MAT 1341 D, Quiz 1

February 4, 2019

Length: 15 minutes.

Professor: Michael Reeks.

Family name:_____

First name:_____

Student number:_____

1	
2	
3	
Total	

PLEASE CAREFULLY READ THESE INSTRUCTIONS:

1. Carefully read each question and **record your responses in the space provided on this page as well as the question page.**
2. You are not allowed to consult your notes or any books. Calculators, phones, and other electronic devices are not allowed.
3. There are three multiple choice questions, each worth 1 point. No partial credit will be awarded. **You must indicate the method you used to select the correct answer; unjustified answers will not be given credit.**

   Record your answers both on the question page and on the title page.

1. Which of the following subsets are subspaces of $M_2(\mathbb{R})$?

A. $\left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \; ; \; a+d=0 \right\}$

B. $\left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \; ; \; ad=1 \right\}$

C. $\left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \; ; \; a,\, b,\, c,\, d \text{ are integers} \right\}$

D. $\left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \; ; \; ad-bc=0 \right\}$

E. $\left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \; ; \; a=1 \right\}$

F. None of these subsets are subspaces.

2. Let $W = \{(x, y, z) \in \mathbb{R}^3 \mid x + y - z = 0\}$. Which of the following subsets of $\mathbb{R}^3$ are a spanning set for W?

A. $\{(0, 0, 0)\}$

B. $\{(1, 1, -1)\}$

C. $\{(-1, 1, 0), (1, -1, 0)\}$

D. $\{(1, 0, 1)\}$

E. $\{(-1, 1, 0), (1, 0, 1)\}$

F. $\{(1, 1, -1), (-1, 1, 0)\}$

3. Let $\mathbb{P}_2 = \{\ p \mid p(x) = a + bx + cx^2,\ \text{where } a, b, c \in \mathbb{R}\}$, the vector space consisting of polynomials of degree less than or equal to 2 with real coefficients.

Consider the following subset of $\mathbb{P}_2$:

$$S = \{x^2 - 1,\ x^2 + 1,\ x - 1,\ x + 1\}$$

Which of the following statements about S is true?

I. S is linearly dependent
II. S is linearly independent
III. S spans $\mathbb{P}_2$
IV. S is a basis of $\mathbb{P}_2$

A. (I) and (II)
B. (I) and (III)
C. (II) and (IV)
D. (II) and (III)
E. (I), (III) and (IV)
F. (III) and (IV)