Quiz N°1 Math 302_122 (February 18, 2013)

KFUPM **Semester 122**

Dept. Math. &Stat. **A.Y:2012/2013**

Name: .....

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Exercise 1

determine which of the following are subspaces of R^3.

(a) all vectors of the form $(a, 0, 0)$

(b) all vectors of the form $(a, 1, 1)$

(c) all vectors of the form (a, b, c), where $b = a + c$

(d) all vectors of the form (a, b, c), where $b = a + c + 1$

(e) all vectors of the form $(a, b, 0)$

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Exercise 2

Find a set to span the given subspace of the given space.

(a) the xz-plane in $\mathbb{R}^3$

(b) $\left\{ \begin{pmatrix} x \\ y \\ z \end{pmatrix} \mid 3x + 2y + z = 0 \right\}$ in $\mathbb{R}^3$

(c) $\left\{ \begin{pmatrix} x \\ y \\ z \\ w \end{pmatrix} \mid 2x + y + w = 0 \text{ and } y + 2z = 0 \right\}$ in $\mathbb{R}^4$

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Exercise 3

Find a basis for the solution set of this system.

$$\begin{aligned} x_1 - 4x_2 + 3x_3 - x_4 &= 0 \\ 2x_1 - 8x_2 + 6x_3 - 2x_4 &= 0 \end{aligned}$$

Exercise 4

Find the rank of each matrix.

(a) $\begin{pmatrix} 2 & 1 & 3 \\ 1 & -1 & 2 \\ 1 & 0 & 3 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & -1 & 2 \\ 3 & -3 & 6 \\ -2 & 2 & -4 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 3 & 2 \\ 5 & 1 & 1 \\ 6 & 4 & 3 \end{pmatrix}$

(d) $\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$