

Function

Q1

The function f is defined by

$$f(x) = 2 + \ln(2x - 1), \quad x \in \mathbb{R}, \quad x > 0.5$$

- (a) Find the exact value of $ff(1)$
- (b) Find an expression for $f^{-1}(x)$

Q2

The function f is defined by

$$f(x) = \frac{1}{x+2}, \quad x \in \mathbb{R}, x \neq -2$$

- (a) Write down the range of $f(x)$
- (b) Find an expression for $f^{-1}(x)$ and state its domain

$$g(x) = x^2 - 5, \quad x \in \mathbb{R}$$

- (c) Solve $fg(x) = \frac{1}{2}$

Q3

The functions f and g are defined by

$$f : x \rightarrow 5^x - 7, \quad x \in \mathbb{R} \qquad g : x \rightarrow 2x + 3, \quad x \in \mathbb{R}$$

- a** Find and simplify an expression for gf , stating its domain.
- b** Solve the equation $gf(x) = 10$.

Q4

$$f : x \rightarrow 2 + \log_4 x, \quad x \in \mathbb{R}, \quad x > 0.$$

- a** Evaluate $ff(1)$.
- b** Solve the equation $f(x) = 0$.
- c** Find the inverse function $f^{-1}(x)$.

Q5 The functions f and g are defined by

$$f : x \rightarrow kx + 2, \quad x \in \mathbb{R},$$

$$g : x \rightarrow x - 3k, \quad x \in \mathbb{R},$$

where k is a constant.

a Find expressions in terms of k for

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

ii $fg(x)$.

Given that $fg(7) = 4$,

b find the two possible values of k .