

Circle your answer(s) to each question. There may be more than one correct answer; circle every one you think is correct. Use the back of the paper for any necessary work.
 No consultation!—that includes no electronics.

(1) We have a matrix $A = [\mathbf{a}_1 \quad \mathbf{a}_2 \quad \cdots \quad \mathbf{a}_n]$ and a vector $\mathbf{b} = \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{bmatrix}$. The product $\mathbf{A}\mathbf{b} =$

$$b_1\mathbf{a}_1 + b_2\mathbf{a}_2 + b_3\mathbf{a}_3$$

$$b_1\mathbf{a}_1 + b_2\mathbf{a}_2 + \cdots + b_n\mathbf{a}_n$$

$$\sum_{i=1}^n b_i\mathbf{a}_i$$

$$b_1\mathbf{a}_1 + b_2\mathbf{a}_2 + b_n\mathbf{a}_n$$

(2) Which of these matrices is (or are) in reduced row echelon form?

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad \begin{bmatrix} 1 & 2 \\ 0 & 3 \\ 0 & 1 \end{bmatrix} \quad \begin{bmatrix} 1 & 2 \\ 0 & 1 \\ 0 & 0 \end{bmatrix} \quad [0 \ 0 \ 1 \ 2] \quad \begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 & 0 \\ 1 & 2 \\ 0 & 0 \end{bmatrix} \quad \textit{None}$$

(3) Circle each matrix that is row equivalent to $A = \begin{bmatrix} 2 & 6 & 8 \\ 3 & 9 & 12 \end{bmatrix}$. (There is at least one.)

$$\begin{bmatrix} 0 & 2 & 3 \\ 1 & 3 & 4 \end{bmatrix} \quad \begin{bmatrix} 0 & 0 & 0 \\ 1 & 3 & 4 \end{bmatrix} \quad \begin{bmatrix} 1 & 3 & 4 \\ 2 & 6 & 8 \end{bmatrix} \quad [1 \ 3 \ 4]$$

(4) Which of these four potential solutions is/are really a solution to the following linear system?

$$\begin{aligned} 2x_1 - 4x_2 + x_4 &= 0 \\ 3x_1 + x_2 + x_3 - 10x_4 &= 1 \end{aligned}$$

The potential solutions:

$$\mathbf{x} = \begin{bmatrix} 2 \\ 0 \\ 7 \\ -4 \end{bmatrix}$$

$$\mathbf{x} = \begin{bmatrix} 2 \\ 0 \\ -45 \\ -4 \end{bmatrix}$$

$$x_1 = 2, x_2 = 0, x_3 = 7, x_4 = -4$$

$$x_1 = 2, x_2 = 0, x_3 = -45, x_4 = -4$$