Appendix F: Finished Good Inventory Chart

Finished Goods Inventory

ID	Type	Common Name	Size	Paper	Quantity	Annual Demand Quantity	Fixed Setup Cost	List Price	Holding Cost Per Unit ($)	Economic Order Quantity	Daily Demand Rate	Lead Time (days)	Reorder Point
BT0202	Bangtail	#09 Bangtail	03-7/8 x 8-7/9	White 24#	107,200	43750	$1,200.00	$0.05	0.00075	374,165.74	119.86	30	3,595.89
CN1C01	Coin	#01 Coin	02-1/4 x 3-1/2	White 24#	80,000	25000	$950.00	$0.25	0.00375	112,546.29	68.49	30	2,054.79
CN3C03	Coin	#03 Coin	02-1/2 x 4-1/4	24ww	39,000	6250	$950.00	$1.12	0.0168	26,586.56	17.12	30	513.70
CN7C01	Coin	#07 Coin	03-1/2 x 6-1/2	24ww	3,500	6250	$850.00	$1.12	0.0168	25,148.37	17.12	30	513.70
CN7C02	Coin	#07 Coin	03-1/2 x 6-1/2	White 24#	36,000	12500	$850.00	$0.50	0.0075	53,229.06	34.25	30	1,027.40
DK0100	Doorknobs	Doorknobs	03-5/8 x 6-1/2	Blue	91,000	14000	$1,200.00	$0.06	0.000825	201,809.99	38.36	60	2,301.37
DK0101	Doorknobs	Doorknobs	03-5/8 x 6-1/2	Yellow 80#	55,000	10250	$1,200.00	$0.06	0.000825	172,679.42	28.08	60	1,684.93
DK0102	Doorknobs	Doorknobs	03-5/8 x 6-1/2	pink	35,000	2250	$1,200.00	$0.06	0.000825	80,903.98	6.16	60	369.86
DK0104	Doorknobs	Doorknobs	03-5/8 x 6-1/2	Green	38,000	34500	$1,200.00	$0.06	0.000825	316,802.20	94.52	6	567.12
DK0105	Doorknobs	Doorknobs	03-5/8 x 6-1/2	24ww	83,000	91000	$1,200.00	$0.06	0.000825	514,516.54	249.32	60	14,958.90
DK0200	Doorknobs	Doorknobs	04-3/8 x 6-	24ww	140,00	30500	$1,200.00	$0.07	0.001065	262,168.64	83.56	60	5,013.70

Finished Goods Inventory

ID	Type	Common Name	Size	Paper	Quantity	Annual Demand Quantity	Fixed Setup Cost	List Price	Holding Cost Per Unit ($)	Economic Order Quantity	Daily Demand Rate	Lead Time (days)	Reorder Point
	obs		1/2		0								
KK0200	Kost Kut	6-3/4 KK	03-5/8 x 6-1/2	White 24#	252,000	34000	$1,200.00	$0.04	0.00054	388,730.13	93.15	30	2,794.52
MN0100	Miniatures	Miniatures	01 x 01	White 24#	547,000	695250	$950.00	$0.02	0.00033	2,000,738.50	1,904.79	30	57,143.84
MN0200	Miniatures	Miniatures	01-1/4 x 1-1/4	24ww	271,000	1263000	$950.00	$0.02	0.000246	3,123,280.01	3,460.27	30	103,808.22
MN0315	Miniatures	Miniatures	01-1/2 x 1-1/2	White 24#	485,000	2317000	$950.00	$0.02	0.000315	3,738,389.43	6,347.95	30	190,438.36
MN0700	Miniatures	Miniatures	01-7/8 x 01-7/8	White 24#	240,000	100250	$950.00	$0.04	0.000597	564,848.30	274.66	30	8,239.73
MN0800	Miniatures	Miniatures	02 x 2	White 24#	40,000	1018500	$950.00	$0.03	0.000444	2,087,689.14	2,790.41	30	83,712.33
MN1201	Miniatures	Miniatures	02-1/2 x 2-1/2	24ww	5,200	465750	$950.00	$0.03	0.000405	1,478,174.55	1,276.03	30	38,280.82
MN1501	Miniatures	Square	03 x 3	cream	59,200	136500	$950.00	$0.04	0.0006225	645,466.12	373.97	30	11,219.18
SL0103	Sleeves	Sleeves	02-1/4 x 3-3/8	RFID Defender	75,000	187500	$950.00	$0.08	0.0012	544,862.37	513.70	30	15,410.96
SL0110	Sleeves	Sleeves	02-1/4 x 3-3/8	24ww	5,000	87500	$950.00	$0.02	0.000345	694,178.69	239.73	30	7,191.78
SL0112	Sleeves	Sleeves	02-1/4 x 3-3/8	orca laminate	62,500	118750	$950.00	$0.05	0.00069	571,832.80	325.34	30	9,760.27
SL0113	Sleeves	Sleeves	02-1/4 x 3-3/8	tyvek	74,000	50000	$950.00	$0.06	0.000825	339,339.82	136.99	30	4,109.59

Appendix G: Warehouse Return on Investment Calculations

If they use the time					
Shipping more	Gain	52.395 hours of shipping more		Miniature ship time	5.5 minutes
		571.5817974	more order		0.09166667
		571.58 orders with 62000 minis in each		Last year sold 620000 minis	Last year 10 orders contained minis
		35438071.44	minis sold extra	62000	average number of units in an order
		0.019354839	list price of mini		
	Gain	$685,898.16	extra money from shipping more		
Producing More	Gain	117.7 hours of producing more		Miniature produce time	8 hours is 80000 units
					117.7 hours
		1177000	extra units		14.7125
		0.019354839			1177000
	Gain	$22,780.65			
If they don't use the time					
BEFORE					
	Time (minutes)	Time(hours)	Wage	Total spent on them	Total
Shipper	13675	227.9166667	16.59	$3,781.14	$6,454.13
Producer	9362.5	156.0416667	17.13	$2,672.99	
AFTER					
Time spent					
	Time (minutes)	Time (hours)	Wages	Total Money spent on them	
Shipper	10531.25	175.5208333	16.59	2911.890625	$3,568.54
Producer	2300	38.33333333	17.13	656.65	
				Total savings if employees didn't work the time saved	
				$2,885.59	

Appendix H: Manual System Tracking Return on Investment Calculations

How Much Inventory Management will Increase Quote Retention

Current					
Won Quotes	Total Quotes			Completed Orders	Total Orders
10	100			3860	38600

Increase by	5%				
Quotes with Inventory Management	Total Quotes			Completed Orders	Total Orders
10.5	100			4053	38600

Price Per Order	Current Revenue	Potential Revenue
$90.36	$348,789.60	$366,229.08

Revenue Increase	First Year ROI	Ongoing ROI
$17,439.48	183%	409%

Increase by	15%				
Quotes with Inventory Management	Total Quotes			Completed Orders	Total Orders
11.5	100			4439	38600

Price Per Order	Current Revenue	Potential Revenue
$90.36	$348,789.60	$401,108.04

Revenue Increase	First Year ROI	Ongoing ROI
$57,550.28	748%	1427%

Training Cost	$2,055.60
System Setup Cost	$685.20
Weekly Data Entry	$3,426.00
Total Cost	$6,166.80

Appendix I: Automated System Tracking Return on Investment Calculations

How Much Inventory Management will Increase Quote Retention

Current				
Won Quotes	Total Quotes		Completed Orders	Total Orders
10	100		3860	38600

Increase by Quotes with Inventory Management	15%			
	Total Quotes		Completed Orders	Total Orders
11.5	100		4439	38600

Price Per Order	Current Revenue	Potential Revenue		115%
$90.36	$348,789.60	$401,108.04		

Revenue Increase	First Year ROI	Ongoing ROI
$57,550.28	887%	4304%

Increase by Quotes with Inventory Management	25%			
	Total Quotes		Completed Orders	Total Orders
12.5	100		4825	38600

Price Per Order	Current Revenue	Potential Revenue		125%
$90.36	$348,789.60	$435,987.00		

Revenue Increase	First Year ROI	Ongoing ROI
$95,917.14	1545%	7240%

Cost of Finale:
Annual Cost

Training Cost	$99/month
System Setup Cost	$ 1,188.00
Total Cost	$ 3,426.00

Appendix J: Cumulative Return on Investment Calculations

Warehouse Value			Cumulative Value		
	Pessimistic	Optimistic		Pessimistic	Optimistic
First Year Cost	$579.13	$579.13	First Year Cost	$5,878.33	$5,878.33
Ongoing Cost	$ -	$ -	Ongoing Cost	$1,188.00	$1,188.00
Gain	$22,780.65	$22,780.65	Gain	$75,099.09	
					$109,978.05
First Year ROI	3834%	3834%	First Year ROI	1178%	1771%
Ongoing ROI	n/a	n/a	Ongoing ROI	6221%	9157%
Automated Value					
	Pessimistic	Optimistic			
First Year Cost	$5,299.20	$ 5,299.20			
Ongoing Cost	$1,188.00	$1,188.00			
Gain	$52,318.44	$87,197.40			
First Year ROI	887%	1545%			
Ongoing ROI	4304%	7240%			

Appendix K: Finale Inventory© Features

Small Business Package	Standard Business Package
Price of System - $99/month	**Price of System** - $199/month

Summary Reports (Historical data, overall financial reports)
- Standard Reports
  o Weekly account report
  o Purchases by account, shipment, product, product category
  o Sales reports by product or category
  o Broad range of stock reports
  o Many more
	Summary Reports (Historical data, overall financial reports)
	- Standard Reports
	  o Weekly account report
	  o Purchases by account, shipment, product, product category
	  o Sales reports by product or category
	  o Broad range of stock reports
	  o Many more
	- Customizable reports

Shop floor Control (WIP Tracking) - Does not support WIP Tracking	**Shop floor Control (WIP Tracking)** - serial number tracking - lot number tracking
Inventory Management (Finished goods, raw materials) - Able to track stock by location - Able to track stock by product - Able to stack stock by category	**Inventory Management (Finished goods, raw materials)** - Able to track stock by location - Able to track stock by product - Able to stack stock by category - Supports automated reorders and reorder points
Work Station Tickets/Manufacturing Tickets - unable to create Work Station Tickets	**Work Station Tickets/Manufacturing Tickets** - able to create Work Station Tickets
QuickBooks™ Integration - Designed to integrate with QuickBooks™	**QuickBooks™ Integration** - Designed to integrate with QuickBooks™
Cloud-Based System - Yes, is a cloud-based system	**Cloud-Based System** - Yes, is a cloud-based system
Barcoding - Does not support barcoding	**Barcoding** - Barcode label printing - 2 mobile barcode scanner licenses
Sales and Billing Documentation - Purchase Order documents - Price quotes - Sales orders - Invoices	**Sales and Billing Documentation** - Purchase Order documents - Price quotes - Sales orders - Invoices
Shipping Documentation - Receive, pack, and ship documentation	**Shipping Documentation** - Receive, pack, and ship documentation

- Able to produce bills of lading - Ability to ship by lot ID (helps with FIFO)	- Able to product bills of lading - Ability to ship by lot ID (helps with FIFO)
Inventory Adjustment at Time of Order - is able to adjust inventory at time of order	**Inventory Adjustment at Time of Order** - is able to adjust inventory at time of order

Table 18: Finale Inventory© Package Features

Appendix L: Fishbowl Inventory© Manufacturing Features

Fishbowl Inventory© Manufacturing
Price of System
- One-time payment of $4395, price increases with added user licenses
Summary Reports (Historical data, overall financial reports)
- Gross Sales by Product - Inventory Turnover Reports - Accounting Reports - Historical data reports - Many more
Shop floor Control (WIP Tracking)
- Multi-location part tracking - Lot number tracking
Inventory Management (Finished goods, raw materials)
- Real time inventory management - Calculates reorder points (can automatically generate reorders too) - Expiration date tracking - LIFO and FIFO Tracking
Work Station Tickets/Manufacturing Tickets
- Can create work orders and multi-station work orders - Can create work order priorities - Helps with work order scheduling - Can automatically generate work orders
QuickBooks™ Integration
- Designed specifically to work with QuickBooks™
Cloud-based System
- Not cloud-based, is installed on a computer system
Barcoding
- Fully supports barcode scanning and capabilities
Sales and Billing Documentation
- Ability to turn price quotes into sales orders - Saves sales orders to use if customer orders product again - "Quick lists" feature allows company to create standard sales orders for commonly ordered products so that only minor order adjustments need to be made - Supports variable pricing options - Convert sales orders to purchases orders
Shipping Documentation
- Pick, pack, and ship documentation - Able to print shipping labels - UPS and FedEx compatible
Inventory Adjustment at Time of Order
- Able to adjust inventory at time of order

Table 19: Fishbowl Inventory© Manufacturing Features

Appendix M: QuickBooks™ Enterprise Features

Platinum Edition
Price of System
- $1600 for 1 user license, price increases with more licenses (4 licenses is $3000)
Summary Reports (Historical data, overall financial reports)
- Has a variety of financial reports - Able to create custom reports - Has a variety of standard inventory reports - Able to create interactive reports and graphs to better identify trends
Shop floor Control (WIP Tracking)
- Serial number tracking - Lot number tracking
Inventory Management (Finished goods, raw materials)
- Real time inventory data - Able to set custom reorder points - Able to track inventory using FIFO
Work Station Tickets/Manufacturing Tickets
- Only able to create work orders if the Field Service Management Add-on is purchased at an additional cost
QuickBooks™ Integration
- Designed to integrate with QuickBooks™
Cloud-based System
- Not normally cloud-based, but can be for an addition $54.99/month/user
Barcoding
- Supports barcode scanning
Sales and Billing Documentation
- Able to create sales orders - Able to create invoices - Able to create estimates (quotes) - Able to set custom pricing and billing levels
Shipping documentation
- Able to create shipping labels for FedEx and UPS from customer orders and invoices
Inventory Adjustment at Time of Order
- Has Available to Promise feature, which adjusts inventory at the time of order

Table 20: QuickBooks™ Enterprise Features

Appendix N: Step-by-Step Process of Analytical Hierarchy Process

The first step in AHP consisted of determining Sheppard's weights based on their preferences and inputting them into a matrix, which can be seen in Table 21. The preferred criteria would get the criteria weighting and the least preferred criteria is determined by calculating the reciprocal of the weight. As seen in Table 21, Price was more preferred over Summary Reports, which is displayed by Price having a 3 and Summary Reports being the reciprocal of that weight.

	Price	Summary	WIP Tracking	Inventory Management	Work Station Ticket	Quickbooks Integration	Cloud Based	Barcoding	Sales & Billing	Shipping Documents	Inventory Adj
Price	1.00	3.00	6.00	0.25	0.33	7.00	8.00	9.00	0.33	0.25	0.33
Summary	=1/D3	1.00	8.00	0.20	0.25	7.00	7.00	9.00	0.20	0.20	0.17
WIP Tracking	0.17	0.13	1.00	0.13	0.11	1.00	1.00	1.00	0.13	0.13	0.11
Inventory Management	4.00	5.00	8.00	1.00	0.50	8.00	8.00	9.00	1.00	4.00	0.50
Work Station Ticket	3.00	4.00	9.00	2.00	1.00	7.00	8.00	9.00	2.00	2.00	2.00
Quickbooks Integration	0.14	0.14	1.00	0.13	0.14	1.00	2.00	2.00	0.17	0.14	0.14
Cloud Based	0.13	0.14	1.00	0.13	0.13	0.50	1.00	2.00	0.13	0.13	0.13
Barcoding	0.11	0.11	1.00	0.11	0.11	0.50	0.50	1.00	0.11	0.11	0.11
Sales & Billing	3.00	5.00	8.00	1.00	0.50	6.00	8.00	9.00	1.00	2.00	0.33
Shipping Documents	4.00	5.00	8.00	0.25	0.50	7.00	8.00	9.00	0.50	1.00	0.20
Inventory Adj	3.00	6.00	9.00	2.00	0.50	7.00	8.00	9.00	3.00	5.00	1.00
Total	18.88	29.52	60.00	7.19	4.07	52.00	59.50	69.00	8.56	14.95	5.02

Table 21: AHP Weights Determined by Sheppard's Preferences

The Table 22 displays the weights from above as normalized numbers. This was done by taking the exact cell from the first matrix and dividing it by its total column sum. The average of each row is calculated at the right of the matrix, resulting in its overall priority. The last cell is the consistency measure, which uses the Excel formula =MMULT. This a multiplication formula that calculates the original weights, from Table 21, with averages from the new normalized matrix giving the consistency measure. The consistency measure is then averaged and used in the CI, the consistency index, calculations for determining the individual index. The RI, ratio index, was a given number determined by the number of criterion. Therefore, the consistency ratio (CR) is computed by dividing the CI by the RI. The CR needs to be below 0.1 in order to be considered as consistent.

	Price	Summary	WIP Tracking	Inventory Management	Work Station Ticket	Quickbooks Integration	Cloud Based	Barcoding	Sales & Billing	Shipping Documents	Inventory Adj	Priority Average	Consistency Measure
Price	0.053	0.102	0.100	0.035	0.082	0.135	0.134	0.130	0.039	0.017	0.066	0.081	=MMULT(C3:M3,$N$17:$N$27)/N17
Summary	0.018	0.034	0.133	0.028	0.061	0.135	0.118	0.130	0.023	0.013	0.033	0.066	11.353
WIP Tracking	0.009	0.004	0.017	0.017	0.027	0.019	0.017	0.014	0.015	0.008	0.022	0.015	11.630
Inventory Management	0.212	0.169	0.133	0.139	0.123	0.154	0.134	0.130	0.117	0.267	0.100	0.153	13.862
Work Station Ticket	0.159	0.135	0.150	0.278	0.245	0.135	0.134	0.130	0.234	0.134	0.398	0.194	12.466
Quickbooks Integration	0.008	0.005	0.017	0.017	0.035	0.019	0.034	0.029	0.019	0.010	0.028	0.020	11.372
Cloud Based	0.007	0.005	0.017	0.017	0.031	0.010	0.017	0.029	0.015	0.008	0.025	0.016	11.405
Barcoding	0.006	0.004	0.017	0.015	0.027	0.010	0.008	0.014	0.013	0.007	0.022	0.013	11.500
Sales & Billing	0.159	0.169	0.133	0.139	0.123	0.115	0.134	0.130	0.117	0.134	0.066	0.129	13.445
Shipping Documents	0.212	0.169	0.133	0.035	0.123	0.135	0.134	0.130	0.058	0.067	0.040	0.112	13.516
Inventory Adj	0.159	0.203	0.150	0.278	0.123	0.135	0.134	0.130	0.350	0.334	0.199	0.200	13.618
Sum	1	1	1	1	1	1	1	1	1	1	1	Average	12.41
												CI	0.14
												RI	1.51
												CR	0.0934

Table 22: AHP Weights as Normalized Numbers

Figure 20 shows one of the matrices for each individual criterion. The first matrix on the left is based on the prices for each product being examined, Finale Inventory© Small Business, Finale Inventory© Standard Business, Fishbowl Inventory© and Enterprise. The next is the normalized matrix, which is calculated the same way as earlier. The last table shows the weighted sum, which incorporates the priority of each product and calculates the consistency measure. The CI is calculated the same way as earlier and the RI is now 0.9 because of the number of products being used as criteria. These three matrices are done for each criterion for a 12-month and 36-month subscription.

Pairwise Matrix

Price	Finale Small	Finale Standard	Fishbowl	Enterprise
Finale Small	1.00	3.00	9.00	7.00
Finale Standard	0.33	1.00	5.00	3.00
Fishbowl	0.11	0.20	1.00	0.20
Enterprise	0.14	0.33	5.00	1.00
Sum	1.59	4.53	20.00	11.20

Normalized Matrix

Price	Finale Small	Finale Standard	Fishbowl	Enterprise	Priority
Finale Small	=C4/C$7	0.66	0.45	0.63	0.59
Finale Standard	0.21	0.22	0.25	0.27	0.24
Fishbowl	0.07	0.04	0.05	0.02	0.05
Enterprise	0.09	0.07	0.25	0.09	0.13

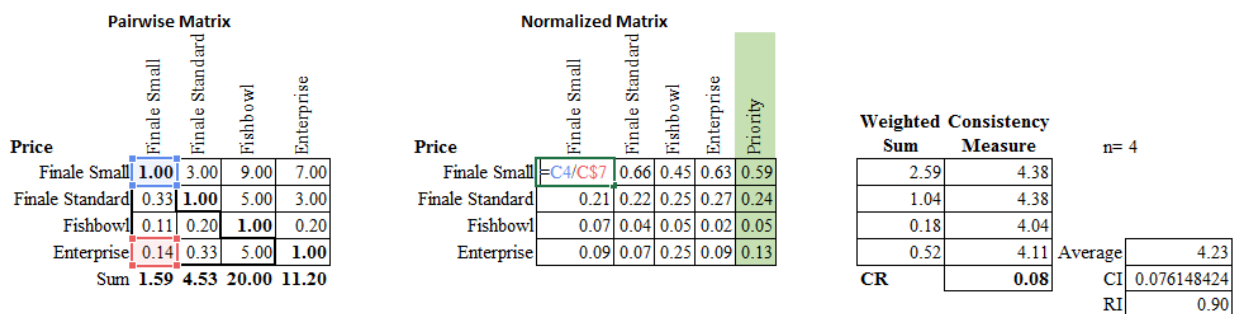|	Weighted Sum	Consistency Measure	n= 4
	2.59	4.38	
	1.04	4.38	
	0.18	4.04	
	0.52	4.11	Average	4.23
CR	0.08		CI	0.076148424
			RI	0.90

Figure 20: Matrices for an Individual Analytical Criterion

The priority summary matrix is a collection of all the priorities from each software for each criteria (Table 23).

Priority Summary											
	Price	Summary Reports	WIP Tracking	Inventory Management	Work Station Tickets	Quickbooks Integration	Cloud Based	Barcoding	Sales & Billing	Shipping Documents	Inventory Adjustment
Priority	0.0812	0.0661	0.0155	0.1526	0.0163	0.0201	0.0163	0.0131	0.1292	0.1124	0.1997
Finale Small Business	0.592	0.250	0.036	0.250	0.321	0.250	0.450	0.036	0.250	0.250	0.250
Finale Standard Business	0.237	0.250	0.321	0.250	0.321	0.250	0.450	0.321	0.250	0.250	0.250
Fishbowl	0.045	0.250	0.321	0.250	0.321	0.250	0.050	0.321	0.250	0.250	0.250
Enterprise	0.126	0.250	0.321	0.250	0.036	0.250	0.050	0.321	0.250	0.250	0.250

Table 23: AHP Priority Summary

The overall rankings for the products were calculated by the addition of the priority for each criteria times each criterion's priority. The left table is the results based on priorities and the criterion for a 12-month subscription and the right a 36-month subscription (see Table 24).

Overall 12 Month Rankings		
1	Finale Small	0.23
2	Finale Standard	0.21
3	Enterprise	0.19
4	Fishbowl	0.19

Overall 36 Month Rankings		
1	Finale Small	0.54
2	Finale Standard	0.53
3	Fishbowl	0.53
4	Enterprise	0.26

Table 24: Product Rankings for Both 12- and 36-Month Periods

Appendix O: Time Value of Money Calculations

Month	1	2	3	4	5	6	7	8	9	10	11	12
Cost	($3,466)	($2,356)	($99)	($99)	($99)	($99)	($99)	($99)	($99)	($99)	($99)	($99)
Learning Curve (%)	-	2.00	3.00	3.00	4.00	5.00	5.00	6.00	6.00	7.00	8.00	9.00
Revenue Warehouse	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39	$ 1,898.39
Revenue Auto	$ -	$ 601.36	$ 902.04	$ 902.04	$ 1,202.72	$ 1,503.40	$ 1,503.40	$ 1,804.08	$ 1,804.08	$ 2,104.76	$ 2,405.45	$ 2,706.13
Total Revenue Increase per Month	$ 1,898.39	$ 2,499.75	$ 2,800.43	$ 2,800.43	$ 3,101.11	$ 3,401.79	$ 3,401.79	$ 3,702.47	$ 3,702.47	$ 4,003.15	$ 4,303.83	$ 4,604.51
Team Recommendation	$ (1,567.53)	$ 144.25	$ 2,701.43	$ 2,701.43	$ 3,002.11	$ 3,302.79	$ 3,302.79	$ 3,603.47	$ 3,603.47	$ 3,904.15	$ 4,204.83	$ 4,505.51
Investment	$3,466	$2,356	$99	$99	$99	$99	$99	$99	$99	$99	$99	$99
Investment Yield (10%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Invest Option	$3,812.51	$4,048.06	$4,057.96	$4,067.86	$4,077.76	$4,087.66	$4,097.56	$4,107.46	$4,117.36	$4,127.26	$4,137.16	$4,147.06

Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Cost	(5800.00)	(1188.00)	(1188.00)	(1188.00)	(1188.00)	(1188.00)	(1188.00)	(1187.00)	(1186.00)	(1185.00)	(1184.00)	(1183.00)	(1182.00)
Gain	$ -	$ 580.00	$ 640.80	$ 695.52	$ 744.77	$ 789.09	$ 828.98	$ 864.88	$ 897.10	$ 925.99	$ 951.89	$ 975.10	$ 995.89
Total	**(5800.00)**	**(6408.00)**	**(6955.20)**	**(7447.68)**	**(7890.91)**	**(8289.82)**	**(8648.84)**	**(8970.95)**	**(9259.86)**	**(9518.87)**	**(9750.99)**	**(9958.89)**	**(10145.00)**

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