want: $\alpha: \mathbb{C}^2 \otimes \mathbb{C}^2 \rightarrow \mathbb{C}$

$\beta: \mathbb{C} \rightarrow \mathbb{C}^2 \otimes \mathbb{C}^2$

$s +$

1. $0 = -2$ (i.e. multiplication by $-2$)

2. $x = 0$

3. $y = -11 + x$

New idea:

We let $e_{11}, e_{12}, e_{21}, e_{22}$ be basis elts. of $\mathbb{C}^2 \otimes \mathbb{C}^2$.

Define $\alpha(e_{11}) = \alpha(e_{22}) = 0$

$\alpha(e_{12}) = 1$

$\alpha(e_{21}) = -1$

Define $\beta(1) = e_{21} - e_{12}$
Hw #4:

Check: \( \alpha(\delta(1)) = \alpha(e_{21} - e_{12}) = \alpha(e_{21}) - \alpha(e_{12}) = -1 - 1 = -2 \quad \checkmark \)

\[ \gamma = -2 \]

LHS:
\[
\begin{align*}
    e_{11} & \rightarrow e_{11} \quad \text{then} \quad \alpha(e_{11}) = 0 \\
    e_{22} & \rightarrow e_{22} \quad \text{then} \quad \alpha(e_{22}) = 0 \\
    e_{12} & \rightarrow e_{21} \quad \text{then} \quad \alpha(e_{21}) = -1 \\
    e_{21} & \rightarrow e_{12} \quad \text{then} \quad \alpha(e_{12}) = 1
\end{align*}
\]

RHS:
\[
\begin{align*}
    -\alpha(e_{11}) & = 0 \\
    -\alpha(e_{22}) & = 0 \\
    -\alpha(e_{12}) & = -(1) = -1 \\
    -\alpha(e_{21}) & = -(-1) = 1
\end{align*}
\]

\( e_{11} = e_1 \otimes e_1 \)
\( e_{22} = e_2 \otimes e_2 \)
\( e_{12} = e_1 \otimes e_2 \)
\( e_{21} = e_2 \otimes e_1 \)
$\chi = \| + \wedge$

**LHS:**
- $e_{22} \mapsto e_{22}$
- $e_{11} \mapsto e_{11}$
- $e_{12} \mapsto e_{21}$
- $e_{21} \mapsto e_{12}$

**RHS:**
- $e_{22} \mapsto e_{22} + \beta(\chi(e_{22}))$
  $= e_{22} + 0 = e_{22}$
- $e_{11} \mapsto e_{11} + \beta(\chi(e_{11}))$
  $= e_{11} + 0 = e_{11}$
- $e_{12} \mapsto e_{12} + \beta(\chi(e_{12}))$
  $= e_{12} + \beta(1)$
  $= e_{12} + (e_{21} - e_{12}) = e_{21}$
- $e_{21} \mapsto e_{21} + \beta(\chi(e_{21}))$
  $= e_{21} + \beta(-1)$
  $= e_{21} + \beta(1)$
  $= e_{21} + -(e_{21} - e_{12}) = e_{12}$