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5pts

1. 4 pts. Find the general solution of the system whose augmented matrix is as follows:

$R_1' = R_1 - 4R_2$

Just checking my work

$78 + 9 + 7 = 5$

$-24 + 9 + 21$

$-3 + 9 = 6$

$\begin{bmatrix} 1 & 3 & 4 & 7 \\ 3 & 9 & 7 & 6 \end{bmatrix}$

$R_2' = R_2 - 3R_1$

$\begin{array}{cccc} 1 & 3 & 4 & 7 \\ \underline{0\,0} & -4 & -12 \\ 1 & 3 & 0 & -5 \end{array}$

$-3 -9 -12 -21$

$\dfrac{3\ 9\ 7\ 6}{0\ 0\ -5\ -15}$

$\Downarrow$

$\begin{bmatrix} 1 & 3 & 0 & -5 \\ 0 & 0 & 1 & 3 \end{bmatrix}$

$-8 + 3 \cdot 1 + 4 \cdot 3$

$-5 + 12 = 7$

$\begin{bmatrix} 1 & 3 & 4 & 7 \\ 0 & 0 & -5 & -15 \end{bmatrix}$

$R_3' = -\frac{1}{5} R_3$

$\Downarrow$

$\begin{bmatrix} 1 & 3 & 4 & 7 \\ 0 & 0 & 1 & 3 \end{bmatrix}$

$X_1 + 3x_2 = -5$

$\boxed{\begin{array}{l} X_1 = -5 - 3x_2 \\ x_2 \text{ is free} \\ X_3 = 3 \end{array}}$

2. 1 pt. Suppose the given matrix represents the augmented matrix for a system of linear equations. Determine if the system is consistent. If the system is consistent, determine if the solution is unique.

$\begin{bmatrix} \blacksquare & * & * & * \\ 0 & \blacksquare & * & * \\ 0 & 0 & \blacksquare & 0 \end{bmatrix}$

This system is [consistent] since it cannot have a row in the form

[0 0 0 □] in the reduced echelon matrix.

It's also [unique] since each column in the coefficient matrix would have a pivot (i.e. no all zero row in augmented matrix and no free variables)