The figure illustrates the composition of function $g$ with function $f$. The function $f$ takes the point $x$ in its domain $A$, and maps it into a point $f(x)$ in its codomain $B$. But $B$ is the domain of function $g$. So, $g$ can be applied to $f(x)$ in $B$ to get a point $g(f(x))$ in the codomain $C$ of $g$. The overall effect is, for each point $x$ in $A$, we obtain a point $g(f(x))$ in $C$. Thus,

$$x \mapsto g(f(x))$$

defines a function with domain $A$ and codomain $C$. This function is denoted by $g \circ f$, and is called the composition of $g$ with $f$. Thus,

$$g \circ f (x) = g(f(x)),$$

for all $x$ in $A$. 