

**Step 3**

$$\begin{array}{ccccc}
 & S^0 \wedge S^0 & \xrightarrow{\text{id}_{\text{Sets}_*|S^0, S^0}^{\otimes, -1}} & S^0 \otimes_{\text{Sets}_*} S^0 & \\
 \nearrow \lambda_{S^0}^{\text{Sets}_*, -1} & \downarrow & \text{(\#)} & \downarrow & \searrow S^0 \text{id}_{\mathbb{1}/\text{Sets}_*}^{\otimes, -1} \wedge \text{id}_{S^0} \\
 S^0 & \xrightarrow{\lambda_{S^0}^{\prime, -1}} & \mathbb{1}_{\text{Sets}_*} \otimes_{\text{Sets}_*} S^0 & & \\
 \downarrow [x] & \downarrow \text{id}_{S^0} \wedge [x] & \text{(1)} & \downarrow \text{id}_{S^0} \otimes_{\text{Sets}_*} [x] & \\
 & & & & \text{(4)} \\
 & \downarrow & \text{(5)} & \downarrow & \\
 & S^0 \wedge X & \xrightarrow{\text{id}_{\text{Sets}_*|S^0, X}^{\otimes, -1}} & S^0 \otimes_{\text{Sets}_*} X & \\
 \nearrow \lambda_X^{\text{Sets}_*, -1} & \downarrow & \text{(2)} & \downarrow & \searrow \text{id}_{\mathbb{1}/\text{Sets}_*}^{\otimes, -1} \wedge \text{id}_X \\
 X & \xrightarrow{\lambda_X^{\prime, -1}} & \mathbb{1}_{\text{Sets}_*} \otimes_{\text{Sets}_*} X & & \\
 & & & \downarrow \text{id}_{\mathbb{1}_{\text{Sets}_*}} \wedge [x] &
 \end{array}$$