

Not to be turned in

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Name

Be sure to re-read the **WRITING GUIDELINES rubric**, since it defines how your project will be graded. In particular, you may discuss this project with others but **you may not collaborate on the written exposition of the solution.**

*“ ‘Know thyself?’ If I knew myself, I’d run away.” – Johann von Goethe*

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Do one (1) of the following.

1. When learning new material it is often illuminating to “think backwards” about new concepts. As a first example, find a system of linear equations with three equations and the three unknowns  $x$ ,  $y$ , and  $z$ , whose solution set is

$$\left\{ \left[ \begin{array}{c} 3s - 2t \\ -1 + s + 3t \\ 4 - 2s + t \end{array} \right] : s, t \in \mathbf{C} \right\}.$$

Note that this solution set is written in a different form than those you have seen in the text.

2. Consider the  $2 \times 2$  system of equations

$$\begin{aligned} ax_1 + bx_2 &= f_1 \\ cx_1 + dx_2 &= f_2. \end{aligned}$$

- (a) Show that if  $ad - bc \neq 0$ , then this system is consistent and has exactly one solution.
- (b) Show that if this system is either inconsistent or has infinitely many solutions then  $ad - bc = 0$ .