

## THE CARPET RIDE PROBLEM: GETTING BACK HOME

Name \_\_\_\_\_ Group Members \_\_\_\_\_

Suppose you are now in a three-dimensional world for the carpet ride problem, and you have three modes of

transportation:  $\mathbf{v}_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ ,  $\mathbf{v}_2 = \begin{bmatrix} 6 \\ 3 \\ 8 \end{bmatrix}$ ,  $\mathbf{v}_3 = \begin{bmatrix} 4 \\ 1 \\ 6 \end{bmatrix}$ .

You are only allowed to use each mode of transportation **once** (in the forward or backward direction) for a fixed amount of time ( $c_1$  on  $\mathbf{v}_1$ ,  $c_2$  on  $\mathbf{v}_2$ ,  $c_3$  on  $\mathbf{v}_3$ ). Find the amounts of time on each mode of transportation ( $c_1$ ,  $c_2$ , and  $c_3$ , respectively) needed to go on a journey that starts and ends at home OR explain why it is not possible to do so.

As a group, state and explain your answer(s) on the group whiteboard. Use the vector notation for each mode of transportation as part of your explanation and use a diagram or graphic to help illustrate your point(s).

**After you have completed the part above, answer the questions on the back of the page:**

1. Is there more than one way to make a journey that meets the requirements described above? (In other words, are there different combinations of times you can spend on the modes of transportation so that you can get back home?) If so, how?

2. Is there anywhere in this 3D world that Gauss could hide from you? If so, where? If not, why not?

3. What is  $\text{span}\left\{\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 6 \\ 3 \\ 8 \end{bmatrix}, \begin{bmatrix} 4 \\ 1 \\ 6 \end{bmatrix}\right\}$ ?