

$$\begin{array}{ccccc}
 ((b \diamond c) \diamond d) \diamond e & \longrightarrow & (b \diamond (c \diamond d)) \diamond e & \longrightarrow & b \diamond ((c \diamond d) \diamond e) \\
 \downarrow & & & & \downarrow \\
 (b \diamond d) \diamond (d \diamond e) & \longrightarrow & b \diamond (c \diamond (d \diamond e)) & & c \diamond d
 \end{array}$$

The diagram illustrates a series of transformations involving the diamond operator ( $\diamond$ ). The top row shows three expressions:  $((b \diamond c) \diamond d) \diamond e$ ,  $(b \diamond (c \diamond d)) \diamond e$ , and  $b \diamond ((c \diamond d) \diamond e)$ , connected by rightward arrows. The bottom row shows  $(b \diamond d) \diamond (d \diamond e)$ ,  $b \diamond (c \diamond (d \diamond e))$ , and  $c \diamond d$ , also connected by rightward arrows. Vertical arrows point from the first and second expressions of the top row to those of the bottom row. Additionally, a diagonal arrow points from the third expression of the top row down to  $c \diamond d$ , and another diagonal arrow points from  $c \diamond d$  up to the third expression of the top row.