



FUNCTIONS

You must write down all the stages in your working.

Q1

g is the function with domain $x \geq -3$ such that $g(x) = x^2 + 6x$

(a) Write down the range of g^{-1}

.....
(1)

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

$g^{-1}: x \mapsto \dots$
(4)

Q2

The functions f and g are such that

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

The function h is such that $h(x) = fg(x)$ for $x \geq -2$

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

$$h^{-1}(x) = \dots \quad \mathbf{[5]}$$

Q3

The function f is such that $f(x) = x^2 - 8x + 5$ where $x \leq 4$

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

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

Q4

The function f is such that $f(x) = \frac{k}{x}$ where $x \neq 0$ and k is an integer.

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

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

The function g is such that $g(x) = 2 - 3x^4$ where $x \neq 0$

The function h is such that $h(x) = \frac{3x}{2-x}$ where $x \neq 2$

(b) (i) Find $g(-2)$

.....
(1)

(ii) Express the composite function hg in the form $hg(x) = \dots$
Give your answer in its simplest form.

$hg(x) = \dots$
.....
(2)

Q5

i $f(x) = 9 - \sqrt{x}$ where $x \geq 0$
 $g(x) = 4x^2$

(a) Find $f(9)$

.....
(1)

- (b) Solve $fg(x) < 0$
Show clear algebraic working.

.....
(3)

Q6

The function f is defined as

$$f: x \mapsto \frac{3x + 1}{x - 2}$$

- (a) State the value of x that cannot be included in any domain of the function f

.....
(1)

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

(3)

Q7

The functions f and g are such that

$$f:x \mapsto 5x + 7$$

$$g:x \mapsto \frac{5}{2x - 9}$$

(a) State which value of x cannot be included in any domain of g

.....
(1)

(b) Find $fg(4)$

.....
(2)

The function h is such that

$$h:x \mapsto 3x^2 - 12x + 8 \quad \text{where } x > 2$$

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

(4)

Q8

The functions f and g are such that

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

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

(a) Find $g(3)$

.....
(1)

(b) Find $gf(x)$

Give your answer in its simplest form.

$gf(x) =$
(2)
