Name ____ Quiz 2

1) Use an augmented matrix and row operations to find the inverse of the matrix below.

$$A = \begin{bmatrix} 2 & 2 & -1 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\left[\begin{array}{ccc|ccc} 2 & 2 & -1 & 1 & 0 & 0 \\ 0 & 1 & 3 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right] \sim_R \left[\begin{array}{ccc|ccc} 2 & 0 & -7 & 1 & -2 & 0 \\ 0 & 1 & 3 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right] \quad R_1 \to R_1 - 2R_2$$

$$\sim_R \left[\begin{array}{ccc|ccc} 2 & 0 & -7 & 1 & -2 & 0 \\ 0 & 1 & 0 & 0 & 1 & -3 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right] \quad R_2 \to R_2 - 3R_3$$

$$\sim_R \left[\begin{array}{ccc|ccc} 2 & 0 & 0 & 1 & -2 & 7 \\ 0 & 1 & 0 & 0 & 1 & -3 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right] \quad R_1 \to R_1 + 7R_3$$

$$\sim_R \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{1}{2} & -1 & \frac{7}{2} \\ 0 & 1 & 0 & 0 & 1 & -3 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right] \quad R_1 \to \frac{1}{2}R_1$$

$$A^{-1} = \begin{bmatrix} \frac{1}{2} & -1 & \frac{7}{2} \\ 0 & 1 & -3 \\ 0 & 0 & 1 \end{bmatrix}$$

2) Find a vector that is a linear combination of $\vec{u}$ and $\vec{v}$ below. Justify your answer.

$$\vec{u} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 2 \\ 3 \end{bmatrix} \quad \vec{v} = \begin{bmatrix} 0 \\ 1 \\ 1 \\ 2 \\ 0 \end{bmatrix}$$

Anything that looks like $a\vec{u} + b\vec{v}$, such as $\vec{u} + \vec{v} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 4 \\ 3 \end{bmatrix}$.