

Inverse and composite functions

Question 1

The function f is such that $f(x) = \frac{2x}{3x+5}$

The function g is such that $g(x) = \frac{3}{x+4}$

Find $g^{-1}(6)$

.....

(2 marks)

Question 2

f is the function such that $f(x) = 4 - 3x$

g is the function such that $g(x) = \frac{1}{1-2x}$

Work out $fg(-1.5)$

$fg(-1.5) = \dots\dots\dots$

(2 marks)

Question 3

For all values of x

$f(x) = (x + 1)^2$ and $g(x) = 2(x - 1)$

Find $gf(x)$ in its simplest form.

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

(2 marks)

Question 4

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

It can be shown that

$$gf(x) = x^2 - 3$$

$$g^{-1}(x) = x + 3$$

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

.....

(3 marks)

Question 5

The functions f and g are such that

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

Find $ff(x)$, simplifying your expression.

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

Question 6

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

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

Solve $gf(a) = 3$

.....

(3 marks)

Question 7

$$f(x) = x^3$$

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

$$h(x) = fg(x)$$

Find an expression for $h^{-1}(x)$

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

(3 marks)**Question 8**

For all values of x

$$f(x) = (x + 1)^2 \quad \text{and} \quad g(x) = 2(x - 1)$$

Find $g^{-1}(7)$.

$$g^{-1}(7) = \dots\dots\dots$$

(2 marks)**Question 9**

The functions f and g are such that $f(x) = x + 3$ and $g(x) = \frac{1}{x-2}$

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

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

(3 marks)**Question 10**

The function f and g are such that

$$f(x) = 5x + 3 \quad g(x) = ax + b \quad \text{where } a \text{ and } b \text{ are constants.}$$

$$g(3) = 20 \quad \text{and} \quad f^{-1}(33) = g(1)$$

Find the value of a and the value of b .

$$\dots\dots\dots$$
(5 marks)