Sample Questions for Exam #1

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. Social security taxes are 6.2% of a person’s wages, but taxes are only assessed on the first $97,500 of annual earnings. (Workers do not have to pay social security taxes on wages over that amount in a given year.) Write a formula for a piecewise linear function $f(x)$ that gives the total social security taxes paid by a person who earns $x$ dollars in a year. (Section 1.3)

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

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

\[
2x + 4y = 4 \\
4x - 2y = -7
\]

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

\[
x - 2.2y = -1 \\
y - 3x = 0.2
\]
7 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)*

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

8 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)*

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)*