94. Let f and g be one-to-one functions.

(a) Let

$$\begin{aligned}(f \circ g)(x_1) &= (f \circ g)(x_2)\\ f(g(x_1)) &= f(g(x_2))\\ g(x_1) &= g(x_2) \qquad (\text{Because } f \text{ is one-to-one.})\\ x_1 &= x_2 \qquad (\text{Because } g \text{ is one-to-one.})\end{aligned}$$

So, $f \circ g$ is one-to-one.

(b) Let $(f \circ g)(x) = y$, then $x = (f \circ g)^{-1}(y)$. Also:

$$\begin{aligned}(f \circ g)(x) &= y\\ f(g(x)) &= y\\ g(x) &= f^{-1}(y)\\ x &= g^{-1}(f^{-1}(y))\\ x &= (g^{-1} \circ f^{-1})(y)\end{aligned}$$

So, $(f \circ g)^{-1}(y) = (g^{-1} \circ f^{-1})(y)$ and

$(f \circ g)^{-1} = g^{-1} \circ f^{-1}$.