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.

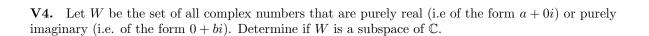
V1. Let V be the set of all points on the parabola $y = x^2$ with the operations, for any $(x_1, y_1), (x_2, y_2) \in V, c \in \mathbb{R}$,

$$(x_1, y_1) \oplus (x_2, y_2) = (x_1 + x_2, y_1 + y_2 + 2x_1x_2)$$

 $c \odot (x_1, y_1) = (cx_1, c^2y_1)$

- (a) Show that the vector **addition** \oplus is **associative**: $(x_1, y_1) \oplus ((x_2, y_2) \oplus (x_3, y_3)) = ((x_1, y_1) \oplus (x_2, y_2)) \oplus (x_3, y_3).$
- (b) Determine if V is a vector space or not. Justify your answer.

V3. Determine if the vectors
$$\begin{bmatrix} 2\\0\\-2\\0 \end{bmatrix}$$
, $\begin{bmatrix} 3\\1\\3\\6 \end{bmatrix}$, $\begin{bmatrix} 0\\0\\1\\1 \end{bmatrix}$, and $\begin{bmatrix} 1\\2\\0\\1 \end{bmatrix}$ span \mathbb{R}^4 .



S2. Determine if the set $\{2x^2 - x + 3, 2x^2 + 2, -x^2 + 4x + 1\}$ is a basis of \mathcal{P}^2 .