{2(7)+1}{7-3} = \frac{15}{4} = 3.75$

[Problem Solving]

Using v² = u² + 2as, find v when u=3, a=4, s=5.

$v^2 = 9 + 40 = 49 \Rightarrow v = \mathbf{7}$

[Fluency]

1.

f(x) = x² – 2x + 1

(a) Find f(3). (1)

(b) Find f(–1). (1)

(c) Write an expression for f(a) in terms of a. (2)

(4 marks)

[Fluency]

2.

Find the value of $\frac{2x+1}{x-3}$ when $x = 7$.

(2 marks)

[Fluency]

3.

Using v² = u² + 2as, find v when u = 3, a = 4 and s = 5.

(3 marks)

[Reasoning]

4.

$g(x) = 3x - 5$

(a) Find g(0). (1)

(b) Find g(a + 1) and simplify. (2)

(c) Find x such that g(x) = 16. (2)

(5 marks)

[Reasoning]

5.

$f(x) = 2x^2 + 3x - 1$

(a) Find f(2). (1)

(b) Find f(–3). (2)

(c) Find the values of x for which f(x) = 0. (3)

(6 marks)

[Reasoning]

6.

The kinetic energy of an object is given by $E = \frac{1}{2}mv^2$.

(a) Find E when m = 4 and v = 3. (2)

(b) Find v when E = 50 and m = 4. (3)

(5 marks)

[Problem Solving]

7.

$f(x) = x^2 + 1$ and $g(x) = 2x - 3$

Find all values of x for which f(x) = g(x).

(4 marks)

[Problem Solving]

8.

A formula for the surface area of a cylinder is $S = 2\pi r^2 + 2\pi rh$.

(a) Find S when r = 3 and h = 5. Give your answer in terms of π. (2)

(b) Find h when $S = 60\pi$ and r = 3. (3)

(5 marks)