

1. a) The purpose of the chapter

• Serves as a foundational introduction to the topic of linear equations aimed at building the conceptual and practical understanding needed for computational applications

i) Revisiting Algebra

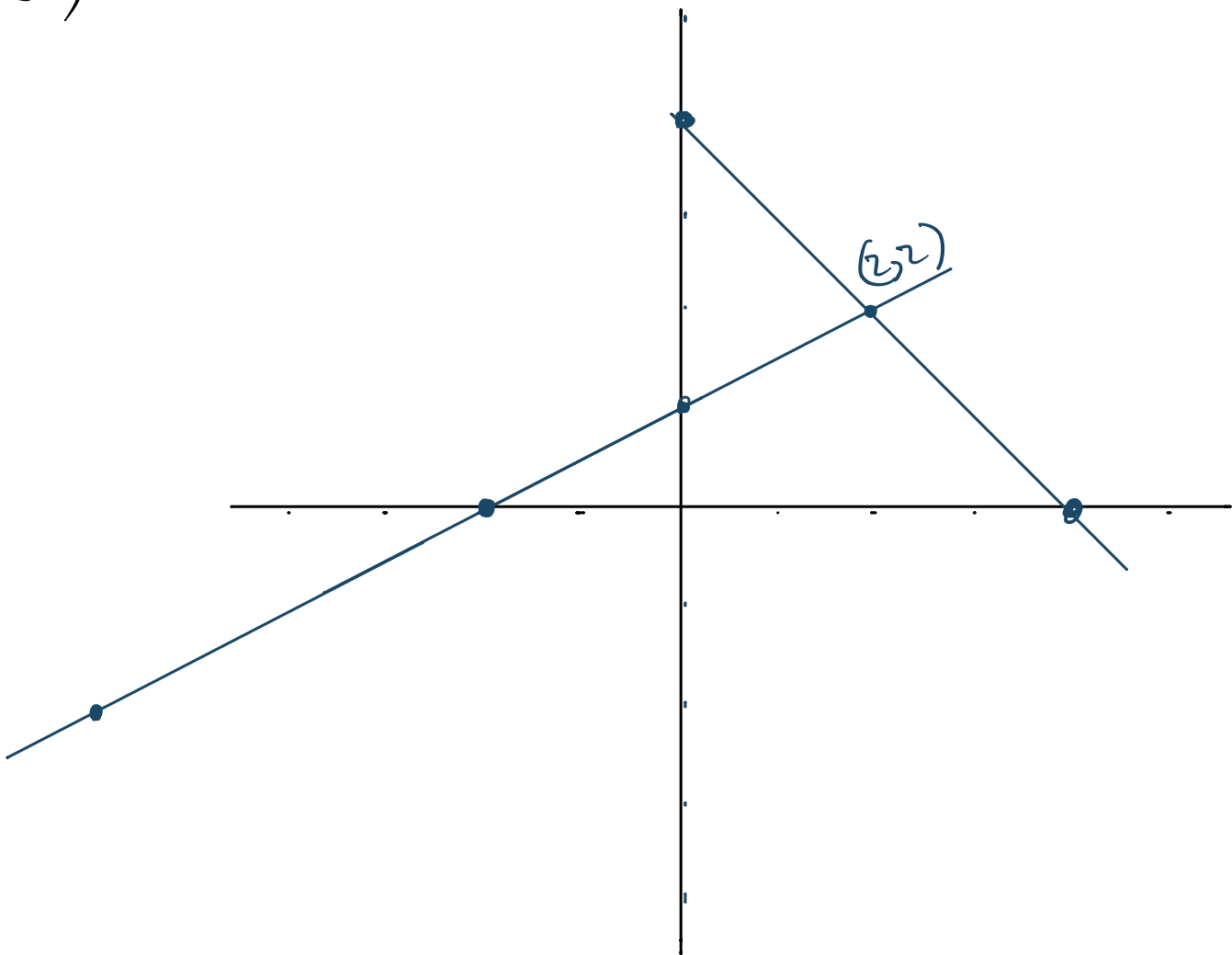
ii) Understanding linear systems

b) The greek alphabet rap song to familiarise with it

• application of linear algebra in controlling a segway.

↳ explains how matrices & vectors are used to describe & predict the segway's state.

2 a)



$$y = 0.5x + 1$$

$$y = 0 \quad \frac{-1}{0.5} = x = -2$$

$$x = 0 \quad y = 1$$

$$y = -x + 4$$

$$y = 0 \quad x = 4$$

$$x = 0 \quad y = 4$$

$$0.5x + 1 = -x + 4$$

$$1.5x = 3$$

$$x = 2$$

$$y = -2 + 4 = 2 \quad \text{Verified Graphically}$$

So it only meets at one point

b) (2,2) lie on the given system of linear equations

3a) Did on Julia check hw 1.ipynb

$$b) \quad 2x - y = -1$$

$$y = 2x + 1 = \text{eq 1}$$

$$-x + \frac{y}{2} = 2$$

$$\frac{y}{2} = x + 2$$

$$y = 2x + 4 = \text{eq 2}$$

$$4. \text{ when } y=0 \quad x = -1.75 \text{ \& } 1.25$$

$$y=2 \quad x = -2 \text{ \& } 1.5$$

$$5. 2x^2 + 3x - 2 = 0$$

$$4 = b^2 - 4ac = 9 - 4(2)(-2) = 9 + 16 = 25$$

$$\frac{-3 \pm 5}{4} = -0.75 \pm 1.25$$

$$x = -2 \text{ \& } 0.5 //$$

$$6. y - 4z = 2 \quad \text{--- i)}$$

$$2y - 10z = -2 \quad \text{--- ii)}$$

$$\text{ii}/2 = y - 5z = -1$$

$$y = -1 + 5z \quad \text{--- iii)}$$

$$\text{put iii) in i)} \quad -1 + 5z - 4z = 2$$

$$-1 + z = 2$$

$$z = 3 \quad \text{--- iv)}$$

$$\text{put iv) in ii)}$$

$$2y - 30 = -2$$

$$2y = 28$$

$$y = 14 //$$

$$Ax = b \text{ form}$$

$$\begin{bmatrix} 1 & -4 \\ 1 & -5 \end{bmatrix} \begin{bmatrix} y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$$