

# Substitution

## Question Paper

<b>Level</b>	OCR
<b>Subject</b>	Maths
<b>Exam Board</b>	GCSE (9-1)
<b>Topic</b>	Algebra
<b>Sub Topic</b>	Substitution
<b>Grade Level</b>	Grade 3
<b>Booklet</b>	Question Paper

**Time Allowed:** 46 minutes

**Score:** /38

**Percentage:** /100

1 (a) When  $a = -5$ ,  $b = -2$  and  $c = 6$ , find the value of

(i)  $a^2$ ,

(a)(i) ..... [1]

(ii)  $1000b$ ,

(ii) ..... [1]

(iii)  $\frac{a+c}{b}$ .

(iii) ..... [1]

(b) Solve these equations.

(i)  $2(3x - 1) = 10x - 5$

(b)(i) ..... [4]

(ii)  $x^2 - 4 = 60$

(ii) ..... [3]

2 The equation  $x^3 - 4x - 1 = 30$  has a solution between 3 and 4.

Use trial and improvement to find this solution correct to one decimal place.

Show all your trials and their outcomes.

..... [4]

3 Simon is asked to solve an equation.

Here is his solution.

$$2(3x - 1) = 7$$

$$6x - 2 = 14$$

$$6x = 14 - 2$$

$$6x = 12$$

$$x = \frac{1}{2}$$

Simon has made **three** errors.

(a) Explain the errors that he has made.

- 1 .....
- .....
- 2 .....
- .....
- 3 .....
- ..... [3]

(b) Show by substitution that  $x = \frac{1}{2}$  is **not** the solution to the equation  $2(3x - 1) = 7$ .

- .....
- ..... [1]

- 4 The equation  $x^3 - 6x = 4$  has a solution between 2 and 3.

Use trial and improvement to find this solution correct to one decimal place.  
Show all your trials and their outcomes.

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[4]

5 (a) Rearrange the following to make  $c$  the subject.

$$11a + 5c = d(6 + 2c)$$

(a) \_\_\_\_\_ [4]

(b)  $f(x) = 5x - 12$ .

(i) Calculate  $f(4)$ .

(b)(i) \_\_\_\_\_ [1]

(ii) Find  $f(x + 1)$ . Give your answer in the form  $ax + b$ .

(ii) \_\_\_\_\_ [2]

6 (a) Factorise.

$$6x + 8$$

(a) \_\_\_\_\_ [1]

(b) Work out the value of  $x^2 - 9$  when

(i)  $x = 5$ ,

(b)(i) \_\_\_\_\_ [1]

(ii)  $x = -4$ .

(ii) \_\_\_\_\_ [1]

(c) Factorise.

$$x^2 - 9$$

(c) \_\_\_\_\_ [1]

7 (a) Solve.

$$3(2x - 1) = 6$$

(a) \_\_\_\_\_ [3]

(b) Find the value of  $3y^2 + 5$  when

(i)  $y = 2.6$ ,

(b)(i) \_\_\_\_\_ [1]

(ii)  $y = -4$ .

(ii) \_\_\_\_\_ [1]