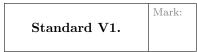
Name:	
J#:	Dr. Clontz
Date:	

## MASTERY QUIZ DAY 14

Math 237 – Linear Algebra Fall 2017

## Version 1

Show all work. Answers without work will not receive credit. You may use a calculator, but you must show all relevant work to receive credit for a standard.



Let V be the set of all points on the line x + y = 2 with the operations, for any  $(x_1, y_1), (x_2, y_2) \in V$ ,  $c \in \mathbb{R}$ ,

$$(x_1, y_1) \oplus (x_2, y_2) = (x_1 + x_2 - 1, y_1 + y_2 - 1)$$
  
 $c \odot (x_1, y_1) = (cx_1 - (c - 1), cy_1 - (c - 1))$ 

- (a) Show that this vector space has an additive identity element  $\mathbf{0}$  satisfying  $(x,y) \oplus \mathbf{0} = (x,y)$ .
- (b) Determine if V is a vector space or not. Justify your answer.

Determine if the vectors 
$$\begin{bmatrix} 2 \\ 0 \\ -2 \\ 0 \end{bmatrix}$$
,  $\begin{bmatrix} 3 \\ 1 \\ 3 \\ 6 \end{bmatrix}$ , and  $\begin{bmatrix} 1 \\ 2 \\ 0 \\ 1 \end{bmatrix}$  span  $\mathbb{R}^4$ .

Standard V4. 
$$\begin{bmatrix} x \\ y \\ 0 \\ z \end{bmatrix} \mid x, y, z \in \mathbb{R}$$
 a subspace of  $\mathbb{R}^4$ .

Standard S2.

Mark:

Determine if the set  $\{x^3 - x, x^2 + x + 1, x^3 - x^2 + 2, 2x^2 - 1\}$  is a basis of  $\mathcal{P}_3$ 

Additional Notes/Marks