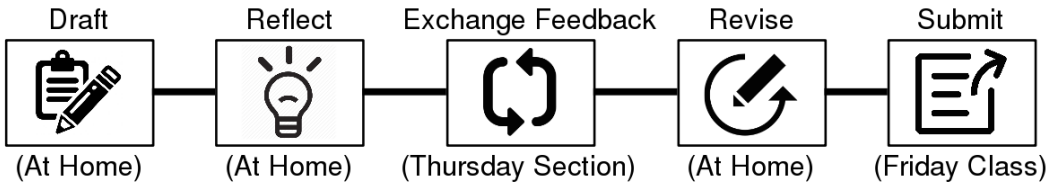
Math 240: Peer-Assisted Reflection #2

Due Dates: 10/6 (draft), 10/7 (final) Name: _____

The PAR Process



Important note: This week, you MUST type your response to at least one of the PAR problems in LaTeX.
LaTeX note: To produce the $\mathbb{R}$ symbol, import the package `amsfonts` and use the command `\mathbb{R}`.

Problem Statement

A **transformation** is a rule that turns input vectors into output vectors. For example, the following transformations turn vectors in $\mathbb{R}^2$ into other vectors in $\mathbb{R}^2$:

- Multiply the first component by 2
- Add 1 to the second component

A special kind of transformation is the transformation associated to a matrix A. This transformation turns the vector $\vec{v}$ into $A\vec{v}$.

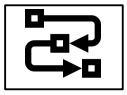
1. For each of the following matrices, describe the associated transformation in words. Explain how you got your answer.
   (a) $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$
   (b) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$
2. For each of the following transformations from $\mathbb{R}^2$ to $\mathbb{R}^2$, either find a matrix that gives the transformation, or explain why there is no such matrix.
   (a) Flip the sign of the first component.
   (b) Add 1 to the second component.
   (c) Rotate the vector counterclockwise (around the origin) by 90 degrees.
3. Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$, and $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$. Describe the transformations associated to A and B. Make sure to include a description of their domain and range as well as what the transformations do. Are both transformations the same? Explain how they are or aren't.
4. We often like to think of a vector in $\mathbb{R}^2$ as actually sitting in a plane in $\mathbb{R}^3$. Come up with a matrix whose corresponding transformation takes vectors in $\mathbb{R}^2$ and "sets them down" in $\mathbb{R}^3$. How many such matrices are there? Explain.

Reflection

Turn the page and check off the icons that you think you did well; circle icons that you want feedback on.

Feedback Provided By: _____

Suggestions Communication **Strengths**

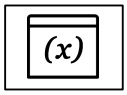


Show All Steps

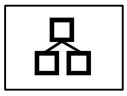
Explain Why,
Not Just What

Avoid Pronouns

Use Correct
Definitions



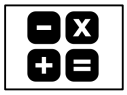
Define Variables,
Units, etc.



Create Diagrams

Suggestions Accuracy **Strengths**

Check Problem
Setup



Check Your
Calculations

Solve Multiple
Ways

Verify Answer
is Reasonable

Other
(Write Below)