1. Consider the matrix

$$A = \begin{pmatrix} 1 & 4 & -2 \\ 1 & 4 & -2 \end{pmatrix}$$

Recall that A corresponds to a linear transformation T_A.

(a) [2 pts] What are the domain and range of T_A?

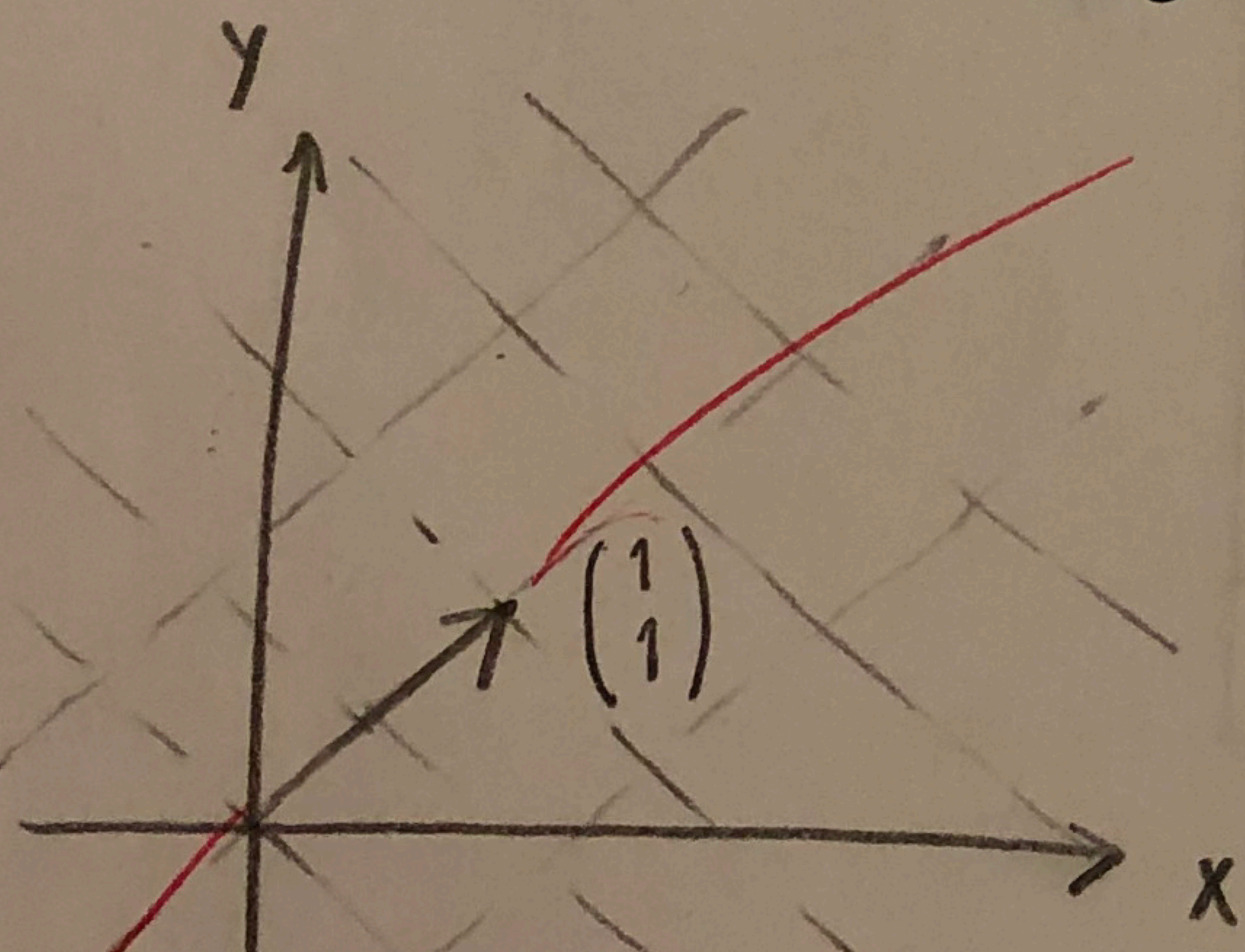$(2 \times 3)(3 \times 1) \to (2 \times 1)$

Domain: $\mathbb{R}^3$

Range: $\mathbb{R}^2$ ✓

(b) [2 pts] Describe the image of T_A as a span of vector(s).

$Im(T_A) = span \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 4 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} -2 \\ -2 \end{pmatrix}$ are redundant

(c) [4 pts] Describe the image of T_A geometrically. Is it a line? A plane? Draw it.

$Im(T_A)$ is a line $y=x$ in $\mathbb{R}^2$

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