Sample Questions for Exam #1

The following list of questions is designed to give you an idea of the difficulty level of questions that I will ask on the first midterm exam. This list is not comprehensive – there are questions I could ask that are not on here. You are responsible for all the material we have covered in this course, in class, in homework and with online quizzes. But this should serve as a guide to the level of mastery I will be looking for. This list of questions is slightly longer than the actual test will be.

You will have fifty minutes to take this exam. You will be allowed to use a single sheet (8”x11”) of notes (both sides) and a graphing calculator during the exam. No other references will be allowed.

I will not answer further questions about what will or will not be on the exam.

1. Find an equation for a line through the points (1.1, 3) and (2.6, 0). (Section 1.2)

2. Find an equation for a line of best fit for the following table of data, and use it to predict the tuition cost per credit at GRCC in 2010. (Section 1.3)

<table>
<thead>
<tr>
<th>Year</th>
<th>GRCC Tuition Cost Per Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$547</td>
</tr>
<tr>
<td>2001</td>
<td>$581</td>
</tr>
<tr>
<td>2002</td>
<td>$661</td>
</tr>
<tr>
<td>2003</td>
<td>$714</td>
</tr>
<tr>
<td>2004</td>
<td>$771</td>
</tr>
<tr>
<td>2005</td>
<td>$815</td>
</tr>
<tr>
<td>2006</td>
<td>$862</td>
</tr>
</tbody>
</table>

3. Find the x- and y-intercepts of the linear function passing through the points (2, 9) and (4, 3). (Section 1.2)

4. Solve the following system of equations using elimination. (Section 2.1)

   \[ \begin{align*}
   2x + 4y &= 4 \\
   4x - 2y &= -7 
   \end{align*} \]

5. Solve the following system of equations using row reduction (a) by hand and (b) using a calculator. (Section 2.2)

   \[ \begin{align*}
   x - 2.2y &= -1 \\
   y - 3x &= 0.2 
   \end{align*} \]
6. Solve the following system of equations by writing it as a matrix equation and using multiplication by an inverse matrix. You may use a calculator for multiplication and finding an inverse, but write down the matrices and the process involved. (Section 3.3)

\[
\begin{align*}
2x + y - z &= 5 \\
5x - 3y + z &= -2 \\
2x + z &= 1
\end{align*}
\]

7. Let

\[
A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 1 & 0 \\ -2 & 5 \end{bmatrix}.
\]

(a) Compute $3A - B$ by hand. (Section 3.1)

(b) Compute $AB$ by hand. (Section 3.2)

8. Solve the following system of equations by writing it as a matrix equation $AX = B$ and using the inverse of $A$ to find $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ (Section 3.3):

\[
\begin{align*}
4x + 2y &= 3 \\
2x + y + 2z &= 1 \\
3x + 2y + 4z &= -1
\end{align*}
\]

9. You have $2000 to invest for one year. You estimate the annual return from the stock market to be 10%, and the annual return from a money market account to be 4.5%. How much should you invest in each area to earn an 8% annual return. Set up a system of linear equations to answer this question and solve it using either elimination, row reduction or matrix multiplication. (Sections 2.3 and 3.3)