

Name: _____

R. Hammack

Score: _____

Directions: Please answer all questions in the space provided.

Use of calculators or any form of electronic communication device is strictly forbidden on this quiz.

1. Solve the system
$$\begin{cases} 5x_1 - 10x_2 - 5x_3 + 15x_4 = 25 \\ -3x_1 + 6x_2 + 2x_3 + x_4 = 5 \end{cases}$$

$$\begin{aligned} & \begin{bmatrix} 5 & -10 & -5 & 15 & 25 \\ -3 & 6 & 2 & 1 & 5 \end{bmatrix} \xrightarrow{\frac{1}{5}R_1 \rightarrow R_1} \begin{bmatrix} 1 & -2 & -1 & 3 & 5 \\ -3 & 6 & 2 & 1 & 5 \end{bmatrix} \xrightarrow{R_2 + 3R_1 \rightarrow R_2} \\ & \begin{bmatrix} 1 & -2 & -1 & 3 & 5 \\ 0 & 0 & -1 & 10 & 20 \end{bmatrix} \xrightarrow{-R_2 \rightarrow R_2} \begin{bmatrix} 1 & -2 & -1 & 3 & 5 \\ 0 & 0 & 1 & -10 & -20 \end{bmatrix} \xrightarrow{R_1 + R_2 \rightarrow R_1} \\ & \begin{bmatrix} 1 & -2 & 0 & -7 & -15 \\ 0 & 0 & 1 & -10 & -20 \end{bmatrix} \end{aligned}$$

The new system is
$$\begin{cases} x_1 - 2x_2 - 7x_4 = -15 \\ x_3 - 10x_4 = -20 \end{cases}$$

So
$$\begin{cases} x_1 = 2x_2 + 7x_4 - 15 \\ x_3 = 10x_4 - 20 \end{cases}$$

Solution:
$$x_1 = 2s + 7t - 15 \quad x_2 = s \quad x_3 = 10t - 20 \quad x_4 = t$$