

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 .

$a =$
(2)

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

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



2.

[8 marks]

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 .

.....

(3)

(b) Calculate $fg(10)$

.....

(3)

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



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

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

(a) Find the value of

(i) $f(3)$,

.....

(ii) $fg(6)$.

.....

(2)

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

.....

(2)

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

.....

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

$x = \dots$

(2)



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

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

(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 $gf(x) = \dots$
Give your answer as simply as possible.

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

(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.

$ff(x) = \dots\dots\dots$

(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 $f(11)$

.....
(1)

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

.....
(1)

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

.....
(3)

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

.....
(1)



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

.....
(1)

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

$f^{-1}(x) = \dots$
(3)



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

(a) Find $f(8)$

.....
(1)

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

.....
(2)

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

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

.....
(2)

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

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

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

$$gg(x) = \dots\dots\dots$$



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

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

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

(2)

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

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

$$x = \dots\dots\dots$$

(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 .

$a =$
(1)

(d) Calculate $fg(1)$

.....
(2)

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

$fg(x) =$
(2)



f is a function such that

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

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

.....
(1)

g is a function such that

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

(b) Find $fg(x)$

Give your answer as simply as possible.

$fg(x) =$
(2)

The function f is such that

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

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

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

The function g is such that

$$g(x) = kx^2 \text{ where } k \text{ is a constant.}$$

Given that $fg(2) = 12$

(b) work out the value of k

$k =$
(2)



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

$$g(x) = x - 3$$

(a) (i) Find $gf(x)$

.....

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

.....

(2)

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

.....

(3)

