

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

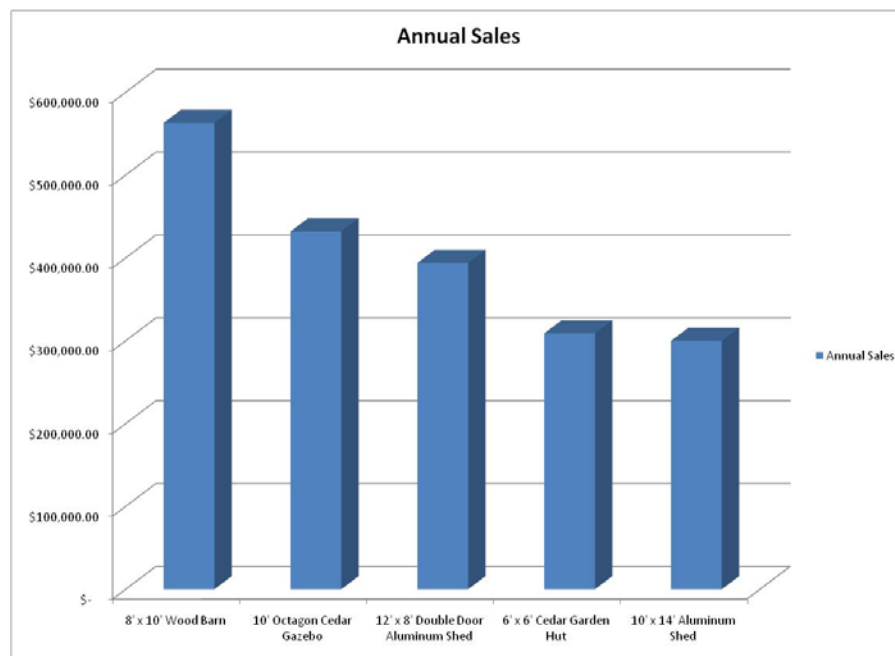
Milligan's Backyard Storage Kits Inventory Analysis Worksheet March 30, 2008				
Item No.	Description	Average Unit Sales/Year	Inventory Turnover	Days In Inventory
A00820	8' x 40' Covered Bridge	2	1.00	365.00
A01140	Milligan's Superior Trellis	7	7.00	52.14
A01100	Monroe Wooden Trellis	25	2.50	146.00
A01110	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.

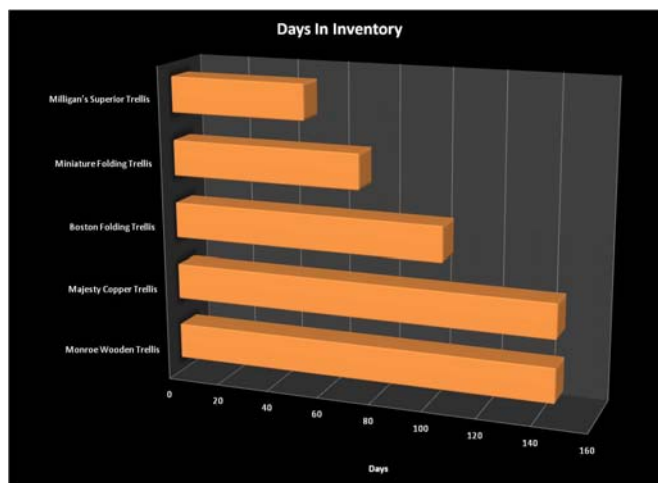
3. What is the gross margin per unit for each inventory item? Which inventory item(s) has (have) the largest gross margin per unit? Least?

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 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	\$94,996.25	\$70,366.50	\$24,629.75	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	26.93%	35.01%	8.00	45.63	1.99%	\$567.43
A00120	12' x 20' Aluminum Shed	\$133.56	\$195.99	32	65	\$4,459.82	\$126,814.35	\$90,581.40	\$36,232.95	28.57%	40.00%	2.03	179.69	2.53%	\$564.82
A00130	6' x 4' Aluminum Shed	\$346.36	\$519.99	50	241	\$17,318.00	\$125,221.19	\$83,472.76	\$41,748.43	33.34%	50.01%	4.62	75.73	2.50%	\$173.23
A00140	8' x 4' Aluminum Shed	\$424.58	\$620.75	215	215	\$21,229.00	\$133,461.25	\$93,472.76	\$40,000.00	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	\$468.93	75	150	\$27,758.25	\$98,889.50	\$55,616.50	\$13,323.00	19.35%	24.00%	2.00	182.50	1.37%	\$68.52
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%	33.00%	3.78	96.69	7.86%	\$260.50
A00320	16' x 10' Double Door Aluminum Shed	\$1,141.84	\$1,507.24	12	50	\$13,702.08	\$75,962.00	\$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	\$139,998.80	\$105,261.80	\$34,736.80	24.81%	33.00%	2.92	125.14	2.79%	\$248.12
A00430	10' x 16' Wood Barn	\$808.28	\$1,074.99	10	67	\$8,082.80	\$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	\$289.28	\$399.99	26	299	\$7,001.28	\$119,591.01	\$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	\$54,991.50	\$176,307.00	\$26,684.50	30.89%	44.63%	11.04	33.06	5.09%	\$92.57
A00530	8' Child's Picnic Table	\$210.59	\$350.99	44	157	\$9,285.56	\$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	\$431,993.56	\$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	\$133,860.61	\$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	\$91,743.04	\$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	4.38%	\$459.43
A00750	6' x 6' Cedar Garden Hut	\$879.99	\$950.78	114	325	\$100,318.85	\$309,003.50	\$255,996.75	\$53,006.75	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 Planer	\$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 Planer	\$27.99	\$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	\$6,182.66	\$3,061.33	33.33%	50.00%	0.73	499.38	0.18%	\$15.33
A00940	6' Windmill	\$43.99	\$65.99	300	278	\$13,197.00	\$18,945.22	\$12,229.22	\$6,716.00	33.34%	50.01%	0.93	393.88	0.37%	\$22.00
A00950	6' Fishing Well	\$53.32	\$79.99	300	760	\$15,998.60	\$62,395.20	\$41,599.60	\$20,802.60	33.34%	50.02%	2.60	140.38	1.24%	\$26.67
A00960	12' Fishing Well	\$130.66	\$195.99	25	147	\$3,266.50	\$28,810.53	\$20,802.50	\$8,008.03	33.33%	50.00%	5.88	62.07	0.54%	\$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	\$67,526.73	\$36,999.50	\$34,456.50	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	\$36,117.60	\$67,526.73	\$32,215.05	\$1,264.25	47.71%	91.23%	1.80	202.78	1.35%	\$1,193.15
A01100	Monroe Wooden Trellis	\$202.30	\$252.67	10	25	\$2,023.00	\$6,321.75	\$5,037.50	\$1,284.25	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	26.00%	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	\$54.67	20	100	\$980.00	\$5,481.00	\$4,800.00	\$687.00	12.52%	14.31%	5.00	73.00	0.11%	\$6.67
A01400	Milligan's Superior Trellis	\$764.81	\$989.78	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	\$2,240.00	\$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						\$1,238,180.65	\$5,013,072.42	\$3,691,910.18	\$1,321,162.24	27.58%	40.74%				
Average		\$11.42	\$15.93			\$30,199.53	\$122,270.06	\$90,046.59	\$32,223.47	7.45%	8.04%	0.73	26.07	0.11%	\$ 4.57
Minimum		\$2,963.99	\$4,700.00			\$177,499.29	\$553,143.00	\$378,931.00	\$184,212.00	47.71%	91.23%	14.00	499.38	11.23%	\$ 2,190.28