

QUIZ September 9, 2013

Clicker Instructions: A = True; B = False;

C = I don't know; D = No truth value

correct = 1pt; don't know = 0pt; wrong = -1pt

1.

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 6 \\ 5 \end{bmatrix} = \begin{bmatrix} 16 \\ 38 \end{bmatrix}$$

2. The equation $A\mathbf{x} = \mathbf{b}$ has a solution if and only if \mathbf{b} is a linear combination of the columns of A .

3. Let

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$$

The set of \mathbf{b} such that $A\mathbf{x} = \mathbf{b}$ is consistent is a line.

4. An $n \times m$ matrix can have at most n pivot positions.

5. The largest space the columns of an $m \times n$ matrix could span is \mathbf{R}^n .

6. Let $\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3, \dots, \mathbf{a}_m$ be m vectors in \mathbf{R}^n . Then the following two statements are logically equivalent:

(a) For each $\mathbf{b} \in \mathbf{R}^n$, the matrix equation $A\mathbf{x} = \mathbf{b}$ corresponding to the vector equation

$$\mathbf{a}_1x_1 + \dots + \mathbf{a}_mx_m = \mathbf{b}$$

has a solution.

(b) For each $\mathbf{b} \in \mathbf{R}^n$, the augmented matrix of the vector equation

$$\mathbf{a}_1x_1 + \dots + \mathbf{a}_mx_m = \mathbf{b}$$

has a pivot position in every row.