In April 2007, the recommended retail value of a used 2001 Toyota Corolla was $8,290. At the same time, the recommended retail value for a used 1998 Toyota Corolla was $6,260.

(a) Find a linear model for the recommended retail value of a used Toyota Corolla as function of its production year. State the meaning of each of your variables.

(b) Use your model to predict the recommended retail value of a used 2003 Toyota Corolla.

(c) The actual recommended retail value of a used 2003 Toyota Corolla in April 2007 was actually $11,880. How good was your model in predicting this value? Explain.

(d) Can you describe any real-world meaning to the x- and y-intercepts of your function? Explain.
The annual base salary for a sales representative is $33,000. The representative also earns a commission of 5% on all sales she makes.

(a) Find a linear function that models the annual income of the sales representative as a function of her total sales that year. Your function should have the form $y = mx + b$, where $y$ is her total income and $x$ is her total sales. Explain what $m$ and $b$ represent.

(b) If the representative wishes to earn $65,000 in a year, what will her total sales have to be?

(c) Suppose the sales representative can negotiate her contract with her employer. She wants to earn $65,000 in a year, but she only expects to be able to make $500,000 in total sales. What rate of commission should she ask for in her contract?
The following table lists the rate of petroleum imports by the U.S. from the top three countries: Canada, Mexico and Saudi Arabia. The units are Thousands of Barrels per Day.

<table>
<thead>
<tr>
<th></th>
<th>Canada</th>
<th>Mexico</th>
<th>Saudi Arabia</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2006</td>
<td>2311</td>
<td>1796</td>
<td>1369</td>
</tr>
<tr>
<td>January 2007</td>
<td>2470</td>
<td>1566</td>
<td>1563</td>
</tr>
</tbody>
</table>

(a) Find linear models for the daily rate of petroleum imports as functions of the year for:

(i) Canada

(ii) Mexico

(iii) Saudi Arabia

(b) Interpret the meaning of the slope in each of the linear functions above: what does it mean in real-world terms?

(c) According to your model, in what year will the U.S. begin to import more oil from Saudi Arabia than from Canada?
You inherit $30,000 from a relative you never knew. You wisely choose to invest it for your retirement. You’ve heard many times that it’s a good idea to *diversify* your investments – that is to say, not to invest all your money in one place. So you decide to break it up into three separate investments: a Stock Market portfolio, a Government Bond, and a Money Market account. Let $x$ be the amount you invest in the Stock Market, let $y$ be the amount you invest in the Government Bond, and let $z$ be the amount that you put in the Money Market account.

(a) Write an equation that states that your total investments will be $30,000.

(b) The following table represents the predicted annual interest rates for each of the investments:

<table>
<thead>
<tr>
<th>Stock Market</th>
<th>Government Bond</th>
<th>Money Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>7.5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

You would like to have a total first-year return on your investment of 8.5%. That means, after one year of accruing interest, the total interest should be 8.5% of $30,000. Write an equation that expresses this.

(c) Your relative’s will requires that if you invest the money, you invest exactly as much in Government Bonds as you do in the Stock Market. Express this as an equation.

(d) You should now have three equations involving the three variables $x$, $y$ and $z$. Write down an augmented matrix that represents the system, then solve it. (You may use your graphing calculator to row-reduce the matrix.) How much will you put in each investment?