WRITE ALL SOLUTIONS IN THE SPACE PROVIDED; FULL CREDIT WILL NOT BE GIVEN WITHOUT CORRECT ACCOMPANYING WORK. FULLY SIMPLIFY ALL ANSWERS AND GIVE EXACT ANSWERS UNLESS OTHERWISE STATED. WHERE PROVIDED, PUT YOUR FINAL ANSWER IN THE BLANK PROVIDED. REMEMBER YOUR UNITS!
1. The quantity demanded of a certain camera phone is 5000 a week when it is priced at $160 each. For each decrease in unit price of $10 below $160, the quantity demanded increases by 800. The supply equation is \( 148p - 11840 = x \) where \( p \) is the unit price in dollars and \( x \) is the quantity of camera phones.

(8pts) \( p = \) _____________________________

a. What is the demand equation?

(8pts) ______________________________

b. Including the units, what is the equilibrium point?

2. Solve the system of equations using Gauss-Jordon row operations to yield a reduced row echelon form. This can be done in two steps. You may either give the GJ row operation notation or the calculator command.

\[
\begin{align*}
2x + 4y &= 6 \\
3x + 6y &= 9
\end{align*}
\]

(8pts) a. ______________________________ is the first GJ row operation.

(4pts) b. ______________________________ is the second GJ row operation.

(8pts) c. ______________________________ Solve the system by any method. If the answer is a point, give the point. If there is no solution, write “no solution.” If there are an infinite number of solutions, give the set of all solutions, plus one particular solution.
3. (8pts) Solve for n.

\[
\begin{bmatrix}
 n \\
 3
\end{bmatrix} = \begin{bmatrix}
 10 \\
 -4
\end{bmatrix}
\]

4. The following table shows the annual number of eyeglasses donated to the Lions Club in the City of Aggieland in certain years. Let x be the number of years after 1998 and y be number of eyeglasses donated.

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>2000</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Eyeglasses Donated</td>
<td>420</td>
<td>500</td>
<td>525</td>
<td>520</td>
<td>565</td>
<td>580</td>
</tr>
</tbody>
</table>

(8pts) ________________________________ a. Find the linear regression equation. Give the coefficients to 4 decimal places.

(4pts) ________________________________ b. Using the linear regression equation, to the nearest whole number, how many eyeglasses would you predict donated in the year 2007?

(8pts) ________________________________ 5. What is the linear depreciation rate (remember your units) if an $8400 commercial refrigerator is worth $6150 five years later?
6. An investor wants to invest $500,000 in three funds: a bond fund, a money market fund, and a stock fund. The investor will invest three times as much in the bond and stock funds as in the money market fund. The weighted average return of all investments is $40,750, where the bond fund gets a 7% return, the money market gets a 5% return, and the stock fund gets a 10% return. How much money should be invested in each fund? Give your answer as a complete sentence.

a. (3pts) Define your variables.

b. (3pts) Write the systems of equations.

c. (3pts) Give your answer as a complete sentence.

(8pts) ________________________

7. To produce x stuffed animals, it costs, in dollars, \( C(x) = 8.25x + 12000 \). If 1200 stuffed animals are produced and sold, there is a loss of $5700. What is the selling price of one stuffed animal?
8. What is the equation of the line through the point (8, 4) that is perpendicular to the x-axis?

9. Assume a model with fuel cells and water. Each of these industries acts as a supplier and user of their own products. The production of 1 unit of fuel cell energy requires the consumption of 0.2 units of fuel cell energy and 0.18 units of pure water. The production of 1 unit of pure water requires the consumption of 0.5 units of fuel cell energy and 0.10 units of water. Find the gross output production of each needed if the external demand is 8379 units of fuel cell energy and 3969 units of water. Give your answer as a complete sentence.

   a. (4pts) What is the input-output matrix A?

   b. (2pts) What is the demand matrix D?

   c. (2pts) What is an equation needed relating A and D to be able to solve this problem?

   d. (3pts) What is the gross output production of each? Give your answer as a complete sentence.

   e. (3pts) Find the number of units of fuel cell energy and of water consumed in the internal production in order to meet this gross output.