

Quiz 3

1. (4 points) Rewrite the Linear System below as

$$\begin{cases} 3x_1 - 4x_2 = 11 \\ -x_1 - 3x_2 = 2 \end{cases}$$

- a. a vector equation

$$\begin{bmatrix} 3 \\ -1 \end{bmatrix} x_1 + \begin{bmatrix} -4 \\ -3 \end{bmatrix} x_2 = \begin{bmatrix} 11 \\ 2 \end{bmatrix}$$

OR $\begin{bmatrix} 3 \\ -1 \end{bmatrix} x_1 - \begin{bmatrix} 4 \\ 3 \end{bmatrix} x_2 = \begin{bmatrix} 11 \\ 2 \end{bmatrix}$

- b. a matrix equation

$$\begin{bmatrix} 3 & -4 \\ -1 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 11 \\ 2 \end{bmatrix}$$

2. (6 points) Use the three vectors \bar{u} , \bar{v} , and \bar{w} as defined below to compute the expressions in parts (a) through (c) as vectors.

$$\bar{u} = \begin{bmatrix} 1 \\ -5 \\ 0 \end{bmatrix}, \quad \bar{v} = \begin{bmatrix} 4 \\ -2 \\ -7 \end{bmatrix}, \quad \bar{w} = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$$

a. $\bar{u} + \bar{v} = \begin{bmatrix} 1 \\ -5 \\ 0 \end{bmatrix} + \begin{bmatrix} 4 \\ -2 \\ -7 \end{bmatrix} = \begin{bmatrix} 5 \\ -7 \\ -7 \end{bmatrix}$

b. $3\bar{u} - 5\bar{v} = 3 \begin{bmatrix} 1 \\ -5 \\ 0 \end{bmatrix} - 5 \begin{bmatrix} 4 \\ -2 \\ -7 \end{bmatrix} = \begin{bmatrix} 3 \\ -15 \\ 0 \end{bmatrix} + \begin{bmatrix} -20 \\ 10 \\ 35 \end{bmatrix} = \begin{bmatrix} -17 \\ -5 \\ 35 \end{bmatrix}$

c. $2\bar{w} - \bar{u} = 2 \begin{bmatrix} 2 \\ -3 \end{bmatrix} - \begin{bmatrix} 1 \\ -5 \\ 0 \end{bmatrix} = \text{no answer, can't add b/c vectors are not the same size}$