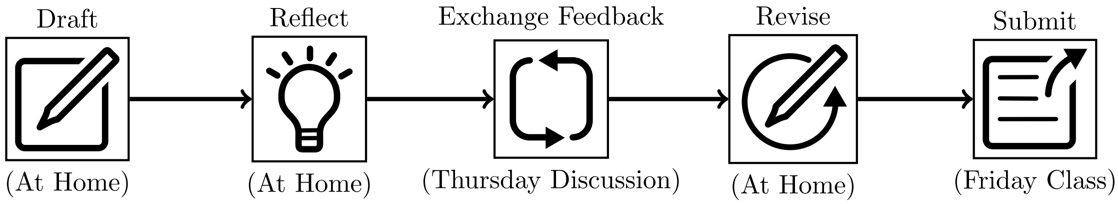
Math 240 | Due: 10/20 (draft), 10/21 (final)
PAR 3 (*April 6, 2017*) | **Name:**__________________________

The PAR Process



Problem Statement

Let M be a 3×4 matrix with unknown entries. You do know, however, that $\mathrm{rref}(M) = \begin{bmatrix} 1 & 2 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$.

1. Is there a vector $\vec{b}$ such that the matrix equation $M\vec{x} = \vec{b}$ is *consistent*? Explain why or why not, or whether you'd need more information to tell.
2. Is there a vector $\vec{b}$ such that the matrix equation $M\vec{x} = \vec{b}$ is *inconsistent*? Explain why or why not, or whether you'd need more information to tell.
3. Let $\vec{c}_1$, $\vec{c}_2$, $\vec{c}_3$, and $\vec{c}_4$ be the columns of the matrix M. For which i and j with $i \neq j$ is the set $\{\vec{c}_i, \vec{c}_j\}$ linearly dependent? For which is it linearly independent? Explain how you know.
4. Can a set of four vectors in $\mathbb{R}^3$ ever be linearly independent? Explain.
5. Suppose $\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4 \in \mathbb{R}^3$. Let $\mathcal{V} = \{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4\}$ and let $X = [\vec{v}_1|\vec{v}_2|\vec{v}_3|\vec{v}_4]$ be the matrix whose columns are $\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4$. Suppose further that every subset of $\mathcal{Y} \subset \mathcal{V}$ of *size two* is linearly independent. Explain what $\mathrm{rref}(X)$ must look like in this case. (*Hint: you won't be able to pin down exact numbers for every entry of* $\mathrm{rref}(X)$, *but you might know things like whether the entry can be zero or not, etc.*)

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)	