

Extreme Problem 13

The function f is defined by $f : x \mapsto \frac{e^x - 1}{e - 1}$, $x \in \mathfrak{R}$

and the function h is defined by

$$h : x \mapsto \begin{cases} (x-1)^2 + 1 & \text{for } x \leq 1 \\ 1 - \frac{|1-x|}{2} & \text{for } 1 < x \leq 4 \end{cases}$$

Find the exact value of $(f^{-1}h)^{-1}(3)$.