Functions

Question Paper

$$f(x) = (x + 2)^3 - 5 \qquad g(x) = 2x + 10 \qquad h(x) = \frac{1}{x}, \; x \neq 0$$

Find

(a) $gf(x)$, [2]

(b) $f^{-1}(x)$, [3]

(c) $gh\left(-\frac{1}{5}\right)$. [2]

$f(x) = (x - 1)^3$ 　　　 $g(x) = (x - 1)^2$ 　　　 $h(x) = 3x + 1$

(a) Work out fg(-1). [2]

(b) Find gh(x) in its simplest form. [2]

(c) Find 　 $f^{-1}(x)$. [2]

(a) f(x) = 1 – 2x.

    (i)   Find f(-5).   [1]

    (ii) g(x) = 3x – 2.

        Find gf(x). Simplify your answer.   [2]

(b) h(x) = x^2 – 5x – 11.

    Solve h(x) = 0.

                                                    [4]

    Show all your working and give your answer correct to 2 decimal places.

f: $x \rightarrow 1 - 2x$ and g: $x \rightarrow \dfrac{x}{2}$.

(a) Find fg(7). [2]

(b) (i) Solve f(x) = g(x). [2]

(ii) The graphs of y = f(x) and y = g(x) meet at M.
Find the coordinates of M. [1]

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

(a) Find fg(6). [2]

(b) Solve the equation gf(x) = 100. [3]

(c) Find f^{-1}(x). [2]

(d) Find ff^{-1}(5). [1]

$$f(x) = 5x + 4 \qquad g(x) = \frac{1}{2x}, \quad x \neq 0 \qquad h(x) = \left(\frac{1}{2}\right)^x$$

Find

(a) fg(5) ,   [2]

(b) gg(x) in its simplest form,   [2]

                                                                                                                          [2]

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

(d) the value of x when h(x) = 8.   [2]

$$f(x) = x + \frac{2}{x} - 3, \ x \neq 0 \qquad\qquad g(x) = \frac{x}{2} - 5$$

Find

(a) fg(18), [2]

(b) $g^{-1}(x)$. [2]

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

(a) Write down the value of x when $f^{-1}(x) = 2$.

[1]

(b) Find fg(x). Give your answer in its simplest form.

[2]

(c) Find $g^{-1}(x)$.

[3]

$f(x) = x^2 + 1$ $g(x) = \dfrac{x+2}{3}$

(a) Work out ff(-1).

[2]

(b) Find gf(3x), simplifying your answer as far as possible.

[3]

(c) Find $g^{-1}(x)$.

[2]

$$f(x) = 3x + 5 \qquad g(x) = 4x - 1$$

(a) Find the value of gg(3).

[2]

(b) Find fg(x), giving your answer in its simplest form.

[2]

(c) Solve the equation.

$$f^{-1}(x) = 11$$

[1]

$$f(x) = \frac{1}{x+4} \quad (x \neq -4)$$

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

$$h(x) = x^3 + 1$$

(a) Work out fg(1). [2]

(b) Find $h^{-1}(x)$. [2]

(c) Solve the equation $g(x) = -2$. [3]

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

(a) Find

    (i) g(6),   [1]

    (ii) f(2x).   [1]

(b) Solve fg(x) = 125.   [3]

(c) Find the inverse function $g^{-1}(x)$.   [2]

$$f(x) = x^2 \qquad g(x) = 2^x \qquad h(x) = 2x - 3$$

(a) Find g(3). [1]

(b) Find hh(x) in its simplest form. [2]

(c) Find fg(x + 1) in its simplest form. [2]

The function f(x) is given by

$$f(x) = 3x - 1.$$

Find, in its simplest form,

(a) $f^{-1}f(x)$,   [1]

(b) ff(x).   [2]

Question 15

f: $x \mapsto 5 - 3x$.

(a) Find $f(-1)$. [1]

(b) Find $f^{-1}(x)$. [2]

(c) Find $ff^{-1}(8)$. [1]

Question 16

$$f(x) = \frac{x + 3}{x}, x \neq 0.$$

(a) Calculate $f\left(\frac{1}{4}\right)$.

[1]

(b) Solve $f(x) = \frac{1}{4}$.

[2]

Question 17

$f(x) = 10^x$.

(a) Calculate f(0.5). [1]

(b) Write down the value of $f^{-1}(1)$. [1]

$f(x) = \dfrac{x+1}{2}$ and $g(x) = 2x + 1$.

(a) Find the value of gf (9) .

[1]

(b) Find gf (x) , giving your answer in its simplest form.

[2]

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

[2]

f: $x \rightarrow 2x - 1$ and g: $x \rightarrow x^2 - 1$.
Find, in their simplest forms,

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

[2]

(b) $gf(x)$.

[2]