Math 24
Spring 2012

Quiz 1

Sample Solutions

1. Complete the definition: The set X is *closed under addition* if

   $\boxed{\text{Whenever } x \text{ and } y \text{ are in } X, \text{ their sum } x + y \text{ is also in } X.}$

2. $\boxed{\text{TRUE}}$ OR FALSE? (True because the set of functions from any set S to $\mathbb{R}$ is a vector space over $\mathbb{R}$, which the text calls $\mathcal{F}(S, \mathbb{R})$.)

   The set of all functions from the closed unit interval $[0, 1]$ to the real numbers is a vector space over $\mathbb{R}$.

3. TRUE OR $\boxed{\text{FALSE}}$? (False because this set does not include the zero matrix, so it cannot be a subspace.)

   $\left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \;\middle|\; a \neq 0 \right\}$ is a subspace of $M_{2\times 2}(\mathbb{R})$.

4. $\boxed{\text{TRUE}}$ or FALSE? (True because the intersection of subspaces always contains the zero vector.)

   If W_1 and W_2 are subspaces of the vector space V, then $W_1 \cap W_2 \neq \emptyset$. (The symbol $\emptyset$ denotes the empty set, which has no elements.)