

MATH 54, FALL 2016, QUIZ 5

- (1) Which of the following sets are vector spaces? Write either Yes or No to indicate your answer. Additionally, for each set that is a vector space indicate whether it is a subspace of any other vector space listed, and for each set that is not a vector space explain why it is not a vector space.
- (a) The set of nonnegative real numbers—i.e. $\{x \in \mathbb{R} \mid x \geq 0\}$.

 - (b) The set of differentiable functions $f : \mathbb{R} \rightarrow \mathbb{R}$ such that $\frac{d}{dx}f(x) = f(x)$.

 - (c) The set of constant functions from $\mathbb{R} \rightarrow \mathbb{R}$ —i.e. $\{f : \mathbb{R} \rightarrow \mathbb{R} \mid \forall x, y (f(x) = f(y))\}$.

 - (d) The set of noninvertible 5×5 matrices with entries in \mathbb{R} .

 - (e) The set of functions from \mathbb{R} to \mathbb{R} that are **not** one-to-one.

 - (f) The set of even functions from \mathbb{R} to \mathbb{R} —i.e. $\{f : \mathbb{R} \rightarrow \mathbb{R} \mid \forall x (f(x) = f(-x))\}$.

 - (g) The set of 5×5 matrices X such that $AX = 0$, where A is a 5×5 matrix.