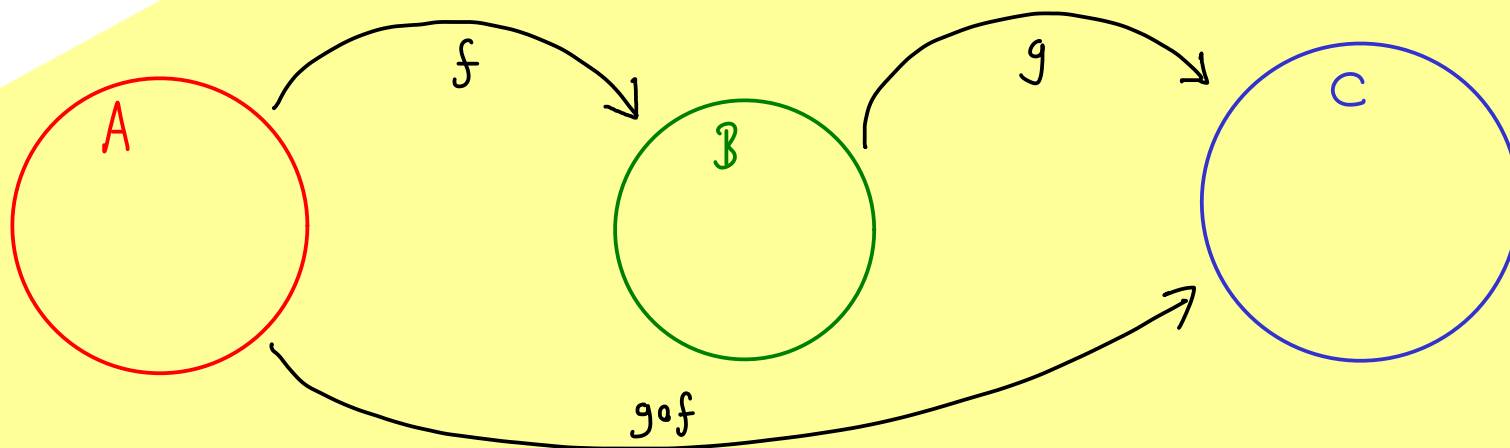




The Bright Side of Mathematics

Start Learning Sets - Part 7



For $f: A \rightarrow B$ and $g: B \rightarrow C$ define:

$$\left. \begin{aligned} g \circ f: A &\rightarrow C \\ x &\mapsto g(f(x)) \end{aligned} \right\} \text{ called the } \underline{\text{composition}} \text{ } g \text{ with } f$$

Examples:

(1)

$(g \circ f)(1) = 9$
 $(g \circ f)(3) = 9$

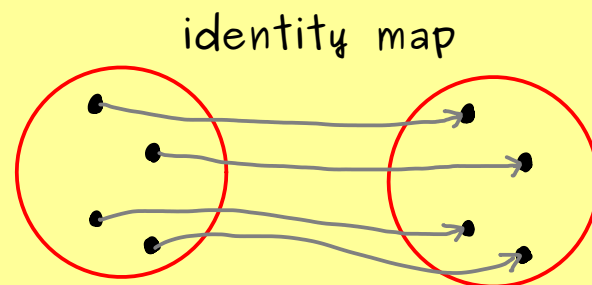
$(g \circ f)(2) = 9$
 $(g \circ f)(4) = 9$

$g(8) = 9$
 $g(2) = 2$
 $f(1) = 8$
 $f(2) = 8$
 $f(3) = 8$
 $f(4) = 8$

(2) $f: \mathbb{R} \rightarrow \mathbb{R}$, $g: \mathbb{R} \rightarrow \mathbb{R}$
 $x \mapsto x^2$ $x \mapsto \sin(x)$

$\rightsquigarrow (g \circ f)(x) = \sin(x^2)$ and $(f \circ g)(x) = (\sin(x))^2$

For any set A , we define: $id_A: A \rightarrow A$
 $x \mapsto x$



For $f: A \rightarrow B$ bijective, we have:

$$\begin{aligned} f \circ f^{-1} &= id_B \\ f^{-1} \circ f &= id_A \end{aligned}$$