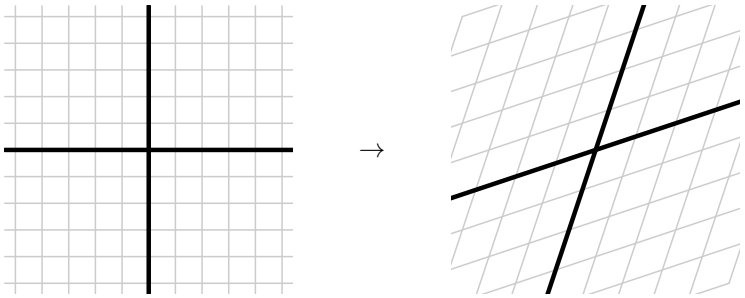
Linear independence

1. Find a vector x_3 so that $\{x_1, x_2, x_3\}$ are linearly independent.

$$x_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \qquad x_2 = \begin{pmatrix} 3 \\ 0 \\ 2 \end{pmatrix}$$

2. More important than finding a specific solution, can you describe a general procedure for solving the problem above?

3. Can you find the matrix $M \in \mathbb{R}^2$ that stretches the plane away from the origin along the the line $y = x$?



Hint: Which vectors will be transformed by a scalar? That is, for which x is

$$Mx = [\text{stretch factor}]x$$

Submission instructions

1. Create a folder in your repo called `linear-independence`
2. Within the folder, create a pdf or html file called `solution`