1. The demand for a VCR is 8000 units when the price is $230. If the price drops down to $210 then 9000 are sold. The manufacturer will not market VCRs if the price drops to $100. For each $60 increase in price, the manufacturer will supply an additional 1300 VCRs. How many VCR's are made at the equilibrium point?

2. A tractor is originally purchased for $48,000. After 8 years, the tractor is worth $19360.
   a. Find a linear equation for the value, V, of the tractor as a function of time, t, in years.
   b. What is the rate of depreciation of the tractor?
   c. What is the tractor worth after 10 years?

3. It cost a company $22,500 to make 50 gadgets and $26,000 to make 120 gadgets. This company sells the gadgets for $80 each. What is the profit function? Compute the profit or loss when 2500 gadgets are produced and sold.

4. A GPS manufacturer has a fixed monthly production cost of $59,985. If 360 GPS’s are produced and sold, there is a loss of $43,785. A GPS is sold for $210. What is the break-even quantity?
5. Due to recycling by Aggies, trash has been decreasing in Maroon City. The table gives the amount of trash in thousands of pounds over the time period of 2000 to 2007. Let $x = 0$ represent the year 2000 and $y$ represent thousands of pounds of trash.

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trash, in thousands of pounds</td>
<td>400</td>
<td>360</td>
<td>320</td>
<td>310</td>
<td>290</td>
</tr>
</tbody>
</table>

a. Find the equation of the least-squares (best fit, regression) line, in slope-intercept form, for this data. Give your coefficients to five decimal places. State any special features or programs you use on your calculator.

b. Use the unrounded-coefficients of the linear regression line to estimate the pounds of trash, to the nearest whole number, that will be produced in the year 2009.

c. What is the value, to 5 decimal places, and interpretation of the correlation coefficient?

6. The table shows the thousands of bacteria in a culture based upon the temperature.

<table>
<thead>
<tr>
<th>$x$, degrees C</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$, thousands of bacteria</td>
<td>80</td>
<td>65</td>
<td>52</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>

a. What is the best-fitting (linear regression) line that represents the data? Do not round your coefficients.

b. Using the line of best fit, how many bacteria, to the nearest whole number, would you predict if the temperature was 38 degrees C?

c. Using the line of best fit, at what temperature, to the nearest degree, would you expect to have 30,000 bacteria?

d. What is the value, to 3 decimal places, and interpretation of the correlation coefficient?
7. If a water recirculation system is priced at $690, the quantity demanded is 310. For each $210 drop in price, an additional 310 are demanded. Suppliers of the water recirculation system will supply 930 systems if the price is $540 and will supply 1550 if the price is $660.

a. Find the linear demand equation.

b. Find the linear supply equation.

c. Above what price will there be no demand?

d. What quantity would be demanded if the system was free?

e. Above what price will the system be marketed?

f. If the system price is $840, how many systems will be marketed?

g. Find and interpret the equilibrium point.