

# 2.10 Functions

## Question Paper

Course	CIE IGCSE Maths
Section	2. Algebra & Graphs
Topic	2.10 Functions
Difficulty	Very Hard

**Time allowed:** 50

**Score:** /38

**Percentage:** /100

### Question 1

$$g(x) = 1 - 2x$$

Find the value of

Find  $g(x)g(x) - gg(x)$ , giving your answer in the form  $ax^2 + bx + c$ .

[4]

[4 marks]

### Question 2

$$h(x) = 3^x.$$

Find the value of  $k$  for which  $\frac{1}{h(x)} = 9^{kx}$

$$k = \dots\dots\dots [2]$$

[2 marks]

### Question 3

$$f(x) = 3x + 2 \qquad g(x) = x^2 + 1$$

Find  $\frac{g(x)}{f(x)} + x$ .

Give your answer as a single fraction, in terms of  $x$ , in its simplest form.

[3]

[3 marks]

### Question 4a

$$f(x) = 4x - 1 \qquad g(x) = x^2 \qquad h(x) = 3^{-x}$$

Show that  $g(3x - 2) - h(-3)$  can be written as  $9x^2 - 12x - 23$ .

[2]

[2 marks]

### Question 4b

Find  $x$  when  $f(61) = h(x)$ .

$x = \dots\dots\dots$  [2]

[2 marks]

### Question 5a

$$h(x) = 2^x$$

Solve the equation  $h^{-1}(x) = 0.5$ .

$$x = \dots\dots\dots [1]$$

**[1 mark]**

### Question 5b

$$\frac{1}{h(x)} = 2^{kx}$$

Write down the value of  $k$ .

$$k = \dots\dots\dots [1]$$

**[1 mark]**

### Question 6a

$$f(x) = 7 - 2x$$

$$g(x) = \frac{10}{x}, x \neq 0$$

$$h(x) = 27^x$$

Simplify, giving your answer as a single fraction.

$$\frac{1}{f(x)} + g(x)$$

[3]

**[3 marks]**

### Question 6b

Find  $h^{-1}(19\,683)$ .

[1]

[1 mark]

### Question 7

$$h(x) = 3^x.$$

Find  $x$  when  $h^{-1}(x) = -2$ .

$$x = \dots\dots\dots [1]$$

[1 mark]

### Question 8a

$$f(x) = 7x - 2$$

$$g(x) = x^2 + 1$$

$$h(x) = 3^x$$

$$gg(x) = ax^4 + bx^2 + c$$

Find the values of  $a$ ,  $b$ , and  $c$ .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

$$c = \dots\dots\dots [3]$$

[3 marks]

### Question 8b

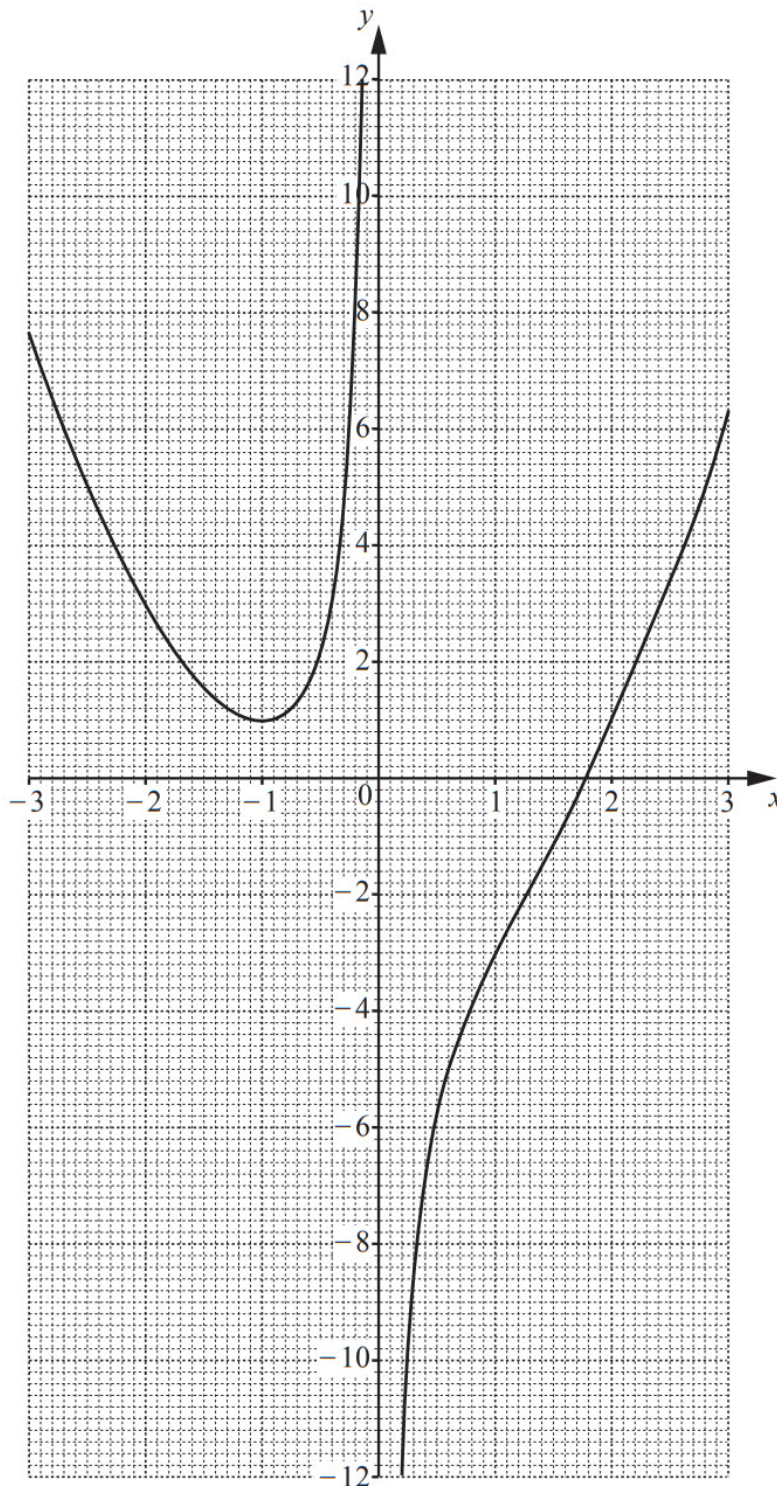
Find  $x$  when  $hf(x) = 81$ .

$x = \dots\dots\dots$  [3]

[3 marks]

## Question 9

The diagram shows the graph of  $y = f(x)$  where  $f(x) = x^2 - \frac{2}{x} - 2$ ,  $x \neq 0$ .



Use the graph to find

i)  
 $f(1)$ .

[1]

ii)  
 $ff(-2)$ .

[2]

[3 marks]

### Question 10

$$g(x) = 2x - 1$$

$$h(x) = 3^x$$

Find  $x$  when  $h^{-1}(x) = g(2)$ .

$x = \dots\dots\dots$  [2]

[2 marks]



### Question 11

$$h(x) = x^x, x > 0$$

i)

Calculate  $h(0.3)$ .

Give your answer correct to 2 decimal places.

[2]

ii)

Find  $x$  when  $h(x) = 256$ .

$x = \dots\dots\dots$  [1]

[3 marks]

### Question 12

$$j(x) = 5^x.$$

Find  $x$  when  $j^{-1}(x) = 2$ .

$x = \dots\dots\dots$  [1]

[1 mark]

### Question 13

$$h(x) = 4^x.$$

Find  $x$  when  $h^{-1}(x) = 2$ .

$x = \dots\dots\dots$  [1]

[1 mark]

### Question 14

$$h(x) = x^2$$

Find the values of  $p$  that satisfy  $h(p) = p$ .

[2]

[2 marks]