

①

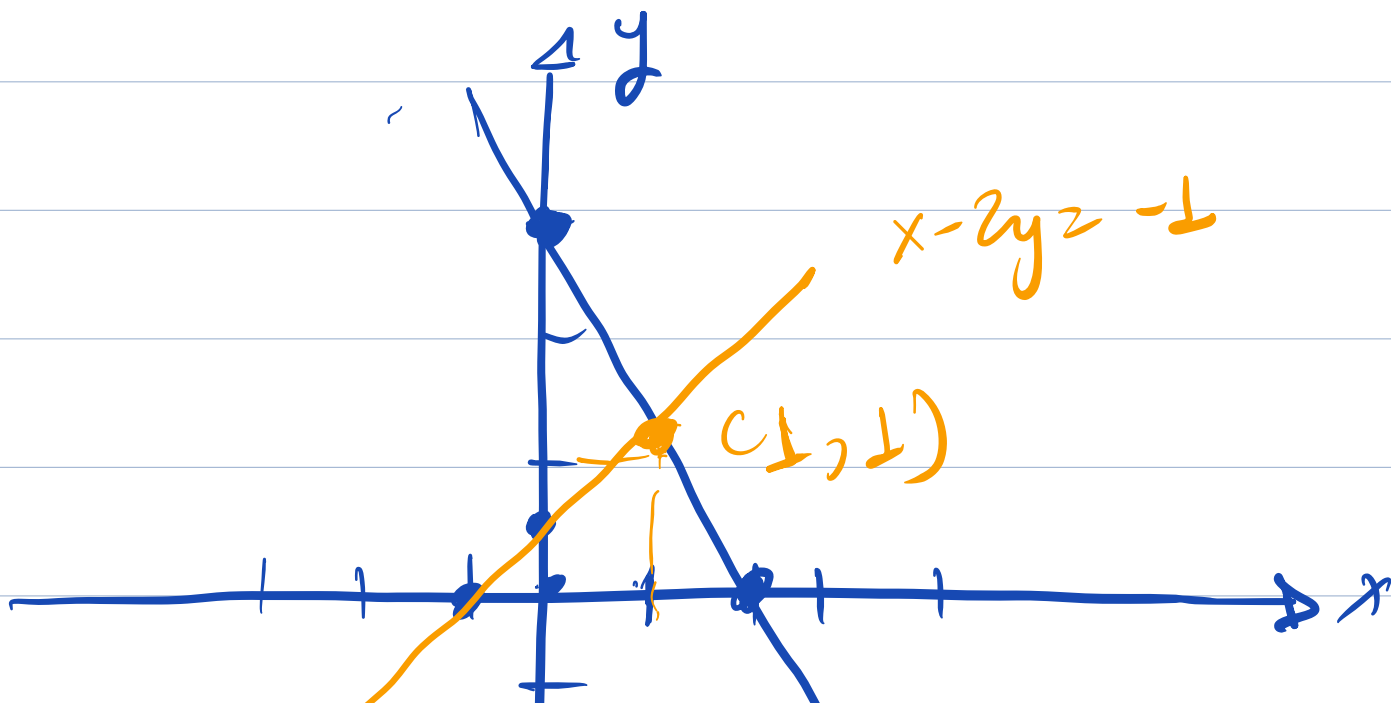
Solve $\begin{cases} 2x + y = 3 \\ x - 2y = -1 \end{cases}$, and find

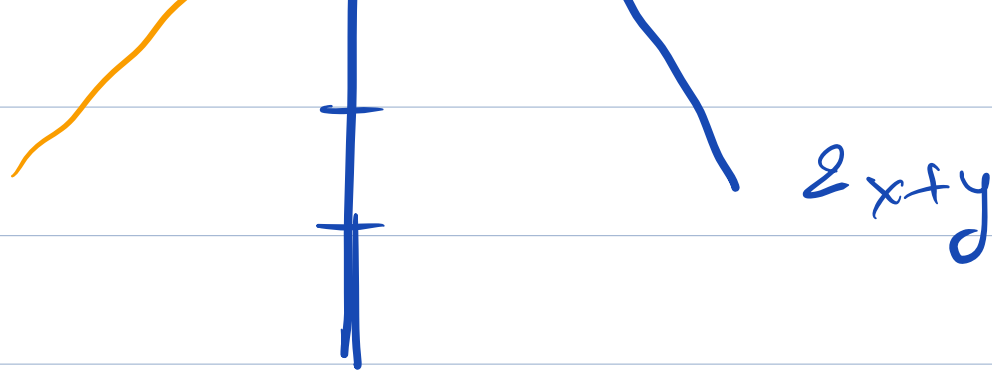
out its:

- "row picture"
- "column picture"

Row picture

$$\begin{bmatrix} 2 & 1 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$$





$$2x + y = 3$$

$$y=0, x = 3/2 = 1.5$$

$$x=0 \Rightarrow y=3$$

$$x - 2y = -1$$

$$y=0$$

$$x=0, y = 1/2 \quad (0, 1/2)$$

$$x = -1 \\ (-1, 0)$$

Point of intersection:

$$x - 2y = -1 \Rightarrow x = 2y - 1$$

$$2x + y = 3$$



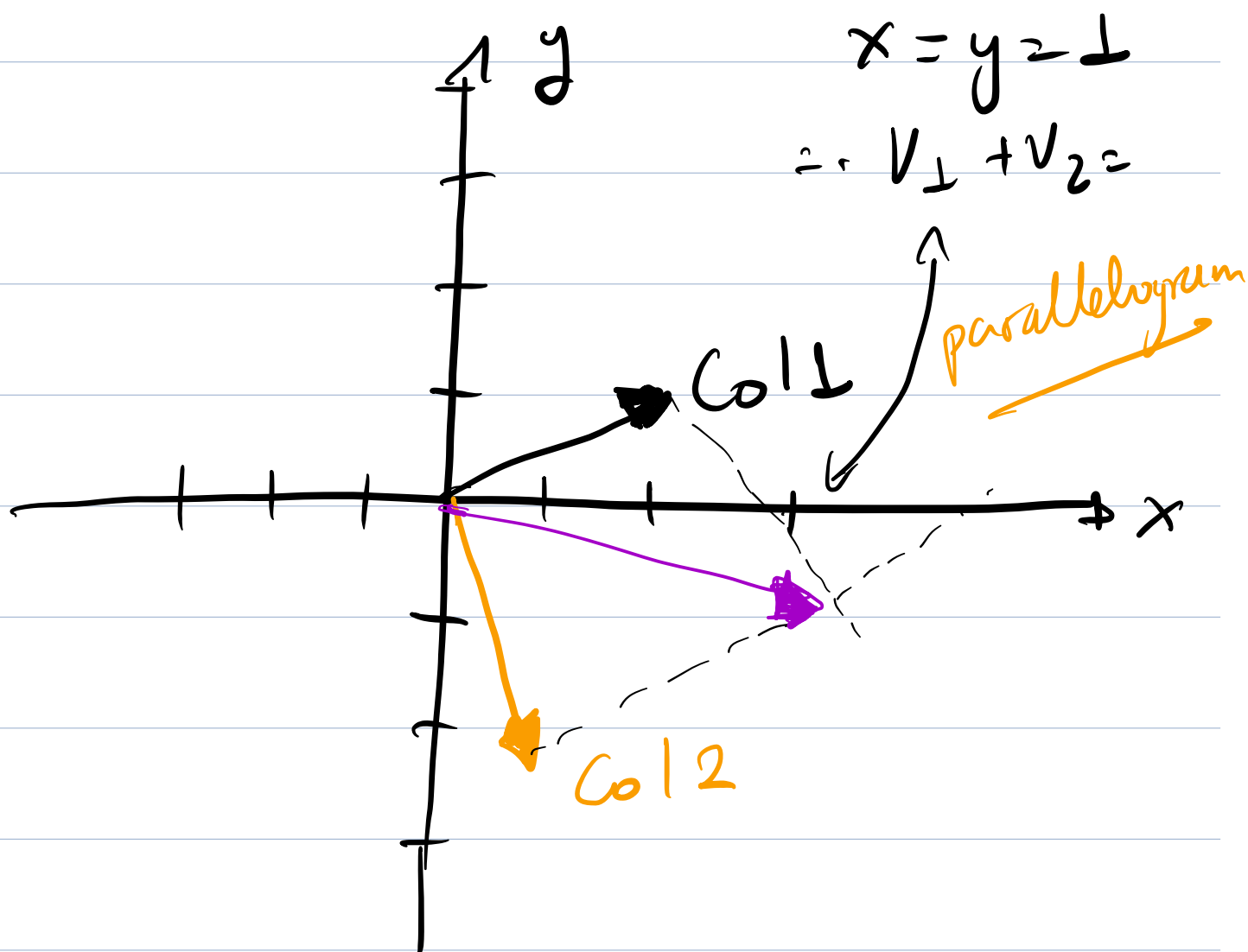
$$2(2y - 1) + y = 3$$

$$5y - 2 = 3$$

$$\underline{y=1} \Rightarrow \underline{x=1}$$

- Column picture

$$x \begin{bmatrix} v_1 \\ 2 \\ 1 \end{bmatrix} + y \begin{bmatrix} v_1 \\ 1 \\ -2 \end{bmatrix} = \begin{bmatrix} 3 \\ 1 \\ -1 \end{bmatrix}$$



Matrix form:

$$A = [v_1 \ v_2] = \begin{bmatrix} 2 & 1 \\ 1 & -2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 1 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$$

$$ax = b \quad x = \frac{b}{a} = a^{-1} b$$

$$A^{-1} A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \rightarrow \text{identity matrix.}$$

$$\Rightarrow \text{Then } \begin{bmatrix} x \\ y \end{bmatrix} = A^{-1} \begin{bmatrix} 3 \\ -1 \end{bmatrix}$$

↳ answer of x & y

(* Keep that in mind) later on curve