FUNCTIONS

[ESTIMATED TIME: 75 minutes]



GCSE

(+ IGCSE) EXAM QUESTION PRACTICE

1. [8 marks]

The functions f and g are defined as

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

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

(a) Work out f(6)

(1)

(b) Work out fg(-3)

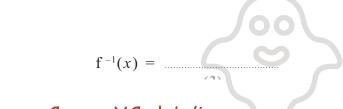
(2)

(c) g(a) = -2

Work out the value of *a*.

 $a = \dots (2)$

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



The functions f and g are defined as follows.

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

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

(a) (i) State which value of x cannot be included in the domain of f.

.....

(ii) State which **values** of x cannot be included in the domain of g.



(b) Calculate fg(10)



(c) Express the inverse function g^{-1} in the form $g^{-1}(x) = \dots$



$$f: x \mapsto 2x - 1$$

$$g: x \mapsto \frac{3}{x}, \ x \neq 0$$

- (a) Find the value of
 - (i) f(3),

.....

(ii) fg(6).

(2)

(b) Express the inverse function f^{-1} in the form $f^{-1}: x \mapsto ...$

(2)

(c) (i) Express the composite function gf in the form gf: $x \mapsto ...$

.....

(ii) Which value of x must be excluded from the domain of gf?

The function f is defined as

$$f(x) = \frac{x - 6}{2}$$

(a) Find f(8)

(1)

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

 $f^{-1}(x) = \dots$ (2)

The function g is defined as

$$g(x) = \sqrt{x - 4}$$

(c) Which values of x cannot be included in a domain of g?

(2)

(d) Express the function gf in the form gf(x) = ... Give your answer as simply as possible.

 $gf(x) = \dots$ (2)

The function f is defined as $f(x) = \frac{x}{x-1}$.

- (a) Find the value of
 - (i) f(3),

.....

(ii) f(-3).

(2)

(b) State which value(s) of x must be excluded from the domain of f.

(1)

(c) (i) Find ff(x). Give your answer in its most simple form.

ff(x) =

(ii) What does your answer to (c)(i) show about the function f?

(4)

$$f(x) = \frac{2x}{x - 1}$$

(a) Find the value of f(11)



(b) State which value of x must be excluded from any domain of f



(c) Find $f^{-1}(x)$



(d) State the value which cannot be in any range of f



f is the function such that

$$f(x) = \frac{x}{3x+1}$$

(a) Find f(0.5)

(1)

(b) Find ff(-1)

(2)

(c) Find the value of x that cannot be included in any domain of f

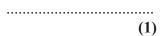


(d) Express the inverse function f^{-1} in the form $f^{-1}(x) = ...$ Show clear algebraic working.

$$f^{-1}(x) = \dots$$

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

(a) Find f(8)

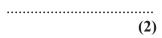


(b) The domain of f is all values of x where $x \ge 7$ Find the range of f.



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

(c) Solve the equation g(x) = 1.2



(d) (i) Express the inverse function g^{-1} in the form $g^{-1}(x) = \dots$

$$g^{-1}(x) = \dots$$

(ii) Hence write down gg(x) in terms of x.

$$gg(x) = \dots$$

(a) f(x) = 2x + 1

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

 $f^{-1}(x) = \dots$ (2)

(b) g(x) = 2 + x $h(x) = x^2$

Solve the equation hg(x) = h(x).

x = (3)

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

(a) Find the value of f(1)

(1)

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

(1)

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

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

 $a = \dots (1)$

(d) Calculate fg(1)

(2)

(e) Find fg(x) Simplify your answer.



f is a function such that

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

(a) Find $f(\frac{1}{2})$

(1)

g is a function such that

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

(b) Find fg(x)Give your answer as simply as possible.

 $fg(x) = \dots$

12. [4 marks]

The function f is such that

$$f(x) = 4x - 1$$

(a) Find $f^{-1}(x)$

 $\mathbf{f}^{-1}(x) = \dots \tag{2}$

The function g is such that

$$g(x) = kx^2$$
 where k is a constant.

Given that fg(2) = 12

(b) work out the value of k

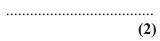
 $k = \dots$ (2)

$$f(x) = x^2$$
$$g(x) = x - 3$$

$$g(x) = x -$$

(a) (i) Find gf(x)

(ii) Find $g^{-1}(x)$



(b) Solve the equation $gf(x) = g^{-1}(x)$

