QUIZ October 11, 2013

Clicker Instructions: A = True; B = False;
C = I don't know; D = No truth value
correct = 1pt; don't know = 0pt; wrong = 0pt

1. Consider the basis

$$\mathcal{B} := \left\{ \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \end{bmatrix} \right\}$$

of the space $\mathbb{R}^2$. The vector $\mathbf{x} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ can be given coordinates relative to $\mathcal{B}$ as follows:

$$[\mathbf{x}]_{\mathcal{B}} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}.$$

2. The dimension of $\text{Span}\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n\}$ is the number of pivot columns of the matrix formed by using the $\mathbf{v}_i$ as column vectors.
3. For a square matrix A, the following three things are equivalent: A is invertible; A is onto; and A is one-to-one.
4. A matrix is onto if and only if its rank is equal to the number of column vectors it has.
5. A matrix is one-to-one if and only if its rank is equal to the number of column vectors it has.
6. If you have a matrix whose reduced echelon form has exactly 2 free variables and exactly 3 basic variables, then it has exactly 5 columns total.