MATH 54 – QUIZ 6

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Name:_____

Instructions: You have 20 minutes to take this quiz, for a total of 10 points. May your luck form a vector space!

1. *(5 points)* Is the set W 2×2 **antisymmetric** matrices (with real entries) a subspace of the vectors space V of all 2×2 matrices (with real entries)?

   (A matrix A is antisymmetric if and only if $A^T = -A$. Equivalently[1], an antisymmetric 2×2 matrix is of the form $\begin{bmatrix} a & b \\ -b & c \end{bmatrix}$, where a, b, c are in $\mathbb{R}$.)

(TURN PAGE)

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[1]Technically, those are not the same, but for the purpose of this quiz assume they're the same

2. *(5 points)* Let $\mathcal{B} = \left\{ \begin{bmatrix} 1 \\ -2 \end{bmatrix}, \begin{bmatrix} 3 \\ -5 \end{bmatrix} \right\}$ be a basis of $\mathbb{R}^2$.

   (a) *(2 points)* Calculate the change-of-coordinates matrix $P_{\mathcal{B}}$ from $\mathcal{B}$ to the standard basis of $\mathbb{R}^2$

   (b) *(3 points)* Use (a) to calculate $[\mathbf{x}]_{\mathcal{B}}$ given $\mathbf{x} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$

3. *(0 points)* Assuming that your happiness is a vector space, what is the basis of your happiness? :)