Case 1
Milligan's Backyard Storage Kits

Spreadsheet Case **Difficulty Rating: ★**

Case Overview

The Milligan's Backyard Storage Kits case requires students to modify an inventory analysis worksheet. The students will insert columns, create simple formulas, use several functions, and apply proper formatting to the cells and worksheet. The modified inventory analysis worksheet provides Mr. Milligan with information about each item's annual sales, cost of goods sold, annual gross profit, markup, gross margin ratio, inventory turnover, and days in inventory.

The students will use the **Milligan4** data file. This file contains unformatted data, requiring students to apply appropriate cell and worksheet formatting. Students will determine each item's cost of average inventory, annual sales, cost of goods sold, annual gross profit, gross margin ratio, markup percentage, inventory turnover, and days in inventory. The necessary formulas are provided in the case scenario. The **MilliganSolution4** file provides the solutions.

This spreadsheet case is given a difficulty rating of 1. In addition to basic formatting skills, students will use the AVERAGE, MAX, MIN, NOW, and SUM functions. Students will use the Sort command to provide Mr. Milligan with many of his information needs. Although the Filter command is not a required skill, your students should explore its use for this case.

Teaching Tips

Milligan's Backyard Storage Kits encourages students to apply basic spreadsheet skills to solve an inventory management problem. Although students can visually examine their Inventory Analysis worksheet or use the Sort command to determine the answers for several of the Information Specifications and Test Your Design questions, encourage your students to investigate the Filter command as well.

Several of the case questions ask students to prepare charts for Mr. Milligan. You may consider allowing your students to choose the charts which they think are most appropriate for Mr. Milligan.

Students often ask whether they should use a portrait or landscape orientation for their worksheets. For this case, students should use a landscape orientation. You might also suggest that the students use a custom header for their worksheets. At a minimum, the custom header should include the student's name, current date, and file name.

The time required for this case is dependent upon the student's skills. A student who is comfortable with the required skills listed for this case should be able to complete this case within a couple of hours. If students are required to prepare an oral presentation, you should

allow extra time for the completion of this case. If you do not have time for student presentations, you may elect to eliminate step 6 from the case deliverables.

Information Specifications Solutions

The Design Specifications section requires students to determine the cost of average inventory, annual sales, cost of goods sold, annual gross profit, gross margin ratio, markup percentage, inventory turnover, and days in inventory for each inventory item. The Information Specifications section requires students to determine the average, minimum, and maximum values for the cost of average inventory, annual sales, cost of goods sold, annual gross profit, gross margin ratio, and markup percentage. Students should also provide the maximum and minimum values for the unit cost, unit sales price, inventory turnover, and days in inventory. Students should provide the total cost of average inventory, total annual gross profit, total cost of goods sold, and total annual sales. The Initial Inventory Analysis worksheet is available in the solution file and provides the information required in the Design Specifications and Information Specifications sections.

The Information Specifications section requires students to use their worksheets to answer several questions. Suggested answers for these questions are provided below. For simplicity, the worksheet answers shown below may have columns that are not necessary for the answer hidden from view.

1. Mr. Milligan wants a markup of at least 30 percent on all items. Which items have markups less than 30 percent?

Figure 1 shows a suggested answer. Students may obtain the answer for this question in a variety of ways. Students may choose to sort the inventory items in ascending order based on markup. Although the Filter command is not a required skill, your students can use the Filter command to retrieve the answer for this question. The ISQ1 worksheet in the solutions file provides the answer for this question.

Figure 1: Markups Less than 30 Percent

Milligan's Backyard Storage Kits

Inventory Analysis Worksheet

March 30, 2008

Item No.	Description	Markup Percentage	Inventory Turnover	Days In Inventory
A00750	6' x 6' Cedar Garden Hut	8.04%	2.85	128.03
A00810	6' x 20' Covered Bridge	12.08%	1.79	204.40
A01130	Miniature Folding Trellis	14.31%	5.00	73.00
A00620	12' Cedar Octagon Gazebo	15.76%	2.60	140.38
A01140	Milligan's Superior Trellis	17.65%	7.00	52.14
A00730	6' x 10' Cedar Garden Hut	18.94%	2.19	166.86
A00610	10' Octagon Cedar Gazebo	20.00%	2.03	179.97
A01100	Monroe Wooden Trellis	25.00%	2.50	146.00
A00210	8' x 10' Aluminum Barn	25.00%	2.69	135.52
A00310	12' x 8' Double Door Aluminum Shed	25.00%	3.78	96.69

2. In terms of annual sales, which item has the lowest annual sales?

As Figure 2 shows, the Miniature Folding Trellis (A01130) has annual sales of $5,487. The ISQ2 worksheet in the solutions file also provides the answer.

Figure 2: Item with Lowest Annual Sales

Milligan's Backyard Storage Kits
Inventory Analysis Worksheet
March 30, 2008

Item No.	Description	Annual Sales
A01130	Miniature Folding Trellis	$5,487.00

3. In terms of annual sales, what were Mr. Milligan's biggest selling items last year? Identify the top five.

Figure 3 provides a suggested answer. As Figure 3 shows, the 8' x 10' Wood Barn, 10' Octagon Cedar Gazebo, 12' by 8' Double Door Aluminum Shed, 6'x 6' Cedar Garden Hut, and the 10' x 14' Aluminum Shed are the top five selling items.

Your students can sort the records to identify the top five selling items. Although not required in this case, the Filter command can be used as well. The ISQ3 worksheet in the solutions file provides the answer for this question.

Figure 3: Top Five Selling Items

Milligan's Backyard Storage Kits
Inventory Analysis Worksheet
March 30, 2008

Item No.	Description	Unit Cost	Annual Sales
A00410	8' x 10' Wood Barn	$541.33	$563,143.00
A00610	10' Octagon Cedar Gazebo	$2,499.99	$431,998.56
A00310	12' x 8' Double Door Aluminum Shed	$1,043.57	$393,949.94
A00750	6' x 6' Cedar Garden Hut	$879.99	$309,003.50
A00150	10' x 14' Aluminum Shed	$650.99	$300,000.00

4. What are the company's total annual sales?

According to the Initial Inventory Analysis worksheet, the company's total annual sales are $4,637,018.24.

5. What is the company's annual gross profit?

This answer can be determined by viewing the Initial Inventory Analysis worksheet. According to the Initial Inventory Analysis worksheet, the company's annual gross profit is $1,187,655.01.

6. Based on average unit sales, which five items had the lowest sales? Based on average unit sales, which five items had the highest sales?

Figure 4 identifies the five lowest selling items, and Figure 5 identifies the highest selling items. The following suggested answers are also available in the solution file's ISQ6Lowest and ISQ6Highest worksheets.

Figure 4: Five Lowest Selling Items

Milligan's Backyard Storage Kits

Inventory Analysis Worksheet

March 30, 2008

Item No.	Description	Average Unit Sales/Year	Inventory Turnover	Days In Inventory
A00820	8' x 40' Covered Bridge	2	1.00	365.00
A01140	Milligan's Superior Trellis	7	7.00	52.14
A01100	Monroe Wooden Trellis	25	2.50	146.00
A01110	Majesty Copper Trellis	35	2.50	146.00
A00620	12' Cedar Octagon Gazebo	39	2.60	140.38

Figure 5: Five Highest Selling Items

Inventory Analysis Worksheet

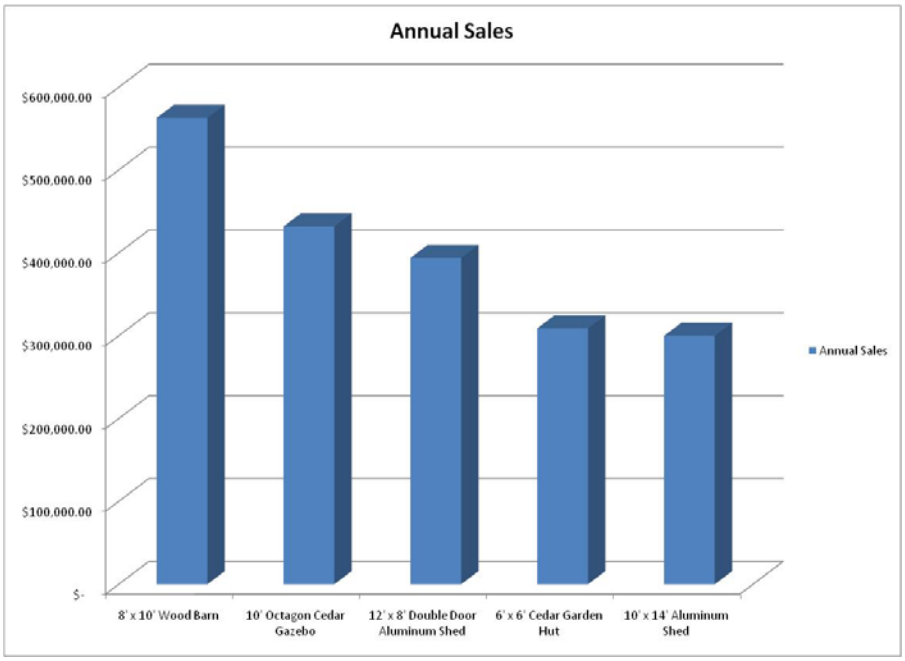
March 30, 2008

Item No.	Description	Average Unit Sales/Year	Inventory Turnover	Days In Inventory
A00520	3' x 7' Picnic Table	850	11.04	33.06
A00920	Mailbox Planter	845	3.67	99.35
A00950	6' Wishing Well	780	2.60	140.38
A00910	Wagon Planter	702	2.96	123.23
A00410	8' x 10' Wood Barn	700	14.00	26.07

7. Mr. Milligan wants a column chart that compares the top five selling items. Based on annual sales, prepare the column chart for Mr. Milligan.

Figure 6 provides a suggested answer. Student chart formats may vary from the suggested answer provided in Figure 6. The ISQ7 Column Chart Top Annual worksheet provides the answer in the solution file.

Figure 6: Column Chart Comparing Top Five Selling Items



8. Which items have an inventory turnover greater than 12?

According to Figure 7, two items have inventory turnovers greater than 12. The ISQ8 Inventory Turnover worksheet in the solution file also provides the suggested answer.

Figure 7: Items with Inventory Turnover Greater Than 12

Milligan's Backyard Storage Kits
Inventory Analysis Worksheet
March 30, 2008

Item No.	Description	Inventory Turnover
A00410	8' x 10' Wood Barn	14.00
A00150	10' x 14' Aluminum Shed	12.50

9. Which items have days in inventory values greater than 150 days?

Figure 8 provides a suggested answer. According to Figure 8, 9 items have inventory values greater than 150 days. A suggested answer is provided in the ISQ9 Days in Inventory worksheet.

Figure 8: Items with Days in Inventory Values Greater Than 150 Days

Milligan's Backyard Storage Kits
Inventory Analysis Worksheet
March 30, 2008

Item No.	Description	Days In Inventory
A00930	4' Windmill	499.38
A00940	6' Windmill	393.88
A00820	8' x 40' Covered Bridge	365.00
A00720	8' x 10' Cedar Shed	350.40
A00810	6' x 20' Covered Bridge	204.40
A00740	8' x 10' Cedar Cabana Shed	201.29
A00610	10' Octagon Cedar Gazebo	179.97
A00120	12' x 20' Aluminum Shed	179.69
A00730	6' x 10' Cedar Garden Hut	166.86

Test Your Design Solutions

The Test Your Design section requires students to modify their worksheet design and then use the modified worksheet to provide Mr. Milligan with answers. Suggested answers for the Test Your Design questions are provided below.

1. **Add the following six items to the Inventory Analysis worksheet.**

   The TYD Inventory Analysis worksheet in the solution file includes the six new items. Figure 11 provides a suggested TYD Inventory Analysis worksheet.

2. **For each inventory item, Mr. Milligan wants to know what percentage of the company's total annual sales the item generated.**

   The students should add a percentage of total sales column to their Initial Inventory Analysis worksheet. The solution file's TYD Inventory Analysis worksheet shows the inventory analysis worksheet with the new column added. The TYD Inventory Analysis worksheet provided below includes the new column.

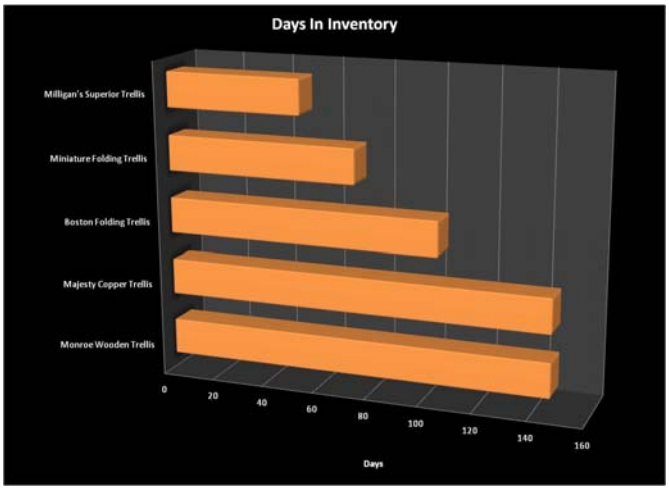
3. **What is the gross margin per unit for each inventory item? Which inventory item(s) has (have) the largest gross margin per unit? Least?**

   The students should add a gross margin per unit column to their worksheet. The solution file's TYD Inventory Analysis worksheet includes a gross margin per unit column. After the new column is added, the students should determine that the 8' x 40' Covered Bridge (A00820) has a $2,190.28 gross margin per unit, and the Wagon Planter (A00910) has a $4.57 gross margin per unit.

4. Prepare a bar chart that compares the age of inventory for the trellis items.

Students should use the days in inventory values to prepare the bar chart. Figure 9 provides a suggested answer. The suggested chart is provided in the TYD4 Bar Chart Days in Inv worksheet.

Figure 9: Days In Inventory Bar Chart



5. Based on inventory turnover, which five items are held the longest in inventory.

Figure 10 provides a suggested answer. Based on Figure 10, items A00930, A00940, A00820, A00720, and A02020 were held the longest.

Figure 10: Items Held Longest in Inventory

Milligan's Backyard Storage Kits
Inventory Analysis Worksheet
March 30, 2008

Item No.	Description	Days In Inventory
A00930	4' Windmill	499.38
A00940	6' Windmill	393.88
A00820	8' x 40' Covered Bridge	365.00
A00720	8' x 10' Cedar Shed	350.40
A02020	12' x 20' Arbor Roof	304.17

6. Mr. Milligan wants to reduce his inventory by $200,000. Which items would you recommend that he remove from his inventory? Why?

Your students will provide a variety of answers for this question.

Figure 11: TYD Inventory Analysis Worksheet

Milligan's Backyard Storage Kits

Inventory Analysis Worksheet

March 30, 2008

Item No.	Description	Unit Cost	Unit Sales Price	Average On Hand	Average Unit Sales/Year	Cost of Average Inventory	Annual Sales	Cost of Goods Sold	Annual Gross Profit	Gross Margin Ratio	Markup Percentage	Inventory Turnover	Days In Inventory	Percentage of Total Sales	Gross Margin Per Unit
A00100	8' x 6' Aluminum Shed	$148.14	$199.99	48	475	$7,110.72	$94,995.25	$70,366.50	$24,628.75	25.93%	35.00%	9.90	36.88	1.89%	$51.85
A00110	10' x 8' Aluminum Shed	$185.17	$249.99	50	400	$9,258.50	$99,996.00	$74,068.00	$25,928.00	25.93%	35.01%	8.00	45.63	1.99%	$64.82
A00120	12' x 20' Aluminum Shed	$1,393.56	$1,950.99	32	65	$44,593.92	$126,814.35	$90,581.40	$36,232.95	28.57%	40.00%	2.03	179.69	2.53%	$557.43
A00130	6' x 4' Aluminum Shed	$346.36	$519.59	50	241	$17,318.00	$125,221.19	$83,472.76	$41,748.43	33.34%	50.01%	4.82	75.73	2.50%	$173.23
A00140	8' x 4' Aluminum Shed	$424.58	$620.75	50	215	$21,229.00	$133,461.25	$91,284.70	$42,176.55	31.60%	46.20%	4.30	84.88	2.66%	$196.17
A00150	10' x 14' Aluminum Shed	$650.99	$1,200.00	20	250	$13,019.80	$300,000.00	$162,747.50	$137,252.50	45.75%	84.33%	12.50	29.20	5.98%	$549.01
A00160	6' x 6' Aluminum Shed	$370.11	$458.93	75	150	$27,758.25	$68,839.50	$55,516.50	$13,323.00	19.35%	24.00%	2.00	182.50	1.37%	$88.82
A00210	8' x 10' Aluminum Barn	$840.47	$1,050.59	75	202	$63,035.25	$212,219.18	$169,774.94	$42,444.24	20.00%	25.00%	2.69	135.52	4.23%	$210.12
A00310	12' x 8' Double Door Aluminum Shed	$1,043.57	$1,304.47	80	302	$83,485.60	$393,949.94	$315,158.14	$78,791.80	20.00%	25.00%	3.78	96.69	7.86%	$260.90
A00320	16' x 10' Double Door Aluminum Shed	$1,141.84	$1,507.24	12	50	$13,702.08	$75,362.00	$57,092.00	$18,270.00	24.24%	32.00%	4.17	87.60	1.50%	$365.40
A00410	8' x 10' Wood Barn	$541.33	$804.49	50	700	$27,066.50	$563,143.00	$378,931.00	$184,212.00	32.71%	48.61%	14.00	26.07	11.23%	$263.16
A00420	8' x 12' Wood Barn	$751.87	$999.99	48	140	$36,089.76	$139,998.60	$105,261.80	$34,736.80	24.81%	33.00%	2.92	125.14	2.79%	$248.12
A00430	10' x 16' Wood Barn	$808.26	$1,074.99	10	67	$8,082.60	$72,024.33	$54,153.42	$17,870.91	24.81%	33.00%	6.70	54.48	1.44%	$266.73
A00510	8' x 10' Picnic Table	$269.28	$399.99	26	299	$7,001.28	$119,597.01	$80,514.72	$39,082.29	32.68%	48.54%	11.50	31.74	2.39%	$130.71
A00520	3' x 7' Picnic Table	$207.42	$299.99	77	850	$15,971.34	$254,991.50	$176,307.00	$78,684.50	30.86%	44.63%	11.04	33.06	5.09%	$92.57
A00530	8' Child's Picnic Table	$210.59	$350.99	44	157	$9,265.96	$55,105.43	$33,062.63	$22,042.80	40.00%	66.67%	3.57	102.29	1.10%	$140.40
A00610	10' Octagon Cedar Gazebo	$2,499.99	$2,999.99	71	144	$177,499.29	$431,998.56	$359,998.56	$72,000.00	16.67%	20.00%	2.03	179.97	8.62%	$500.00
A00620	12' Cedar Octagon Gazebo	$2,963.99	$3,430.99	15	39	$44,459.85	$133,808.61	$115,595.61	$18,213.00	13.61%	15.76%	2.60	140.38	2.67%	$467.00
A00710	4' x 6' Cedar Shed	$333.33	$500.00	80	200	$26,666.40	$100,000.00	$66,666.00	$33,334.00	33.33%	50.00%	2.50	146.00	1.99%	$166.67
A00720	8' x 10' Cedar Shed	$1,135.32	$1,702.99	72	75	$81,743.04	$127,724.25	$85,149.00	$42,575.25	33.33%	50.00%	1.04	350.40	2.55%	$567.67
A00730	6' x 10' Cedar Garden Hut	$1,135.00	$1,350.00	80	175	$90,800.00	$236,250.00	$198,625.00	$37,625.00	15.93%	18.94%	2.19	166.86	4.71%	$215.00
A00740	8' x 10' Cedar Cabana Shed	$1,148.56	$1,607.99	75	136	$86,142.00	$218,686.64	$156,204.16	$62,482.48	28.57%	40.00%	1.81	201.29	4.36%	$459.43
A00750	6' x 6' Cedar Garden Hut	$879.99	$950.78	114	325	$100,318.86	$309,003.50	$285,996.75	$23,006.75	7.45%	8.04%	2.85	128.03	6.16%	$70.79
A00810	6' x 20' Covered Bridge	$1,250.00	$1,400.99	42	75	$52,500.00	$105,074.25	$93,750.00	$11,324.25	10.78%	12.08%	1.79	204.40	2.10%	$150.99
A00820	8' x 40' Covered Bridge	$2,509.72	$4,700.00	2	2	$5,019.44	$9,400.00	$5,019.44	$4,380.56	46.60%	87.27%	1.00	365.00	0.19%	$2,190.28
A00910	Wagon Planter	$11.42	$15.99	237	702	$2,706.54	$11,224.98	$8,016.84	$3,208.14	28.58%	40.02%	2.96	123.23	0.22%	$4.57
A00920	Mailbox Planter	$21.02	$27.99	230	845	$4,834.60	$23,651.55	$17,761.90	$5,889.65	24.90%	33.16%	3.67	99.35	0.47%	$6.97
A00930	4' Windmill	$30.66	$45.99	275	201	$8,431.50	$9,243.99	$6,162.66	$3,081.33	33.33%	50.00%	0.73	499.38	0.18%	$15.33
A00940	6' Windmill	$43.99	$65.99	300	278	$13,197.00	$18,345.22	$12,229.22	$6,116.00	33.34%	50.01%	0.93	393.88	0.37%	$22.00
A00950	6' Wishing Well	$53.32	$79.99	300	780	$15,996.00	$62,392.20	$41,589.60	$20,802.60	33.34%	50.02%	2.60	140.38	1.24%	$26.67
A00960	12' Wishing Well	$130.66	$195.99	25	147	$3,266.50	$28,810.53	$19,207.02	$9,603.51	33.33%	50.00%	5.88	62.07	0.57%	$65.33
A01020	10' x 20' Aluminum Carport	$999.99	$1,789.95	27	45	$26,999.73	$80,547.75	$44,999.55	$35,548.20	44.13%	79.00%	1.67	219.00	1.61%	$789.96
A01030	12' x 24' Aluminum Carport	$1,199.99	$1,888.72	25	50	$29,999.75	$94,436.00	$59,999.50	$34,436.50	36.47%	57.39%	2.00	182.50	1.88%	$688.73
A01040	14' x 20' Aluminum Carport	$1,307.84	$2,500.99	15	27	$19,617.60	$67,526.73	$35,311.68	$32,215.05	47.71%	91.23%	1.80	202.78	1.35%	$1,193.15
A01100	Monroe Wooden Trellis	$202.30	$252.87	10	25	$2,023.00	$6,321.75	$5,057.50	$1,264.25	20.00%	25.00%	2.50	146.00	0.13%	$50.57
A01110	Majesty Copper Trellis	$379.29	$505.72	14	35	$5,310.06	$17,700.20	$13,275.15	$4,425.05	25.00%	33.33%	2.50	146.00	0.35%	$126.43
A01120	Boston Folding Trellis	$145.92	$207.56	12	42	$1,751.04	$8,717.52	$6,128.64	$2,588.88	29.70%	42.24%	3.50	104.29	0.17%	$61.64
A01130	Miniature Folding Trellis	$48.00	$54.87	20	100	$960.00	$5,487.00	$4,800.00	$687.00	12.52%	14.31%	5.00	73.00	0.11%	$6.87
A01140	Milligan's Superior Trellis	$764.81	$899.78	1	7	$764.81	$6,298.46	$5,353.67	$944.79	15.00%	17.65%	7.00	52.14	0.13%	$134.97
A02010	8' x 12' Arbor Roof	$1,326.42	$1,550.42	4	10	$5,305.68	$15,504.20	$13,264.20	$2,240.00	14.45%	16.89%	2.50	146.00	0.31%	$224.00
A02020	12' x 20' Arbor Roof	$2,787.96	$4,100.00	10	12	$27,879.60	$49,200.00	$33,455.52	$15,744.48	32.00%	47.06%	1.20	304.17	0.98%	$1,312.04
Total						**$1,238,180.85**	**$5,013,072.42**	**$3,691,910.18**	**$1,321,162.24**						
Average						**$30,199.53**	**$122,270.06**	**$90,046.59**	**$32,223.47**	**27.58%**	**40.74%**				
Minimum		**$11.42**	**$15.99**			**$764.81**	**$5,487.00**	**$4,800.00**	**$687.00**	**7.45%**	**8.04%**	**0.73**	**26.07**	**0.11%**	**$ 4.57**
Maximum		**$2,963.99**	**$4,700.00**			**$177,499.29**	**$563,143.00**	**$378,931.00**	**$184,212.00**	**47.71%**	**91.23%**	**14.00**	**499.38**	**11.23%**	**$ 2,190.28**

Case 2
Piedmont Trailer Manufacturing Company

Spreadsheet Case **Difficulty Rating:** ★

Case Overview

The Piedmont Trailer Manufacturing Company case requires students to construct an Economic Feasibility workbook. The Economic Feasibility workbook summarizes and analyzes the benefits and costs associated with a proposed custom order tracking project that is currently underway at the Piedmont Trailer Manufacturing Company. The preparation of the Economic Feasibility workbook requires the student to design five worksheets, use several formulas and functions, apply basic cell and worksheet formatting, and consolidate data from multiple worksheets into a summary worksheet.

The students will create the Economic Feasibility workbook; therefore, there is not an existing data file available for this case. The case scenario provides the students with the information that they need to prepare the Economic Feasibility workbook. The solutions for this case are located in the **PiedmontSolution4** file.

Teaching Tips

This case requires students to prepare a documentation sheet. Often students have some concerns about the contents of the documentation sheet. When you assign this case, you can mention that the documentation sheet is a worksheet that briefly summarizes the contents of the workbook. At a minimum, the documentation sheet should identify the workbook's creator, specify the date the workbook is created, describe the contents of the workbook, and provide a brief explanation of each worksheet.

Students are asked to determine the internal rate of return for the custom order tracking system project. Microsoft Excel provides an IRR function that is easy to use. Before assigning this case, you may want to briefly discuss discount rates, present value factors, present values, future values, and the internal rate of return. You can work a simple example in class to demonstrate these concepts. Alternatively, have your students research these financial terms and concepts. In particular, have your students use Microsoft Excel's help feature to obtain information about the IRR function.

Information Specifications Solutions

The Design Specifications section requires the student to prepare documentation, one-time costs, recurring costs, tangible benefit, and economic feasibility summary worksheets. Figures 1 – 5 show the initial documentation, economic feasibility summary, one-time costs, recurring costs, and tangible benefit worksheets.

Figure 1: Documentation Worksheet

Economic Feasibility Workbook		
Created by:	Lisa Miller, Senior Systems Analyst	
Date Created:	January 2, 2008	
Purpose:	The Economic Feasiblity Workbook tracks the benefits and costs associated with Piedmont's new custom order tracking system.	
Worksheets:	Documentation	Documents the workbook.
	Economic Feasibility Summary	Summarizes the economic feasibility for the project.
	One-Time Costs	Identifies the one-time costs and their approximate dollar values.
	Recurring Costs	Identifies the recurring costs and their approximate dollar values.
	Tangible Benefit	Identifies the recurring benefits and their approximate dollar values.

Figure 2: Economic Feasibility Summary Worksheet

Piedmont Trailer Manufacturing Company
Custom Order Tracking Project
Economic Feasibility Summary
January 2, 2008

Discount Rate	**0.14**						
	Year						**Totals**
Year	**0**	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of Benefits	$0.00	$380,701.75	$333,948.91	$292,937.64	$256,962.84	$225,406.00	
Net Present Value of All Benefits	**$0.00**	**$380,701.75**	**$714,650.66**	**$1,007,588.30**	**$1,264,551.14**	**$1,489,957.14**	**$1,489,957.14**
Costs							
One-Time Costs	(370,703.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of Recurring Costs		(278,947.37)	(244,690.67)	(214,640.94)	(188,281.53)	(165,159.24)	
Net Present Value of All Costs	**(370,703.00)**	**(649,650.37)**	**(894,341.04)**	**(1,108,981.98)**	**(1,297,263.51)**	**(1,462,422.75)**	**(1,462,422.75)**
Overall Net Present Value							**$27,534.39**
Cash Flow Analysis							
Yearly NPV Cash Flow	(370,703.00)	101,754.39	89,258.23	78,296.70	68,681.31	60,246.77	
Overall NPV Cash Flow	(370,703.00)	(268,948.61)	(179,690.38)	(101,393.68)	(32,712.37)	27,534.39	
IRR:	(370,703.00)	116,000.00	116,000.00	116,000.00	116,000.00	116,000.00	**17.049417%**
Break-even Occurs Between:	Years 4 and 5						
Break-even Fraction:	0.542973						
Actual Break-even Occurs:	4.542973						

Figure 3: One-Time Costs Worksheet

Piedmont Trailer Manufacturing Company Custom Order Tracking Project One-Time Costs January 2, 2008	
Cost	**Approximate Dollar Value**
Development Personnel	(142,000.00)
Training	(45,000.00)
Project-Related Technology Purchases	(65,000.00)
Site Preparation	(105,250.00)
Miscellaneous	
Conference-Related	(7,500.00)
Supplies	(2,704.00)
Duplication	(3,249.00)
Total One-Time Costs	**(370,703.00)**

Figure 4: Recurring Costs Worksheet

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Recurring Costs January 2, 2008	
Cost	**Approximate Dollar Value**
Software Maintenance	($55,000.00)
Hardware	($30,000.00)
Supplies	($35,000.00)
IT Positions (3 people)	($160,000.00)
Site Rental	($38,000.00)
Total Recurring Costs	**($318,000.00)**

Figure 5: Tangible Benefit Worksheet

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Recurring Benefits January 2, 2008	
Benefit	**Approximate Dollar Value**
Storage Savings	$30,000.00
Staff Reduction (2 people)	$45,000.00
Reduced Order Rework	$14,000.00
Increased Sales	$100,000.00
Faster Order Processing	$40,000.00
Better Data Management	$125,000.00
Streamline Activities	$80,000.00
Total Recurring Benefits	**$434,000.00**

1. How will discount rates of 8, 10, 12, 14, and 16 percent affect the project's feasibility?

Figures 6 – 10 provide suggested answers for this question. The answers for this question assume a useful life of 5 years. Using a discount rate of 8 percent, the net present value of all benefits is $1,732,836.16; the net present value of all costs is $1,640,384.79; the overall net present value is $92,451.36, and the project breaks even in approximately 3.84 years.

Using a 10 percent discount rate, the net present value of all benefits is $1,645,201.46; the net present value of all costs is $1,576,173.19; the overall net present value is $69,028.27, and the project breaks even in approximately 4.04 years.

Using a 12 percent discount rate, the net present value of all benefits is $1,564,472.87; the overall net present value of all costs is $1,517,021.83; the overall net present value is $47,451.04, and the project breaks even in approximately 4.279 years.

Using a 14 percent discount rate, the net present value of all benefits is $1,489,957.14; the net present value of all costs is $1,462,422.75; the overall net present value is $27,534.39, and the project breaks even in approximately 4.54 years.

Using a discount rate of 16 percent, the net present value of all benefits is $1,421,043.45; the net present value of all costs is $1,411,928.38, and the overall net present value is $9,115.06. At a discount rate of 16 percent, the project breaks even in 4.83 years.

Figure 6: Economic Feasibility Summary with an 8 Percent Discount

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.08**						
	Year						**Totals**
Year	**0**	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.925926	0.857339	0.793832	0.735030	0.680583	
Present Value of Benefits	$0.00	$401,851.85	$372,085.05	$344,523.19	$319,002.96	$295,373.11	
Net Present Value of All Benefits	**$0.00**	**$401,851.85**	**$773,936.90**	**$1,118,460.09**	**$1,437,463.05**	**$1,732,836.16**	**$1,732,836.16**
Costs							
One-Time Costs	(370,703.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.925926	0.857339	0.793832	0.735030	0.680583	
Present Value of Recurring Costs		(294,444.44)	(272,633.74)	(252,438.65)	(233,739.49)	(216,425.46)	
Net Present Value of All Costs	**(370,703.00)**	**(665,147.44)**	**(937,781.19)**	**(1,190,219.84)**	**(1,423,959.34)**	**(1,640,384.79)**	**(1,640,384.79)**
Overall Net Present Value							**$92,451.36**
Cash Flow Analysis							
Yearly NPV Cash Flow	(370,703.00)	107,407.41	99,451.30	92,084.54	85,263.46	78,947.65	
Overall NPV Cash Flow	(370,703.00)	(263,295.59)	(163,844.29)	(71,759.75)	13,503.71	92,451.36	
IRR:	(370,703.00)	116,000.00	116,000.00	116,000.00	116,000.00	116,000.00	**17.049417%**
Break-even Occurs Between:	Years 3 and 4						
Break-even Fraction:	0.841624						
Actual Break-even Occurs:	3.841624						

Figure 7: Economic Feasibility Summary with a 10 Percent Discount

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.10**						
	Year						**Totals**
Year	**0**	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.909091	0.826446	0.751315	0.683013	0.620921	
Present Value of Benefits	$0.00	$394,545.45	$358,677.69	$326,070.62	$296,427.84	$269,479.85	
Net Present Value of All Benefits	**$0.00**	**$394,545.45**	**$753,223.14**	**$1,079,293.76**	**$1,375,721.60**	**$1,645,201.46**	**$1,645,201.46**
Costs							
One-Time Costs	(370,703.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.909091	0.826446	0.751315	0.683013	0.620921	
Present Value of Recurring Costs		(289,090.91)	(262,809.92)	(238,918.11)	(217,198.28)	(197,452.98)	
Net Present Value of All Costs	**(370,703.00)**	**(659,793.91)**	**(922,603.83)**	**(1,161,521.93)**	**(1,378,720.21)**	**(1,576,173.19)**	**(1,576,173.19)**
Overall Net Present Value							**$69,028.27**
Cash Flow Analysis							
Yearly NPV Cash Flow	(370,703.00)	105,454.55	95,867.77	87,152.52	79,229.56	72,026.87	
Overall NPV Cash Flow	(370,703.00)	(265,248.45)	(169,380.69)	(82,228.17)	(2,998.61)	69,028.27	
IRR:	(370,703.00)	116,000.00	116,000.00	116,000.00	116,000.00	116,000.00	**17.049417%**
Break-even Occurs Between:	Years 4 and 5						
Break-even Fraction:	0.041632						
Actual Break-even Occurs:	4.041632						

Figure 8: Economic Feasibility Summary with a 12 Percent Discount

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.12**						
	Year						**Totals**
Year	**0**	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.892857	0.797194	0.711780	0.635518	0.567427	
Present Value of Benefits	$0.00	$387,500.00	$345,982.14	$308,912.63	$275,814.85	$246,263.26	
Net Present Value of All Benefits	**$0.00**	**$387,500.00**	**$733,482.14**	**$1,042,394.77**	**$1,318,209.62**	**$1,564,472.87**	**$1,564,472.87**
Costs							
One-Time Costs	(370,703.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.892857	0.797194	0.711780	0.635518	0.567427	
Present Value of Recurring Costs		(283,928.57)	(253,507.65)	(226,346.12)	(202,094.75)	(180,441.74)	
Net Present Value of All Costs	**(370,703.00)**	**(654,631.57)**	**(908,139.22)**	**(1,134,485.34)**	**(1,336,580.09)**	**(1,517,021.83)**	**(1,517,021.83)**
Overall Net Present Value							**$47,451.04**
Cash Flow Analysis							
Yearly NPV Cash Flow	(370,703.00)	103,571.43	92,474.49	82,566.51	73,720.10	65,821.52	
Overall NPV Cash Flow	(370,703.00)	(267,131.57)	(174,657.08)	(92,090.57)	(18,370.48)	47,451.04	
IRR:	(370,703.00)	116,000.00	116,000.00	116,000.00	116,000.00	116,000.00	**17.049417%**
Break-even Occurs Between:	Years 4 and 5						
Break-even Fraction:	0.279095						
Actual Break-even Occurs:	4.279095						

Figure 9: Economic Feasibility Summary with a 14 Percent Discount

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.14**						
	Year						**Totals**
Year	**0**	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of Benefits	$0.00	$380,701.75	$333,948.91	$292,937.64	$256,962.84	$225,406.00	
Net Present Value of All Benefits	**$0.00**	**$380,701.75**	**$714,650.66**	**$1,007,588.30**	**$1,264,551.14**	**$1,489,957.14**	**$1,489,957.14**
Costs							
One-Time Costs	(370,703.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of Recurring Costs		(278,947.37)	(244,690.67)	(214,640.94)	(188,281.53)	(165,159.24)	
Net Present Value of All Costs	**(370,703.00)**	**(649,650.37)**	**(894,341.04)**	**(1,108,981.98)**	**(1,297,263.51)**	**(1,462,422.75)**	**(1,462,422.75)**
Overall Net Present Value							**$27,534.39**
Cash Flow Analysis							
Yearly NPV Cash Flow	(370,703.00)	101,754.39	89,258.23	78,296.70	68,681.31	60,246.77	
Overall NPV Cash Flow	(370,703.00)	(268,948.61)	(179,690.38)	(101,393.68)	(32,712.37)	27,534.39	
IRR:	(370,703.00)	116,000.00	116,000.00	116,000.00	116,000.00	116,000.00	**17.049417%**
Break-even Occurs Between:	Years 4 and 5						
Break-even Fraction:	0.542973						
Actual Break-even Occurs:	4.542973						

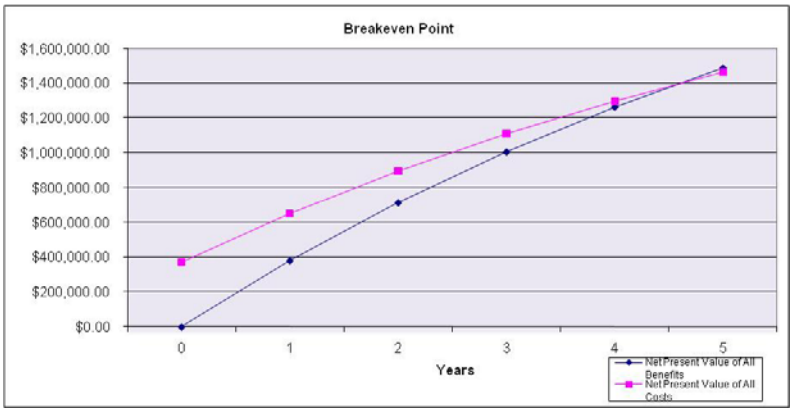
Figure 10: Economic Feasibility Summary with a 16 Percent Discount

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.16**						
	Year						**Totals**
Year	**0**	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.862069	0.743163	0.640658	0.552291	0.476113	
Present Value of Benefits	$0.00	$374,137.93	$322,532.70	$278,045.43	$239,694.34	$206,633.05	
Net Present Value of All Benefits	**$0.00**	**$374,137.93**	**$696,670.63**	**$974,716.06**	**$1,214,410.40**	**$1,421,043.45**	**$1,421,043.45**
Costs							
One-Time Costs	(370,703.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.862069	0.743163	0.640658	0.552291	0.476113	
Present Value of Recurring Costs		(274,137.93)	(236,325.80)	(203,729.14)	(175,628.57)	(151,403.94)	
Net Present Value of All Costs	**(370,703.00)**	**(644,840.93)**	**(881,166.73)**	**(1,084,895.87)**	**(1,260,524.44)**	**(1,411,928.38)**	**(1,411,928.38)**
Overall Net Present Value							**$9,115.06**
Cash Flow Analysis							
Yearly NPV Cash Flow	(370,703.00)	100,000.00	86,206.90	74,316.29	64,065.77	55,229.11	
Overall NPV Cash Flow	(370,703.00)	(270,703.00)	(184,496.10)	(110,179.81)	(46,114.05)	9,115.06	
IRR:	(370,703.00)	116,000.00	116,000.00	116,000.00	116,000.00	116,000.00	**17.049417%**
Break-even Occurs Between:	Years 4 and 5						
Break-even Fraction:	0.834959						
Actual Break-even Occurs:	4.834959						

2. Reset the discount rate to 14 percent. Prepare a breakeven chart that compares the net present value of all benefits to the net present value of all costs.

Figure 11 provides a suggested answer. The solution is also provided in the solution file's ISQ2 BEP Chart worksheet.

Figure 11: Breakeven Chart



3. If management stipulates that the internal rate of return must be equal to or greater than the discount rate, is this project still justifiable?

Using the results shown in Figure 10 as a guide, it appears that the internal rate of return is approximately 17.049 percent. As long as the discount rate is equal to or less than the internal rate of return, the project is justifiable.

4. Assuming the discount rate is 14 percent, how will eliminating an additional staff position of $32,500 affect the economic feasibility assessment?

Figure 12 shows the Economic Feasibility Summary worksheet. The elimination of a staff position is a recurring benefit and causes the recurring benefits to increase $32,500 for each year. The recurring benefits for years 1 through 5 increase from $434,000 to $466,500. The overall net present value is $139,109.52; the IRR increases to approximately 28.72 percent, and the project breaks even in approximately 3.295 years. The solution file's ISQ4 EFS worksheet also shows the results.

Figure 12: Economic Feasibility Summary Reflecting Staff Position Reduction

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.14**						
	Year						**Totals**
	0	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0.00	$466,500.00	$466,500.00	$466,500.00	$466,500.00	$466,500.00	
Present Value Factor	1	0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of Benefits	$0.00	$409,210.53	$358,956.60	$314,874.21	$276,205.45	$242,285.48	
Net Present Value of All Benefits	$0.00	**$409,210.53**	**$768,167.13**	**$1,083,041.34**	**$1,359,246.79**	**$1,601,532.27**	**$1,601,532.27**
Costs							
One-Time Costs	($370,703.00)						
Recurring Costs		($318,000.00)	($318,000.00)	($318,000.00)	($318,000.00)	($318,000.00)	
Present Value Factor		0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of the Recurring Costs		($278,947.37)	($244,690.67)	($214,640.94)	($188,281.53)	($165,159.24)	
Net Present Value of All Costs	($370,703.00)	($649,650.37)	($894,341.04)	($1,108,981.98)	($1,297,263.51)	($1,462,422.75)	**($1,462,422.75)**
Overall Net Present Value							**$139,109.52**
Cash Flow Analysis							
Yearly NPV Cash Flow	($370,703.00)	$130,263.16	$114,265.93	$100,233.27	$87,923.92	$77,126.25	
Overall NPV Cash Flow	($370,703.00)	($240,439.84)	($126,173.91)	($25,940.64)	$61,983.28	$139,109.52	
IRR:	($370,703.00)	$148,500.00	$148,500.00	$148,500.00	$148,500.00	$148,500.00	28.724918%
Break-even Occurs Between:	Years 3 and 4						
Break-even Fraction:	0.295035112						
Actual Break-even Occurs:	3.295						

5. Assume that the staff position mentioned in Step 4 is eliminated, the site preparation cost increases to $120,000, and the discount rate is 14 percent. What impact will these changes have on the project's feasibility?

Figure 13 provides a suggested answer. The increase in the site preparation cost requires the student to change this cost in his one-time cost worksheet. The recurring value of benefits is $466,500, and the one-time costs increase to $385,453.00 per year. The net present value of all benefits is $1,601,532.27; the net present value of all costs is $1,477,172.75, and the overall net present value is $124,359.52. The project breaks even in 3.86 years, and the IRR is approximately 26.75 percent. The solution file's ISQ5 EFS worksheet also provides the answer.

Figure 13: Economic Feasibility Summary Reflecting Staff Position Reduction and Increased Cost

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008							
Discount Rate	**0.14**						
	Year						**Totals**
	0	**1**	**2**	**3**	**4**	**5**	
Benefits							
Recurring Value of Benefits	$0.00	$466,500.00	$466,500.00	$466,500.00	$466,500.00	$466,500.00	
Present Value Factor	1.000000	0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of Benefits	0.00	409,210.53	358,956.60	314,874.21	276,205.45	242,285.48	
Net Present Value of All Benefits	$0.00	**$409,210.53**	**$768,167.13**	**$1,083,041.34**	**$1,359,246.79**	**$1,601,532.27**	**$1,601,532.27**
Costs							
One-Time Costs	(385,453.00)						
Recurring Costs		(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	(318,000.00)	
Present Value Factor		0.877193	0.769468	0.674972	0.592080	0.519369	
Present Value of the Recurring Costs		(278,947.37)	(244,690.67)	(214,640.94)	(188,281.53)	(165,159.24)	
Net Present Value of All Costs	(385,453.00)	(664,400.37)	(909,091.04)	(1,123,731.98)	(1,312,013.51)	(1,477,172.75)	**(1,477,172.75)**
Overall Net Present Value							**$124,359.52**
Cash Flow Analysis							
Yearly NPV Cash Flow	(385,453.00)	130,263.16	114,265.93	100,233.27	87,923.92	77,126.25	
Overall NPV Cash Flow	(385,453.00)	(255,189.84)	(140,923.91)	(40,690.64)	47,233.28	124,359.52	
IRR:	(385,453.00)	148,500.00	148,500.00	148,500.00	148,500.00	148,500.00	26.749302%
Break-even Occurs Between:	Years 3 and 4						
Break-even Fraction:	0.861483						
Actual Break-even Occurs:	3.86						

6. Assume that management has enough money to fund two development projects. After you determine this project's internal rate of return, compare its internal rate of return to the internal rate of returns for the proposed development projects listed in the following table. Based on the projects' internal rate of returns, do you think management will fund the custom order tracking system?

Student answers to this question should vary. Many factors will (or should) influence management's ultimate decision about which projects to fund. Hopefully, your students will suggest that additional factors should be considered. These factors include scheduling, strategic alignment, operational objectives, government regulations, and potential benefits. If we base our decision solely on the information from the table, it appears that the custom order tracking system has the second highest IRR. (See Figure 13 for the IRR value.)

Test Your Design Solutions

The Test Your Design section requires students to modify their worksheet design and then use the modified worksheet to provide Ms. Pablo with answers. Suggested answers for the Test Your Design questions are provided below.

1. What recommendations would you make if the useful life of the project is three years instead of five years? Six years? (Use the original case values and assume a discount rate of 14 percent.)

Figure 14 shows the modified Economic Feasibility Summary worksheet. Using a 14 percent discount rate, it appears that the project breaks even in approximately 4.54 years. At first glance, the students may recommend that the project is not feasible, if its useful life is only three years. As the project is in its planning phase, the project team has not identified all benefits and costs. Arguably, this project is still viable, especially if the team emphasizes the custom order tracking system's intangible benefits, such as customer service and employee morale.

In terms of six years, the net present value of all benefits is $1,687,681.70; the net present value of all costs is $1,607,299.27; the overall net present value is $80,382.43, and the IRR is approximately 21.62 percent. The solution file's TYD1 EFS worksheet also provides the answer.

Figure 14: Economic Feasibility Summary Reflecting Six-Year Useful Life

Piedmont Trailer Manufacturing Company Custom Order Tracking Project Economic Feasibility Summary January 2, 2008								
Discount Rate	**0.14**							
	Year							**Totals**
	0	**1**	**2**	**3**	**4**	**5**	**6**	
Benefits								
Recurring Value of Benefits	$0.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	$434,000.00	
Present Value Factor	1.000000	0.877193	0.769468	0.674972	0.592080	0.519369	0.455587	
Present Value of Benefits	$0.00	$380,701.75	$333,948.91	$292,937.64	$256,962.84	$225,406.00	$197,724.56	
Net Present Value of All Benefits	**$0.00**	**$380,701.75**	**$714,650.66**	**$1,007,588.30**	**$1,264,551.14**	**$1,489,957.14**	**$1,687,681.70**	**$1,687,681.70**
Costs								
One-Time Costs	($370,703.00)							
Recurring Costs		($318,000.00)	($318,000.00)	($318,000.00)	($318,000.00)	($318,000.00)	($318,000.00)	
Present Value Factor		0.877193	0.769468	0.674972	0.592080	0.519369	0.455587	
Present Value of the Recurring Costs		($278,947.37)	($244,690.67)	($214,640.94)	($188,281.53)	($165,159.24)	($144,876.52)	
Net Present Value of All Costs	**($370,703.00)**	**($649,650.37)**	**($894,341.04)**	**($1,108,981.98)**	**($1,297,263.51)**	**($1,462,422.75)**	**($1,607,299.27)**	**($1,607,299.27)**
Overall Net Present Value								**$80,382.43**
Cash Flow Analysis								
Yearly NPV Cash Flow	($370,703.00)	$101,754.39	$89,258.23	$78,296.70	$68,681.31	$60,246.77	$52,848.04	
Overall NPV Cash Flow	($370,703.00)	($268,948.61)	($179,690.38)	($101,393.68)	($32,712.37)	$27,534.39	$80,382.43	
IRR:	($370,703.00)	$116,000.00	$116,000.00	$116,000.00	$116,000.00	$116,000.00	$116,000.00	21.624673%
Break-even Occurs Between:	Years 4 and 5							
Break-even Fraction:	0.542973098							
Actual Break-even Occurs:	4.54							

2. Identify at least three additional benefits that might be derived from this project. Estimate their value and include the values in your analysis. What impact do these new benefits have on your economic feasibility?

Your students should identify several additional benefits that the new system will provide. Once your students have identified the additional benefits, these new benefits should be added to the recurring benefits worksheet. Better inventory management, reduced expenses, and error reduction are three additional benefits. The new benefits should strengthen the economic feasibility analysis.

3. Identify at least one additional one-time cost and at least three additional recurring costs. Estimate their values and include these values in your analysis. What impact do these new costs have on your economic feasibility? Is the project still justifiable? Why or why not?

Your students should easily identify additional one-time and recurring costs for the new system. While their answers will vary, new hardware and software purchases are examples of one-time costs. Prorated overhead, maintenance, and computer usage are three examples of recurring costs.