Matrices these are objects that rotate and stretch vectors.

Imagine buying apples and bananas,

a: apples b: bananas

$$\left.\begin{aligned} 2a + 3b &= 8 \\ 10a + 1b &= 13. \end{aligned}\right\}$$ each equation represents the cost of buying the respective amount of apples and bananas from independent stores.

Which price is more competitive?

↳ form of price discovery.

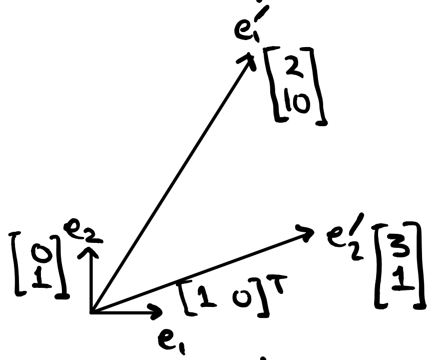
These linear equations can be represented by using a matrix,

$$\underbrace{\begin{bmatrix} 2 & 3 \\ 10 & 1 \end{bmatrix}}_{\text{2x2 Matrix.}} \underbrace{\begin{bmatrix} a \\ b \end{bmatrix}} = \underbrace{\begin{bmatrix} 8 \\ 13 \end{bmatrix}}$$

2x1 Column Matrix

Matrices transform vectors, for example e_1.

$$\begin{bmatrix} 2 & 3 \\ 10 & 1 \end{bmatrix}\begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 2 \\ 10 \end{bmatrix}$$



The question is what vector is required to get $\begin{bmatrix} 8 \\ 13 \end{bmatrix}$?

(*) Matrices transform the basis vectors.

With the understanding of matrices, can see why Linear Algebra is named so,

1. linear: takes input - then multiplies by constant values.
2. algebra: a notation describing mathematical objects and a system of manipulating those notations.

- manupupalating vectors in a space described by vectors
- relationship between simultaneous eq.s, matrices and vectors
  the key to solving simultaneous eq. is by how matrices transform vectors.