Functions

Question Paper

Course	Edexcel IGCSE Maths
Section	3. Sequences, Functions & Graphs
Topic	Functions
Difficulty	Medium

Time allowed: 80

Score: /63

Percentage: /100

Question 1a

f and g are functions such that

$$\mathrm{f}(x) = \frac{2}{x^2} \qquad \text{and} \qquad \mathrm{g}(x) = 4x^3$$

Find $\mathrm{f}(-5)$

[1 mark]

Question 1b

Find $\mathrm{fg}(1)$

[2 marks]

Question 2a

$$\mathrm{f}(x) = 3x - 2$$

$$\mathrm{g}(x) = \frac{10}{x+2}$$

Express the inverse function f^{-1} in the form $\mathrm{f}^{-1}(x) = \ldots$

[2 marks]

Question 2b

Find $\mathrm{gf}(x)$

Simplify your answer.

[2 marks]

Question 3a

f is a function such that

$$\mathrm{f}(x) = \frac{1}{x^2 + 1}$$

Find $\mathrm{f}\left(\frac{1}{2}\right)$

[1 mark]

Question 3b

g is a function such that

$$\mathrm{g}(x) = \sqrt{x-1} \quad x \geqslant 1$$

Find $\mathrm{f}g(x)$

Give your answer as simply as possible.

[2 marks]

Question 4a

f is the function $\mathrm{f}(x) = 2x + 5$

Find $\mathrm{f}(3)$

[1 mark]

Question 4b

Express the inverse function f^{-1} in the form $\mathrm{f}^{-1}(x) =$

[2 marks]

Question 4c

g is the function $g(x) = x^2 - 25$

Find $g(-3)$

[1 mark]

Question 4d

(i)

Find $gf(x)$

Give your answer as simply as possible.

[3]

(ii)

Solve $gf(x) = 0$

[2]

[5 marks]

Question 5a

The functions f and g are defined as

$$\mathrm{f}(x) = \frac{1}{2}x + 4$$

$$\mathrm{g}(x) = \frac{2x}{x+1}$$

Work out $\mathrm{f}(6)$

[1 mark]

Question 5b

Work out $\mathrm{fg}(-3)$

[2 marks]

Question 5c

$\mathrm{g}(a) = -2$

Work out the value of a.

[2 marks]

Question 5d

Express the inverse function f^{-1} in the form $\mathrm{f}^{-1}(x) = \ldots$

[3 marks]

Question 6a

f is the function such that $f(x) = 2x - 5$
g is the function such that $g(x) = x^2 - 10$

Find f (4)

[1 mark]

Question 6b

Find fg(-4)

[2 marks]

Question 6c

Express the inverse function f^{-1} in the form $f^{-1}(x) = ...$

[2 marks]

Question 6d

Solve gf $(x) = -1$

[4 marks]

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Question 7a

The functions f and g are such that

$$\mathrm{f}(x) = 3(x - 4) \text{ and } \mathrm{g}(x) = \frac{x}{5} + 1$$

Find the value of $\mathrm{f}(10)$

[1 mark]

Question 7b

Find $\mathrm{g}^{-1}(x)$

[2 marks]

Question 7c

Show that $\mathrm{ff}(x) = 9x - 48$

[2 marks]

Question 8a

The function f is defined as $\mathrm{f}(x) = \frac{3}{4 + x}$

Find the value of f(1)

[1 mark]

Question 8b

State which value of x must be excluded from any domain of f.

[1 mark]

Question 8c

The function g is defined as $g(x) = 5 + x$

Given that $g(a) = 7$, find the value of a.

[1 mark]

Question 8d

Calculate $\mathrm{f}g(1)$

[2 marks]

Question 8e

Find $\mathrm{fg}(x)$

Simplify your answer.

[2 marks]

Question 9a

The function h is defined as

$$\mathrm{h}(x) = \frac{2x - 4}{x}$$

State the value of x that cannot be included in the domain of h

[1 mark]

Question 9b

Express the inverse function h^{-1} in the form $\mathrm{h}^{-1}(x) = \ldots$

$\mathrm{h}^{-1}(x) =$ .....

[3 marks]

Question 10a

The function f is such that $\mathrm{f}(x) = (x - 4)^2$ for all values of x.

Find $\mathrm{f}(1)$

[1 mark]

Question 10b

State the range of the function f

[1 mark]

Question 10c

The function g is such that $\mathrm{g}(x) = \dfrac{4}{x+3} \qquad x \neq -3$

Work out $\mathrm{fg}(2)$

[2 marks]

Question 11

$\mathrm{f}(x) = 3x$

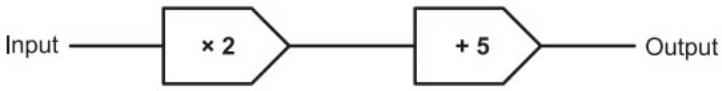
Circle the expression for $\mathrm{f}^{-1}(x)$

$-3x$ $\qquad$ $\dfrac{3}{x}$ $\qquad$ $\dfrac{1}{3x}$ $\qquad$ $\dfrac{x}{3}$

[1 mark]

Question 12a

A function is represented by the following function machine.



A number is input into the machine.
The output is used as a new input.
The second output is 11.

Work out the number that was the **first input**.

[2 marks]

Question 12b

A number is input into the machine.
The output given is the same number.

Work out the number.

[3 marks]

Question 13

$g(x) = 2x$ and $h(x) = \frac{x-1}{2}$

Circle the expression for $hg(x)$

$\frac{2x^2 - x}{2}$ $\frac{2x-1}{2}$ $x^2 - x$ $x - 1$

[1 mark]