

Name: \_\_\_\_\_  
Student ID #: \_\_\_\_\_

**Mini-Quiz # 9**  
MAT-022A-Summer Session II (8/28/09)

You have 10 minutes. You may only use a pencil (or pen) and scrap paper.

1. Write down a basis for the following vector spaces and write down their dimension. You do not have to show any work. (2 points each)

(a)  $\mathbb{R}^6$

Dimension:6

$(1, 0, 0, 0, 0, 0)$   $(0, 1, 0, 0, 0, 0)$   $(0, 0, 1, 0, 0, 0)$   $(0, 0, 0, 1, 0, 0)$   $(0, 0, 0, 0, 1, 0)$   $(0, 0, 0, 0, 0, 1)$

(b)  $P_5$

Dimension:6

$\{1, x, x^2, x^3, x^4, x^5\}$

(c)  $\mathbb{R}^{3 \times 2} = M_{32}$

Dimension:6

$\begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 \\ 1 & 0 \\ 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 1 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 1 \end{bmatrix}$

(d) The space of all  $3 \times 3$  upper triangular matrices

Dimension:6

$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

(e) The space of all  $2 \times 2$  symmetric matrices

Dimension:3

$\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$   $\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$   $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$