MATH 2090: Linear Algebra 2   **Dr. S. Cooper, Fall 2018**

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Dictionary Quiz 1 (B02 & B03)
Sample Solutions

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Name and Student Number: _____

In the space provided, please write your solutions to the following exercises. *Fully explain your work.* Remember to use good notation and full sentences. For full credit you must also demonstrate serious effort on the Tutorial Worksheet.

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Good Luck!

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1. Let V be a set and fix the field $\mathbb{F}$ (for us, $\mathbb{F} = \mathbb{R}$ or $\mathbb{F} = \mathbb{C}$).

   (a) Complete the following definition: [2 pts]

   An *addition* operation on V is

   Solution: a function that assigns an element $\mathbf{x} + \mathbf{y}$ in V to each pair of elements $\mathbf{x}$ and $\mathbf{y}$ in V.

   (b) Give an example of an addition operation on a set V which is not $\mathbb{R}^n$. For full credit, your answer must explicitly state the set V, the field $\mathbb{F}$ and the addition operation.   [2 pts]

   Solution: There are many examples. One example is to let $V = \mathcal{P}_n(\mathbb{R})$ which is the set of polynomials of degree at most n with real coefficients and to let $\mathbb{F}$ be the real numbers. Then for $p(x) = a_0 + a_1 x + \cdots + a_n x^n$ and $q(x) = b_0 + b_1 x + \cdots + b_n x^n$ in $\mathcal{P}_n(\mathbb{R})$ we define "vector addition" by

   $$p(x) + q(x) = (a_0 + b_0) + (a_1 + b_1)x + \cdots + (a_n + b_n)x^n.$$

2. You have demonstrated serious effort on the Tutorial Worksheet.   [1 pt]

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