Sample Final Exams

Like the sample midterm exam, this sample final exam is designed as a mini-lab. Unlike the midterm, which emphasized formatting skills the emphasis on the final is on problem solving, and equation building. The midterm dictated what must be placed in each cell. The final exam is more like the labs where you decide how to lay out the spreadsheet.

The exam is scenario based with each class section being given a different scenario. The given scenario might be a loan (lab 8), an annuity (labs 9 and 10), a financial forecast (lab 11), or a business optimization (lab 7).

In this exam, you need to demonstrate not just that you have mastered basic Excel skills, but that you can determine which skills to apply when. The student who can do so has the fluency necessary to move on into a rigorous business management program.

The exam requires the use of a computer with Microsoft Office and a printer. It is designed to allow use of the local, built-in (non-Internet) Microsoft Office Help system, a single page of notes, a dictionary and a time limit of 50 minutes. All Internet use is strictly prohibited.

Throughout this exam, no equations may include “hard coded” assumptions (constants) such as loan rates, contribution amounts, etc. All such assumptions, when used in equations, must be cell references. Hard coded values that are ok to use in equations include “7” for the number of days in a week, “1” as a unit increment or constants that are part of a general equation such as, for example the 2 in equation for the perimeter of a rectangle: $P = 2(L+W)$.

Below are example scenarios of each of the four types. Expect the scenarios given in the actual exam to be different enough that you will need to decide which of the skills covered here to apply to what data in the scenario.
Part 0 - Setting up the worksheet:

- Create Microsoft Excel worksheet with the formatting described below. All of the worksheet must fit on a single side of a single page.
- In row 2, enter your name, your computer's ID number, name, seat number or whatever code your instructor uses to distinguish one lab computer from another. Also enter your course section number.
- When your spreadsheet is printed, the row and column labels do not print. In order for the grader to understand the cell references used in your equations, it is necessary for you to add these labels to your spreadsheet. The labels can be typed in as constants (A, B, C, ...) along the first row and 2, 3, 4,... down the first column. If it please you, equations may be used as a shortcut to entering these constant letters in the first row and numbers in the first column: In column A, you may use the equation: =ROW(). In row 1, you may use the equation: =CHAR(ASC(CODE("A") + COLUMN()-1)). Regardless of whether you enter constants or use equations you must end up with the layout shown below.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Your First and Last Name, Computer Name, Section</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>3</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mortgage Scenario:

Annette is buying a home for $265,000. Given her credit history, the best rate she is able to find in the current market for a 30-year, fixed rate mortgage is 5.75% APR. The closing date on the home is set for August 5th, 2013. Monthly payments are due on the last of each month starting August 31st, 2013. Interest is calculated by using a daily periodic rate with simple interest on the balance for the number of days between payments. From the sale of her current home, she is able to put a 20% down payment. The $265,000 price includes all closing costs, and fees. Assume Annette always makes her payments on the due date. The bank calculates daily interest rates from APR based on a 365 day year. The loan accrues simple interest on the current loan balance between payments.

Part 1 - Mortgage Scenario Assumptions Table (45 points):

a) [1 Point]: Clearly label a cell containing the **Home Cost** in dollars given in the scenario.

b) [1 Point]: Clearly label a cell containing the **Down Payment Percentage** given in the scenario.
c) [5 Points]: Clearly label a cell containing the **Down Payment Amount** expressed in dollars. Calculate this from cell references. In same row as this cell, *enter an exact copy of the equation without the equal sign* (copy the equation as text).

d) [5 Points]: Clearly label a cell containing the **Loan Amount** expressed in dollars. Calculate this from cell references. In same row, include a *copy of the equation as text*.

e) [1 Point]: Clearly label a cell containing the **Loan Term** given in the scenario.

f) [2 Points]: Clearly label a cell containing the **Loan APR** given in the scenario.

g) [5 Points]: Clearly label a cell containing the **Daily Interest Rate**. Use a formula to calculate this value. In same row, include a *copy of the equation as text*.

h) [5 Points]: Clearly label a cell containing the **Total Number of Payments** of the loan. In same row, include a *copy of the equation as text*.

i) [10 Points]: Clearly label a cell containing the **Monthly Payment Amount** of the loan. Note: the *period of this loan is one month* - even though the actual interest accrued each month is based on the number of days between payments. In same row, include a *copy of the equation as text*. (Hint: use PMT).

j) [10 Points]: *Format* the Assumptions Table with a consistent and appropriate number of decimal places used in all percentages. Monetary amounts must be formatted with a currency symbol and with two decimal places. The table must look neat.

**Part 2 - Mortgage Scenario Amortization Schedule (55 points):**

- The first row of some columns may be special cases. In every column, the equation entered in either the first or second row must be filled down through all of the remaining rows of the table to calculate the values in those rows.

- In order to receive any points for a column, the equation used in THE SECOND ROW of that column must be COPIED and PASTED without the equal, =, symbol into a clearly labeled cell.

a) [10 Points]: Create a table with appropriate **headers** and with **a row for each of the first 7 payments**. The table must be *easy to read, well organized*, and use *consistent formatting*.

b) [10 Points]: The table must include a column that calculates and displays the payment **date** of each period by *using an equation (not some auto fill feature)*.

c) [10 Points]: The table must include a column that calculates and displays the number of days in period.

d) [10 Points]: The table must include a column displaying **Interest Accrued this Period**.

e) [10 Points]: The table must include a column that displays the **Balance** of the loan at the end of each period.

f) [5 points]: Add a **solid line border** around all four sides of **ALL cells that print on your worksheet page**. The border must be around empty cells as well as cells that contain
information. This is necessary for the grader to be able to easily read to which rows and columns your equations are referring. Any cells that you choose to merge will, of course only show borders around the outside of the merged group.

### Mortgage Scenario Example Solution:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Lena Lovegood, DSH-141-002 Section 009</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Home Cost</td>
<td>$ 265,000 Given</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Down Payment Percentage</td>
<td>20.00% Given</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Down Payment Amount</td>
<td>$ 53,000 E3*E4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Loan Amount</td>
<td>$ 212,000 E3-E5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Loan Term (years)</td>
<td>30 Given</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Loan APR</td>
<td>5.7% Given</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Daily Interest Rate</td>
<td>0.01575% E8/365</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Total Number of Payments</td>
<td>390 E7*12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Monthly Payment</td>
<td>$1,237.17 PMT(E8/12E10,-E6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Loan Date</td>
<td>8/5/2013 Given</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>13</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

The sample solution above includes an extra column titled **payment number**. This column is not specified in the scenario requirements and, therefore, is not required. As with the labs, however, you may choose to include extra columns that help you feel help organize your spreadsheet or help with intermediate calculations. If you do choose to create an extra column you must copy its second row as text into a clearly and labeled cell.

The scenario did not specify a date format. It would have been fine to display in other formats such as or "m/d/yy", or "mm/dd/yyyy", or "mmm d, yyyy", etc. However, the date format would have been marked wrong if different rows used different formats. Since the dates in column C span more than one year, professionalism requires that the year be displayed as part of the date. Thus, a date format of "m/d" or "d-mmm" would have been marked down.

The date equation shown in the solution, \( =\text{EOMONTH(C15,1)} \), must reference the first payment date, C15, as a relative address (NOT \( \text{C}$C15\)) so that when filled down, the C15 becomes C16, C17, .... The second argument of \( \text{EOMONTH} \) must be 1 to tell \( \text{EOMONTH} \) to skip to the end of the next month.

Properly, C15 should contain an equation referencing the loan date from the assumptions section: \( =\text{EOMONTH(E12,0)} \). In this case, the second argument of \( \text{EOMONTH} \) must be 0 since the first payment date is the last day of the same month as the loan date. This equation is not shown in the solution because the instructions only require showing the equation in the
second row of the amortization table. Indeed, since it is not required to show an equation, the
date in C15 could, for full credit, be entered as the constant: 8/31/2013.

A different, but equally correct layout, would have been to make the first row of the table the
loan start date rather than the first payment date. If this extra row were added to the table,
then the payment number for this row would be 0, the date would be the loan date (=E12)
with the "Days in Period" and "Interest" cells both blank. The balance on the loan date would
equal to the original loan amount (E6).

With this loan, the monthly payment amount calculated with the PMT function will only give an
approximation of what will actually be needed to pay off the loan. This is because the PMT
function uses a fixed period of 1/12 of a year while the actual loan uses periods that vary in
length from 27 to 31 days for full months and only 26 days for the first payment which
covers only part of a month.
Annuity Scenario:
Tanner is nearing retirement and is "fed up" with the news on stocks and mutual funds. His local bank is offering federally insured, 60-day Certificate of Deposits (CDs) that pay a guaranteed interest of 0.2318% on the day of maturity. Note: 0.2318% is NOT an annual rate. It is the 60-day periodic rate. Tanner purchases his first CD with the minimum deposit of $5,000 on August 12, 2011. This CD will mature 60 days later on October 11, 2011. Tanner sets up an electronic transfer so that on the CD's date of maturity, the full value of the CD (including interest) plus $500 (automatically withdrawn from his checking account) is rolled into a new 60-CD. Tanner sets this automatic transfer to be in effect every sixty day cycle through August 2014. Assume that the CD's interest rate stays constant throughout the three years.

Part 1 - Annuity Scenario Assumptions Table (20 points):

a) [20 Points]: Create an assumptions table with each clearly labeling each value given in the scenario needed in the calculations of the value of Tanner's Annuity. Format the assumptions table with a consistent and appropriate number of decimal places used in all percentages. Monetary amounts must be formatted with a currency symbol and with two decimal places. The table must look neat and all values must fit within the cells.

Part 2 - Annuity Scenario Contribution Table (80 points):

The first row of some columns may be special cases. In every column, the equation entered in either the first or second row must be filled down through all of the remaining rows of the table to calculate the values in those rows.

In order to receive any points for a column, the equation used in THE SECOND ROW of that column must be COPIED and PASTED without the equal, =, symbol into a clearly labeled cell.

a) [5 Points]: Create an annuity contribution table with a row for the first ten periods of the annuity starting the first row with the original investment date. The table must include appropriate headers.

b) [12 Points]: The table must include a column displaying the Investment Date. The column must be formatted to display the month, day and year (in the order and format of your choice) of each date.

c) [5 Points]: The table must include a column displaying the Additional Contribution amount in dollars made into the rolling annuity each period.

d) [12 Points]: The table must include a column displaying the Cumulative Contribution in dollars from the start of the annuity through the row displaying each cumulative value.

e) [15 Points]: The table must include a column that displays the Value of the Annuity at the investment date of that row.

f) [15 Points]: The table must include a column displaying the Interest Accrued at maturity of the CD purchased in each row in dollars.

g) [10 Points]: The table must be neat, clear, easy to read, well organized, use consistent formatting.
h) [6 points]: Add a **solid line border** around all four sides of **ALL cells that print on your worksheet page**. The border must be around empty cells as well as cells that contain information.

**Annuity Scenario Solution Example:**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Narissa Black, DSH-141-002, Section 009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CD Term (days)</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Periodic Interest Rate</td>
<td>0.2318%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Original Deposit</td>
<td>$5,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Periodic Contribution</td>
<td>$500.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Original Purchase Date</td>
<td>8/12/2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Investment Date</td>
<td>Contribution</td>
<td>Cumulative Contribution</td>
<td>Value of Annuity</td>
<td>Interest Accrued</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>8/12/2011</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000.00</td>
<td>$11.59</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10/11/2011</td>
<td>$500</td>
<td>$5,500</td>
<td>$5,511.59</td>
<td>$12.78</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12/10/2011</td>
<td>$500</td>
<td>$6,000</td>
<td>$6,024.37</td>
<td>$13.96</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2/8/2012</td>
<td>$500</td>
<td>$6,500</td>
<td>$6,538.33</td>
<td>$15.16</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>4/8/2012</td>
<td>$500</td>
<td>$7,000</td>
<td>$7,053.49</td>
<td>$15.34</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>6/7/2012</td>
<td>$500</td>
<td>$7,500</td>
<td>$7,569.84</td>
<td>$17.55</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>8/6/2012</td>
<td>$500</td>
<td>$8,000</td>
<td>$8,087.38</td>
<td>$19.75</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>10/5/2012</td>
<td>$500</td>
<td>$8,500</td>
<td>$8,606.30</td>
<td>$21.95</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>12/4/2012</td>
<td>$500</td>
<td>$9,000</td>
<td>$9,126.08</td>
<td>$24.16</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>2/2/2013</td>
<td>$500</td>
<td>$9,500</td>
<td>$9,647.33</td>
<td>$26.36</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>B10+$E$3</td>
<td>$E$6</td>
<td>E10+C11</td>
<td>E10+F10+C11</td>
<td>E11*E$4</td>
<td>&lt;--- Equations in 2nd row</td>
</tr>
</tbody>
</table>

In this layout, the column headers in row 8 are also used for the text equations used in the second row.

It is ok that the headers in row 8 do not exactly match the bold text in the requirements. The text given in the requirements is, in general, more verbose that is needed for headers.

This table was set up with the Value column before the Interest Accrued column. This matches the order given in the directions. This order was used because the directions ask for the **value at the investment date**. Thus, the value in **E11** is the value at the start of the previous period (**E10**), plus the interest accrued at the end of the previous (**F10**), plus the contribution made at the start of the current period (**C11**). Contrariwise, if the instructions had asked for the **value at maturity**, then the "Value of Annuity" column should be placed after the "Interest Accrued" column. More importantly, the equation for value would have been the value at the start of the previous period, plus the interest accrued at the end of the current period, plus the contribution made at the start of the current period. This illustrates the importance of a careful reading of the both scenario and the instructions.
Business Optimization Scenario:
Patrick's girlfriend is hosting a cook out. Patrick was given $40.00 and instructed to purchase a particular brand of spicy buffalo sausages and buns. The sausages come in packs of 5 and cost $3.75 per pack. The buns come in packs of 6 and cost $1.95 per pack. These prices include sales tax. Patrick assumes that each guest will eat 2 sausages and 2 buns.

Part 1 - Business Optimization Assumptions Table (20 points):

a) [10 Points]: Clearly label a cells containing the assumptions given in the scenario.

b) [10 Points]: Format the assumptions table with a consistent and appropriate number of decimal places used in all percentages. Monetary amounts must be formatted with a currency symbol and with two decimal places. The table must look neat.

Part 2 - Business Optimization Possibilities Table (80 points):

The first row of some columns may be special cases. In every column, the equation entered in either the first or second row must be filled down through all of the remaining rows of the table to calculate the values in those rows.

In order to receive any points for a column, the equation used in THE SECOND ROW of that column must be COPIED and PASTED without the equal, =, symbol into a clearly labeled cell.

a) [5 Points]: Create a table with appropriate **headers** and with a row for each possibility of the number of packs of sausage packs purchased with the first row being 0 packs of sausages and the last row being 10 packs of sausages.

b) [10 Points]: The table must include a column that calculates and displays the Money Spent on Sausages for each possibility row.

c) [10 Points]: The table must include a column that calculates and displays the Packs of Buns Patrick Can Afford for each possibility row.

d) [10 Points]: The table must include a column that calculates and displays the Total Sausages for each possibility row.

e) [10 Points]: The table must include a column that calculates and displays the Total Buns for each possibility row.

f) [10 Points]: The table must include a column that calculates and displays the People Served for each possibility row.

g) [10 Points]: Highlight with a light background color the possibility row with the greatest number of people served.

h) [5 points]: Add a **solid line border** around all four sides of **ALL cells that print on your worksheet page**.

i) [10 points]: Format the possibilities table with a consistent and appropriate number of decimal places used in all percentages. Monetary amounts must be formatted with a currency symbol and with two decimal places. The table must look neat.
Outdoor Adventure Scenario: You are planning to start an outdoor adventure company where you offer guided hiking trips throughout the Land of Enchantment. You plan to offer two-week adventures for groups of up to 12 people with you and your buddies doing the cooking and a team of 6 llamas carrying everyone’s gear. For this amazing experience of breath-taking sunsets, brilliant starry nights, and wine and cheese above 10,000 feet, you plan to charge $1,200 per person in the first year of operation. Your goal is to run four trips in 2010 and to double that number (increase by 100%) each year for 4 years. You estimate that food and expendable supplies will cost $200 per person per trip in 2010. You have land with an old paddock, but you estimate it will cost $20,000 in 2010 to maintain the heard of llamas. You and two buddies each plan to draw annual salaries totaling $36,000 for all three of you in the first year. You estimate that the cost of maintaining the llamas, the per-person cost of food and supplies, and the per-person price of the trip will all increase by 4.00% each year. You also estimate that the total salary cost will increase by 20% each year for the 4 years. You assume that there will be an average of 10 persons per trip.

Outdoor Adventure Scenario Part 1 - Assumptions Table (10 points):

a) [10 points]: Create a clearly labeled assumptions section wherein you include all of the financial assumptions given in the scenario.

Outdoor Adventure Scenario Part 2 - Expenses Table (50 Points):

In order to receive any points a calculation, the equation used in THE SECOND YEAR of that calculation must be COPIED and PASTED without the equal, =, symbol into a clearly labeled cell (i.e. E3+$B$2) so that the exact letters, numbers and symbols of the equation are visible on the printed page.

a) [10 points]: Create a clearly labeled Expenses table. This table must have a separate section for Fixed Costs and Marginal Costs with each of the required rows listed in the appropriate section. The table must include a column for each year of the forecast. The table must be neat, clear, well organized and use consistent formatting.

b) [8 points]: There must be a row labeled Personnel Costs. The second year of this row must be an equation that fills across to each of the later years. The equation used in the second year calculation must be copied and pasted without the equal sign so that it will print as text. This pasted equation must be clearly identifiable.

c) [8 points]: There must be a row labeled Lama Heard Cost. The second year of this row must be an equation that fills across to each of the later years. Do not forget to copy and paste this equation without the equal sign where it can be clearly identified.

d) [8 points]: There must be a row labeled Unit Adventurer Cost. The second year of this row must be an equation that fills across to each of the later years.

e) [8 points]: There must be a row labeled Number of Trips. The second year of this row must be an equation that fills across to each of the later years.

f) [8 points]: Below the fixed costs and marginal costs, there must be a row labeled Total Costs. Calculate this value in the first year so that the equation fills across to each of the later years.
Outdoor Adventure Scenario Part 3 - Income Table (40 Points):

In order to receive any points a calculation, the equation used in THE SECOND YEAR of that calculation must be COPIED and PASTED without the equal, =, symbol into a clearly labeled cell (i.e. E3+$B$2) so that the exact letters, numbers and symbols of the equation are visible on the printed page.

a) [10 points]: Create a clearly labeled Income table. The table must include a column for each year of the forecast. The table must be neat, clear, well organized and use consistent formatting.

b) [7 points]: There must be a row labeled Price for One Adventurer. The second year of this row must be an equation that fills across to each of the later years.

c) [8 points]: There must be a row labeled Gross Revenue. Calculate this in the first year of this row using an equation that fills across to each of the later years.

d) [8 points]: There must be a row labeled Profit. Calculate this in the first year of this row using an equation that fills across to each of the later years.

e) [5 points]: Add a solid line border around all four sides of ALL cells that print on your worksheet page. The border must be around empty cells as well as cells that contain information.

And these few precepts in thy memory....

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn. --Alvin Toffler

Education is not filling a pail but the lighting of a fire. --William Butler Yeats