16 Let $\ell_1 \subseteq \mathbb{R}^2$ be the line with equation $x - y = 0$ and $\ell_2 \subseteq \mathbb{R}^2$ the line with equation $x - y = 4$.

16.1 If possible, describe ℓ_1 as a span. Otherwise explain why it's not possible.

16.2 If possible, describe ℓ_2 as a span. Otherwise explain why it's not possible.

16.3 Does the expression $\text{span}(\ell_1)$ make sense? If so, what is it? How about $\text{span}(\ell_2)$?

DEF

Set Addition

If A and B are sets of vectors, then the ***set sum*** of A and B, denoted $A+B$, is

$$A+B=\{\vec{x} \,:\, \vec{x}=\vec{a}+\vec{b} \text{ for some } \vec{a}\in A \text{ and } \vec{b}\in B\}.$$

17 Let $A=\left\{\begin{bmatrix}1\\2\end{bmatrix}\right\}$, $B=\left\{\begin{bmatrix}1\\1\end{bmatrix},\begin{bmatrix}1\\-1\end{bmatrix}\right\}$, and $\ell=\operatorname{span}\left\{\begin{bmatrix}1\\-1\end{bmatrix}\right\}$.

17.1 Draw A, B, and $A+B$ in the same picture.

17.2 Is $A+B$ the same as $B+A$?

17.3 Draw $\ell+A$.

17.4 Consider the line ℓ_2 given in vector form by $\vec{x}=t\begin{bmatrix}1\\-1\end{bmatrix}+\begin{bmatrix}1\\2\end{bmatrix}$. Can ℓ_2 be described using only a span? What about using a span and set addition?