Composite Functions - **Questions** - 2013-2017

Marks are indicated in brackets after each question number

2013 Paper 1 Question 1, (2)

The functions f and g are defined by $f(x) = x^2 + 1$ and $g(x) = 3x - 4$, on the set of real numbers.

Find $g(f(x))$.

2014 Paper 2 Question 3, (2)

Functions f and g are defined on suitable domains by

$$f(x) = x(x - 1) + q \ \text{ and } \ g(x) = x + 3.$$

(a) Find an expression for $f(g(x))$.

(b) Hence, find the value of q such that the equation $f(g(x)) = 0$

has equal roots.

2015 Paper 1 Question 5, (2) (1)

A function g is defined on $\mathbb{R}$, the set of real numbers, by $g(x) = 6 - 2x$.

(a) Determine an expression for $g^{-1}(x)$.

(b) Write down an expression for $g(g^{-1}(x))$.

2015 Paper 2 Question 2, (2) (3) (2)

Functions f and g are defined on suitable domains by

$$f(x) = 10 + x \quad \text{and} \quad g(x) = (1 + x)(3 - x) + 2.$$

(a) Find an expression for $f(g(x))$.

(b) Express $f(g(x))$ in the form $p(x + q)^2 + r$.

(c) Another function h is given by $h(x) = \dfrac{1}{f(g(x))}$.

What values of x cannot be in the domain of h?

2016 Paper 1 Question 12, (2) (3)

The functions f and g are defined on $\mathbb{R}$, the set of real numbers by

$$f(x) = 2x^2 - 4x + 5 \quad \text{and} \quad g(x) = 3 - x.$$

(a) Given $h(x) = f(g(x))$, show that $h(x) = 2x^2 - 8x + 11$.

(b) Express $h(x)$ in the form $p(x + q)^2 + r$.

2017 Paper 1 Question 1, (1) (2)

Functions f and g are defined on suitable domains by $f(x) = 5x$ and $g(x) = 2\cos x$.

(a) Evaluate $f(g(0))$.

(b) Find an expression for $g(f(x))$.