to accompany Spence, Insel & Friedberg’s *Elementary Linear Algebra*.

Work with a partner if you wish. If you do, put both names above and turn in one solution. You can do the matrix reduction by hand, or use a calculator or software.

Record answers on this page. Attach sheets where you explain your answers: for each question, write any equations and matrices you use, show any hand work, and explain succinctly but clearly how you arrived at each answer.

A farming supply store has three different mixtures of bluegrass and rye seeds. The following table describes the proportion of each type of seed in these mixes (a similar example is on page 15 in our text, *Elementary Linear Algebra*, by Spence, Insel and Friedberg):

<table>
<thead>
<tr>
<th></th>
<th>Deluxe mix</th>
<th>Standard mix</th>
<th>Economy mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>bluegrass</td>
<td>.9</td>
<td>.7</td>
<td>.4</td>
</tr>
<tr>
<td>rye</td>
<td>.1</td>
<td>.3</td>
<td>.6</td>
</tr>
</tbody>
</table>

The store manager wants to create a new "Western Special" mix which will be 0.6 bluegrass and 0.4 rye.

(4) 1. How could they mix $x_1$ pounds of Deluxe, $x_2$ pounds of Standard, and $x_3$ pounds of Economy to create one pound of the new Special mix? Record the general solution here:

$$x_1 = \quad \quad x_2 = \quad \quad x_3 =$$

(3) 2. Suppose the three mixes in stock cost: $10/lb. (Deluxe), $8/lb. (Standard), and $4/lb. (Economy). What values of $x_1$, $x_2$ and $x_3$ will create the lowest cost Special mix, and what will it cost per pound?

$$x_1 = \quad \quad x_2 = \quad \quad x_3 = \quad \quad \text{Cost/lb. of Special mix} =$$

(3) 3. Suppose the three mixes in stock cost: $10/lb. (Deluxe), $6/lb. (Standard), and $4/lb. (Economy). Now what values of $x_1$, $x_2$ and $x_3$ will create the lowest cost Special mix, and what will it cost per pound?

$$x_1 = \quad \quad x_2 = \quad \quad x_3 = \quad \quad \text{Cost/lb. of Special mix} =$$