

Work on these with your partner(s) at the board

1. Let

$$f : \mathbb{Z} \rightarrow \mathbb{Z} \text{ where } f(k) = k + 7,$$

$$g : \mathbb{Z} \rightarrow \{0, 1, 2, 3, 4\} \text{ where } g(k) = k + 1 \pmod{5},$$

$$\text{and } h : \{0, 1, 2, 3, 4\} \rightarrow \{0, 1, 2, 3, 4\} \text{ where } h(a) = a^2 \pmod{5}$$

Determine if the following expressions are defined. If so, find the value.

$$(g \circ f)(2), \quad (h \circ g)(2), \quad (h \circ f)(4), \quad (h \circ f)(-3), \quad (h \circ g \circ f)(0)$$

2. Let $g : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $g(x) = 2x - 7$.

Prove that g is a bijection. i.e. Prove that g is one-one and onto.