

1. Let  $f(x) = \frac{3x}{2} + 1$ ,  $g(x) = 4\cos\left(\frac{x}{3}\right) - 1$ . Let  $h(x) = (g \circ f)(x)$ .

(a) Find an expression for  $h(x)$ .

(3)

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

(3)

(c) Write down the range of  $h$ .

(2)

**(Total 8 marks)**

2. Let  $f(x) = 3x$ ,  $g(x) = 2x - 5$  and  $h(x) = (f \circ g)(x)$ .

(a) Find  $h(x)$ .

(2)

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

(3)

**(Total 5 marks)**

3. The functions  $f$  and  $g$  are defined by  $f: x \mapsto 3x$ ,  $g: x \mapsto x + 2$ .

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

(2)

(b) Find  $f^{-1}(18) + g^{-1}(18)$ .

(4)

**(Total 6 marks)**