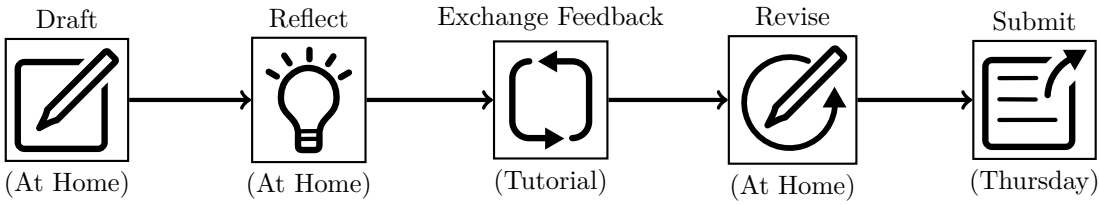
The PAR Process



Problem Statement

Let $T : \mathbb{R}^4 \to \mathbb{R}^4$ be a linear transformation with Jordan form given by $\begin{bmatrix} \alpha & 0 & 0 & 0 \\ 0 & \beta & 1 & 0 \\ 0 & 0 & \beta & 1 \\ 0 & 0 & 0 & \beta \end{bmatrix}$ (i.e., the matrix for T is similar to the given matrix). You also know $\alpha > 1$ is a real number and $0 < |\beta| < 1$.

Let $c : \mathbb{R}^4 \to \mathbb{R}$ be the function that returns the first coordinate of a vector when written in the standard basis. That is,

$$c(a\vec{e}_1 + b\vec{e}_2 + c\vec{e}_3 + d\vec{e}_4) = a.$$

Define the function $R_n : (\mathbb{R}^4 \backslash \{\vec{0}\}) \to \mathbb{R}$ by

$$R_n(\vec{v}) = \frac{c(T^n\vec{v})}{c(T^{n-1}\vec{v})}.$$

For a non-zero vector $\vec{v} \in \mathbb{R}^4$, what possible values can

$$\lim_{n\to\infty} R_n(\vec{v})$$

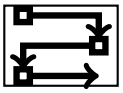
take?

Reflection

Turn the page and check off the icons for things you think you did well; circle the icons for things you would like feedback on.

Feedback Provided By:_____

Suggestions Communication **Strengths**

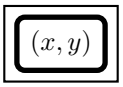


Show All Steps

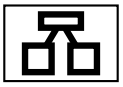
Explain Why,
Not Just What

Avoid Pronouns

Use Correct
Definitions

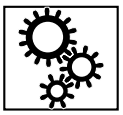


Define Variables,
Units, etc.

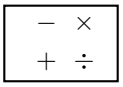


Create Diagrams

Suggestions Accuracy **Strengths**



Correct Setup



Accurate Calculations

Solve Multiple Ways

Answer Reasonable

Other
(Write Below)