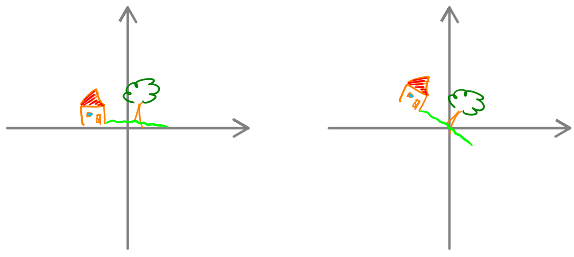
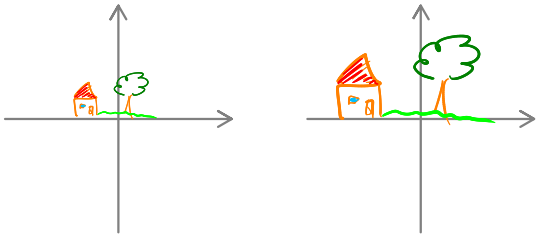


(a) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$ Rotation um 30° im Uhrzeigersinn



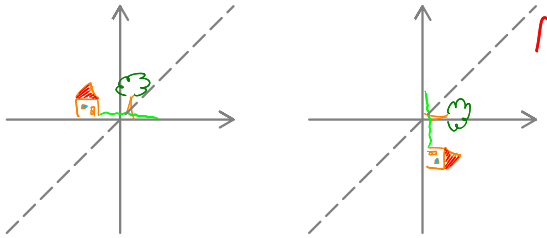
~~X~~ ~~E~~ ✓

(b) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$ Streckung um Faktor 2



✓

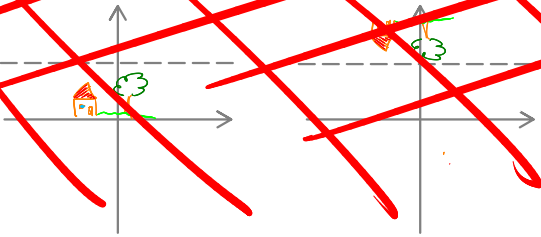
(c) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$ Spiegelung an einer Ursprungsgeraden



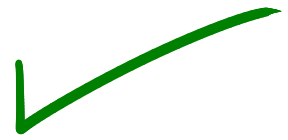
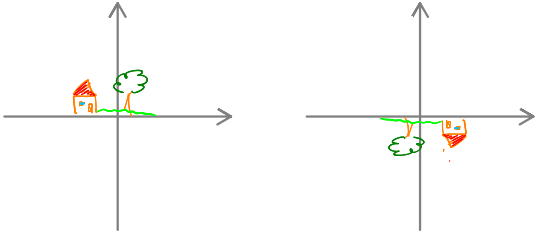
Diagonale

✓

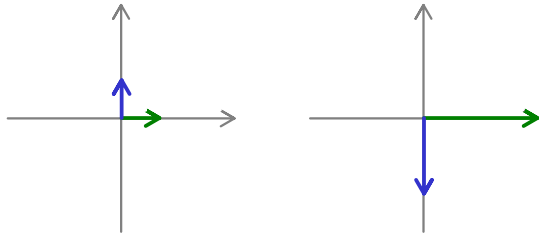
~~(d) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$ Spiegelung an Geraden die nicht durch \emptyset verläuft~~



(e) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$ Spiegelung im Ursprung



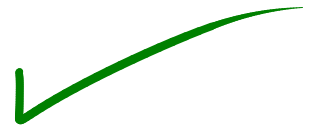
(f) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$



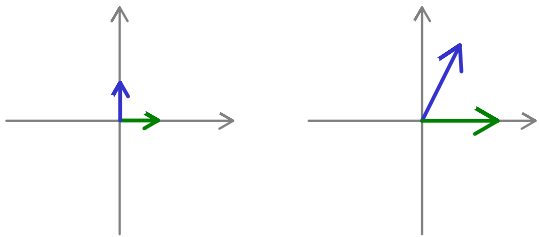
$$\begin{pmatrix} 1 \\ 0 \end{pmatrix} \mapsto \begin{pmatrix} 3 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ 1 \end{pmatrix} \mapsto \begin{pmatrix} 0 \\ -2 \end{pmatrix}$$

$$\begin{pmatrix} 3 & 0 \\ 0 & -2 \end{pmatrix}$$



(g) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$



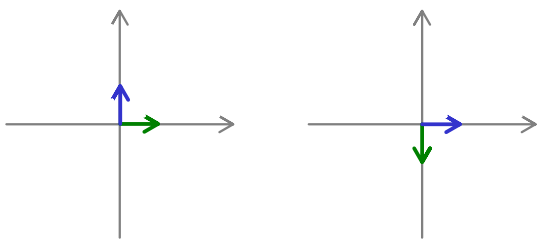
$$\begin{pmatrix} 1 \\ 0 \end{pmatrix} \mapsto \begin{pmatrix} 2 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ 1 \end{pmatrix} \mapsto \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} 2 & 1 \\ 0 & 2 \end{pmatrix}$$



(h) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$



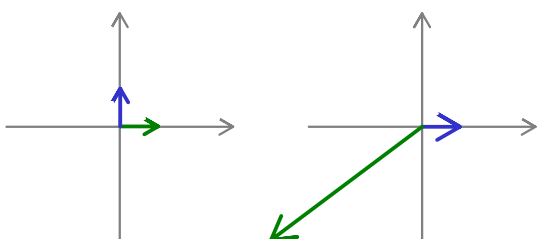
$$\begin{pmatrix} 1 \\ 0 \end{pmatrix} \mapsto \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ 1 \end{pmatrix} \mapsto \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

Rotation



(i) $\mathbb{R}^2 \rightarrow \mathbb{R}^2$



$$\begin{pmatrix} 1 \\ 0 \end{pmatrix} \mapsto \begin{pmatrix} 4 \\ -3 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ 1 \end{pmatrix} \mapsto \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$



$$F: \mathbb{R}^3 \longrightarrow \mathbb{R}^3 \quad \text{Kann}$$

- gar keinen EW haben ~~X~~
- kann genau 1 EW haben ✓
- kann genau 2 versch. EW haben ✓
- kann genau 3 versch. EW haben ✓
- kann genau 4 versch. EW haben ~~X~~

$$F: \mathbb{C}^2 \longrightarrow \mathbb{C}^2$$

- (a) hat mindestens einen EW ✓
- (b) ist immer diagonalisierbar
- (c) ist genau dann diagonalisierbar, wenn er 2 versch. EW hat ~~X~~