

Volume

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OPTION INVESTMENT SPREADSHEET

BA225

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Option Investment Spreadsheet Guide

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Spreadsheet Overview

The Option Analysis spreadsheet was created to look at portfolios of mixed stocks and options. In the simplest case the data is entered into the “portfolio Positions” spreadsheet, “Solve Values” is pressed, then graphs on additional pages may be viewed.

Option Data Sheet

This page is provided for cut and paste option data from online resources. Format does not matter, and there are no automated links to other sheets from this page (although you can chose to link to this data yourself rather than copying values later).

The data provided in the default spreadsheet was obtained via <http://www.cboe.com/DelayedQuote/QuoteTable.aspx>.

Portfolio Positions Sheet

This page is where the user enters their portfolio of stocks and options.

Quantity - When buying a stock or option the “Quantity” is entered as a positive value; when selling the quantity is negative.

Trade Cost – Trade Cost is the transaction cost.

Current Price – Current price for the stock can be entered at the top of the page.

User Date – There is a User Date that allows for plotting of options at any point in time. By default the spreadsheet creates graphs for current, and end point data. User Date can be used to create intermediate graphs as well.

Options Data – For Options there are two blocks, one for CALLS, the other for PUTS. Up to three calls and three puts can be entered. If not using all three leave the quantity at zero on the unused lines.

Risk Free Rate, Expected Return, and Estimated Volatility, are entered at the top. Risk free rate is used in the Black-Scholes equations, but the other two only used in the “Expected Returns” page of the spreadsheet.

Graph Mid-Point, and **Graph Step-Size** – These values allow you to adjust the data range that is processed for graphing. The program uses 100 data points centered around “mid-Point”, and separated by “Step Size”.

Once the data has been entered into the Portfolio page, press the “Solve Values” button to process the data and create the results for the graphs.

Implied Volatility

The Implied Volatility values on the Portfolio Positions sheet are calculated when the “Solve Values” button is pressed. The program uses a binary search function and Black-Scholes models to calculate the implied Volatility based on the give current stock price, option price, and option strike price and exercise date.

Current Date ROI Graph

This graph provides the current value of the stock and option positions based on the Black-Scholes pricing models. “Current Date” is picked up automatically in the cells on the Portfolio page.

User Defined Date Graph

This graph is based on the user defined date entered into the Portfolio Page. Typcailly a value between the current date and end date will be used.

End Point Graph

End point graph is based on all of the options dates expired. The “End Point Date” on the Portfolio page is calculated as the maximum of all the options dates.

Note – The program does not recognize when one option expires prior to others, and assumes the stock price applies to all options. This can be a valid assumption when a call is exercised and the owner continues to hold the shares as they change in value, but will not be true if the option is sold at the exercise date instead of exercising it. In this case the relevant price is the price at exercise, not the stock price at the end of the longest options.

Expected Return Sheet

The expected return page uses the first of the CALL options for additional analysis.

Data in the first block including User Date, Current Price, Risk Free rate, etc., are all automatically pulled from the portfolio page.

Time (T) – Is calculated based on the difference between the User Date and option expiration date. As the desired result is the fraction of the year the option is still open, this uses $T = (\text{Expiration_Date} - \text{User_Date}) / 365$.

Expected Return (Price)– Is calculated based on the current stock price and given expected return values. This is calculated using the log-normal distribution equations.

Confidence Range – The user can enter a confidence range in sigma to obtain the estimated low and high stock prices. The associated confidence percentage for the given sigma is calculated and displayed as well.

Expected Return Data – The table toward the bottom of this page calculates the probability that a given stock price will be “in the money” at expiration. The “Prob. Of Final Price” column is the probability the price will be higher than that stock price at expiration. The “Expected Return Dist” column is used to create a log-normal distribution plot for the given information.

ROI Data Sheet

This sheet holds the calculated values for the individual stocks and option positions. If panning right the user will see three tables consisting of current data, Value at Tim T, and End Point data. This is where the calculated values are stored for graphing.

The user typically will not use this raw data sheet.

Quick Start Steps

This section provides a quick process the user can follow to see how the spreadsheet can be used.

Stock Only Portfolio

1. Open the spreadsheet and click on the "Portfolio Positions" Tab

The screenshot shows the 'Portfolio Positions' tab in Microsoft Excel. The spreadsheet is organized into several sections:

- Input Fields:**
 - Date: 3/19/2005
 - Stock: INTC
 - Current Price: \$35.08
 - Risk Free Rate: 5%
 - Expected Return: 16%
 - Est. Volatility: 30%
 - Start Date: 3/19/2005
 - End Date: 8/22/2005
 - User Date: 6/5/2005
 - Graph Midpoint: \$50.00
 - Graph Step Size: 1.5%
- STOCK - LONG (SHORT) Table:**

#	Quantity	Trade Cost	Curr. Price
1	0	\$0.00	\$0.00
2	0	\$0.00	\$0.00
3	0	\$0.00	\$0.00
- CALL OPTIONS - LONG (SHORT) Table:**

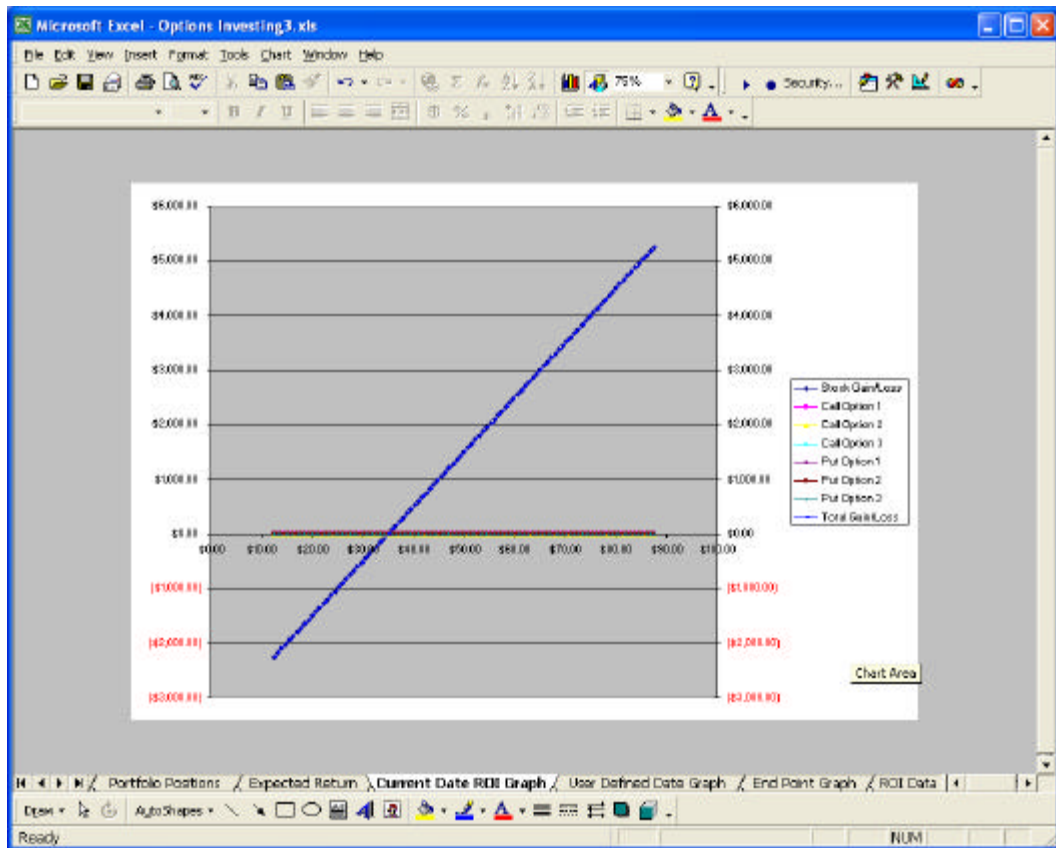
#	Quantity	Trade Cost	Strike Price	Price	Expiration	Implied Volatility
1	0	\$0.00	\$35.00	\$1.38	4/22/2005	29.54%
2	0	\$0.00	\$35.00	\$2.12	5/22/2005	32.96%
3	0	\$0.00	\$35.00	\$3.25	8/22/2005	31.30%
- PUT OPTIONS - LONG (SHORT) Table:**

#	Quantity	Trade Cost	Strike Price	Price	Expiration	Implied Volatility
1	0	\$0.00	\$35.00	\$1.22	4/22/2005	31.40%
2	0	\$0.00	\$35.00	\$1.82	5/22/2005	34.42%
3	0	\$0.00	\$35.00	\$2.73	8/22/2005	34.82%

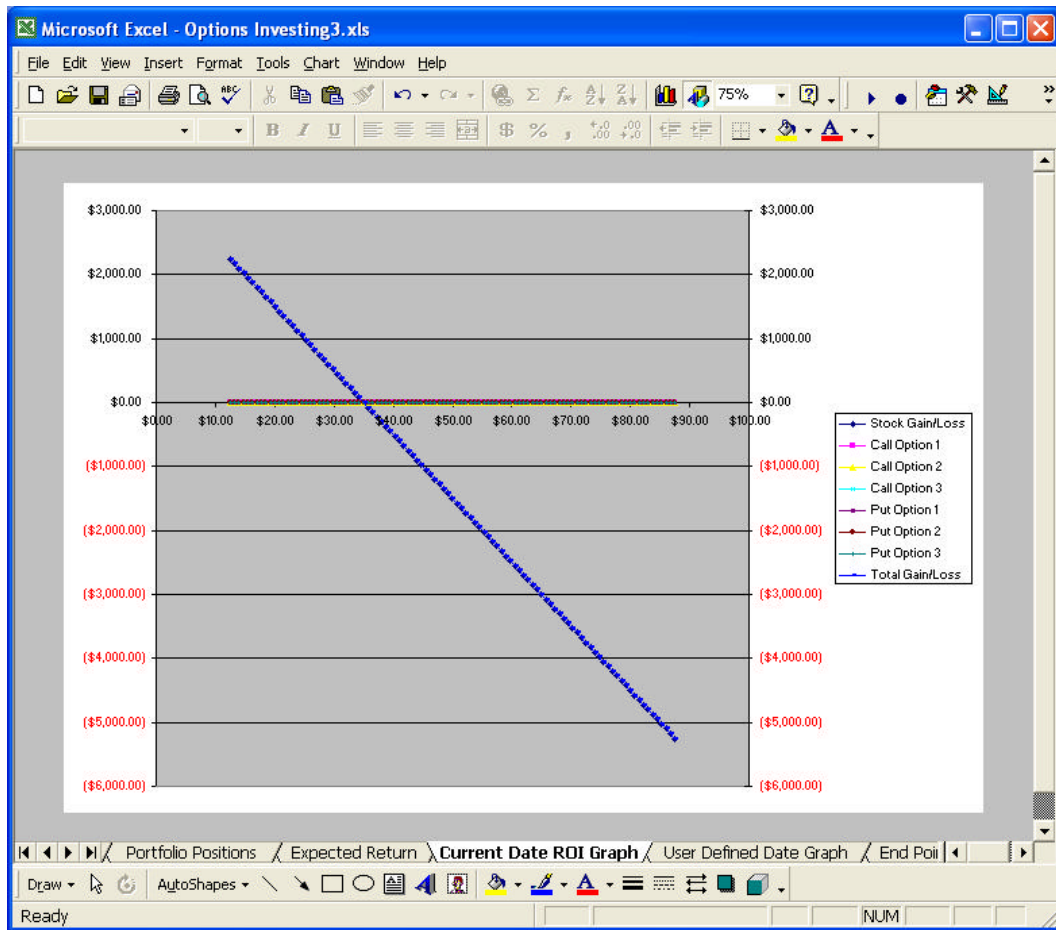
A 'SOLVE VALUES' button is located in the center of the spreadsheet.

2. In all of the stock and Option blocks set the quantity and trade cost numbers to zero.
3. In the Upper left enter:
 - a. Stock = INTC
 - b. Current Price = \$35.00
4. In the next Block Enter
 - a. Risk Free Rate = 5%
 - b. Expected Return = 10%

- c. Estimated Volatility = 20%
 - d. *Note – Only the risk free rate is used in the options evaluation. The other data is used in the expected returns calculations.*
5. In the “STOCK – LONG (SHORT)” block, Line Item #1, enter: Quantity = 100



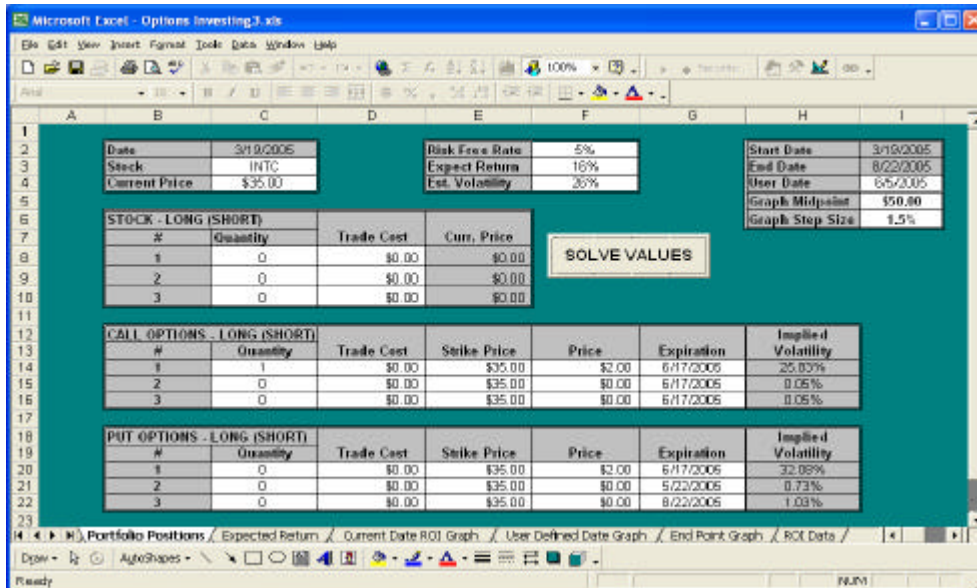
6. Click on any of the Current, User Defined, or End-Point graph pages to view the payback for specific ending prices.
- a. *Note that the stock value is automatically calculated and does not require the “Solve Values” button to be pressed. If there was previous option data in the tables it will be desirable to press the Solve button to reset the tables.*
7. Change the quantity to –100 (shorted shares) and observe the graphs.



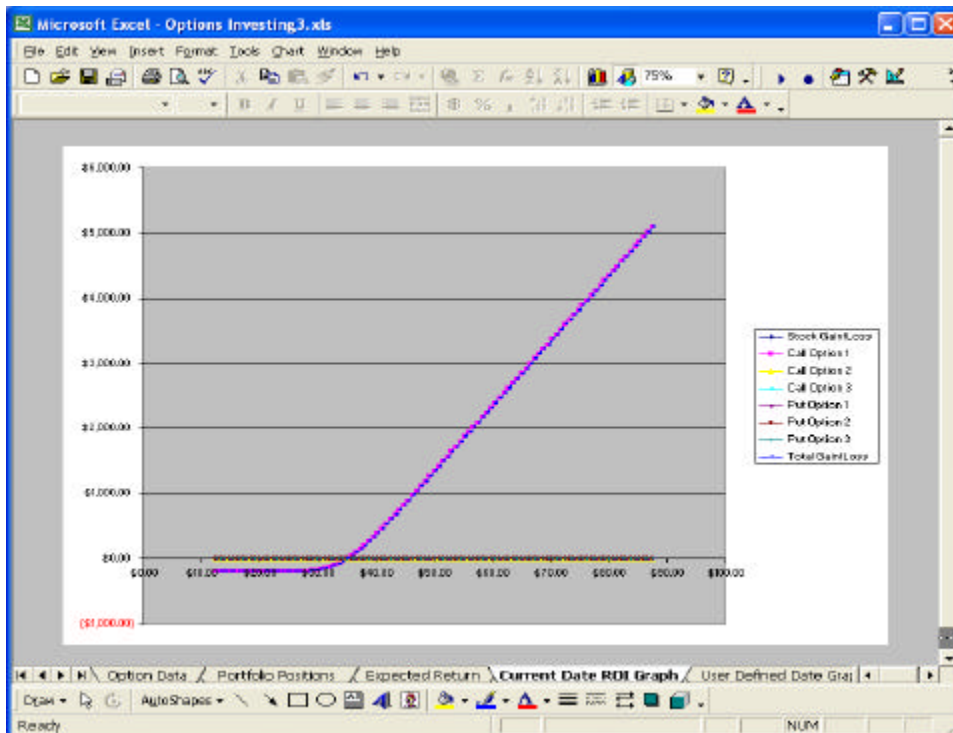
Long CALL and Long Put Portfolio

1. Clear the quantity in the Stock entry. Leave the INTC and \$35 in the upper left corner (For Stock and Current Price as per the previous portfolio).
2. In the CALL Options Block, first Item, enter:
 - a. Quantity = 1
 - b. Strike Price = \$35
 - c. Price = \$2.00
 - d. Expiration = (Approximately 3-months from now)
3. Press the “Solve Values” button and wait while the status messages are flashing below the button.

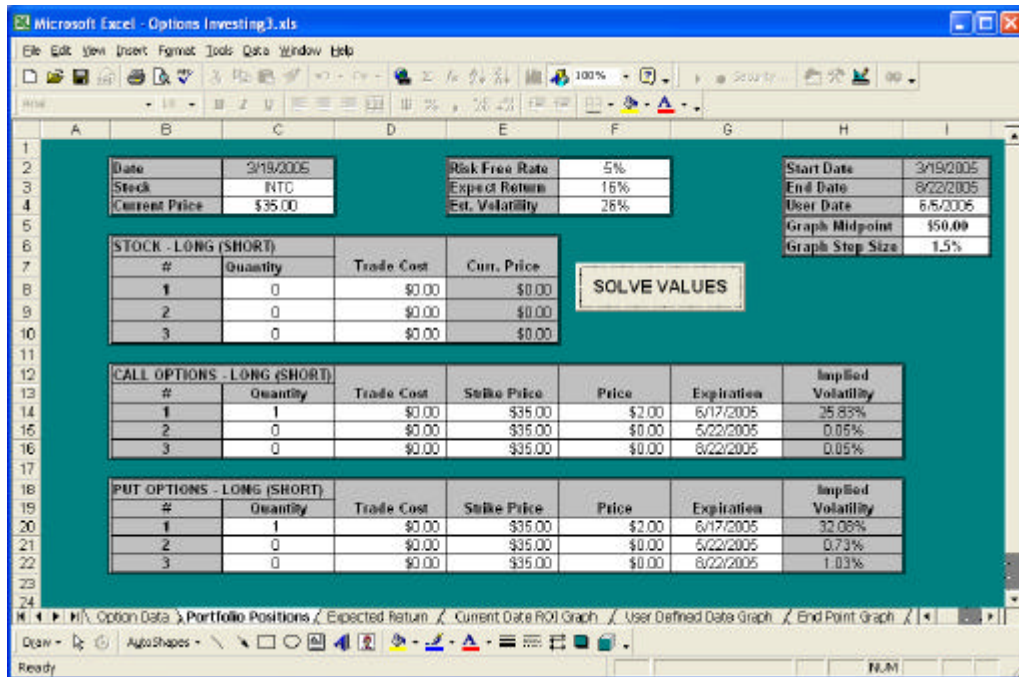
- Observe the Implied Volatility value of ~25%. (if you entered more or less than 1/4th year between today and expiration this value may vary).



- Click on the Current, User, and End-Point graphs and observe the results. Specifically note the corner at exercise price which is curved if time is remaining until expiration.



6. Repeat the data entry from step #2 in the first line of the PUT options.

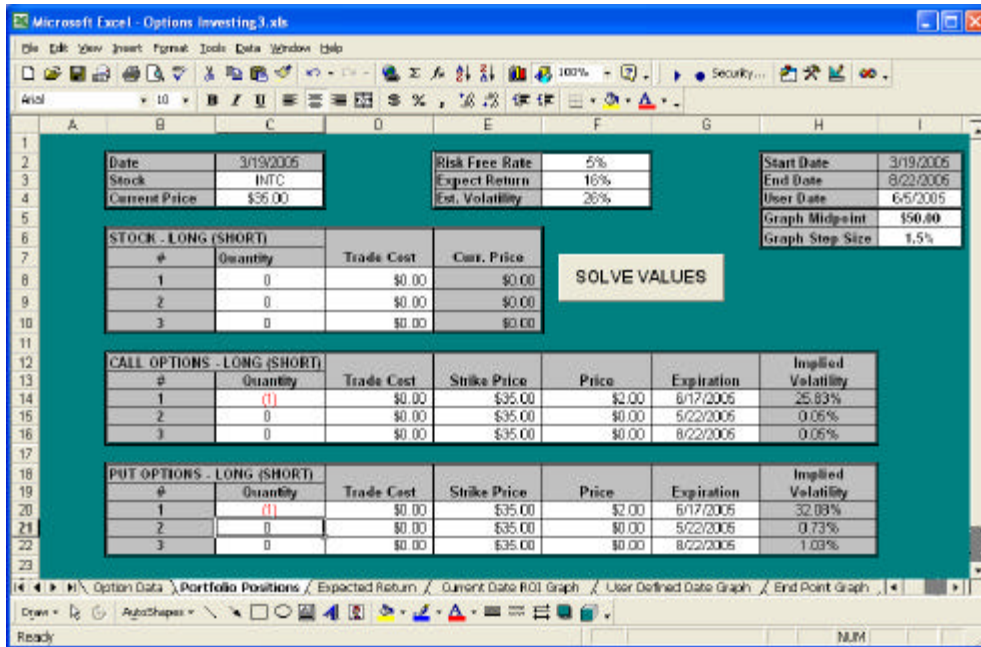


7. Press Solve Values, and wait while the data is updated.

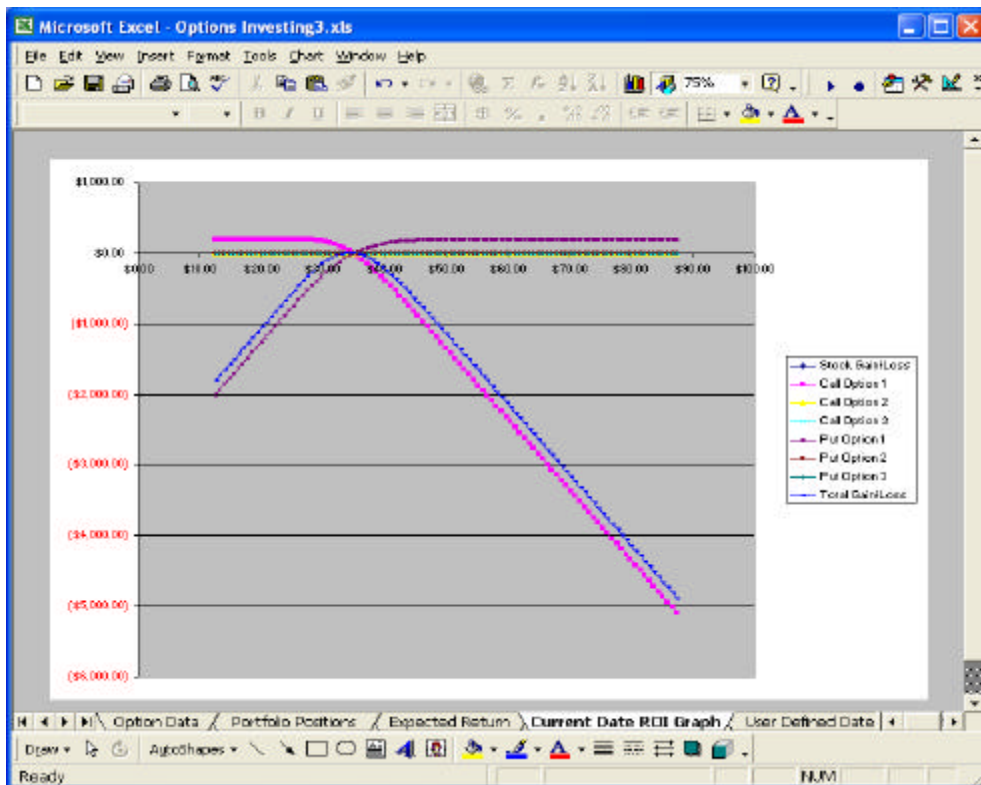
8. Observe the Current ROI Graph

Short CALL and Short Put Portfolio

1. Using the data from the previous portfolio, change the CALL and PUT quantities to "-1".



2. Press Solve Values, and wait while the data is updated.
3. Observe the graphs.



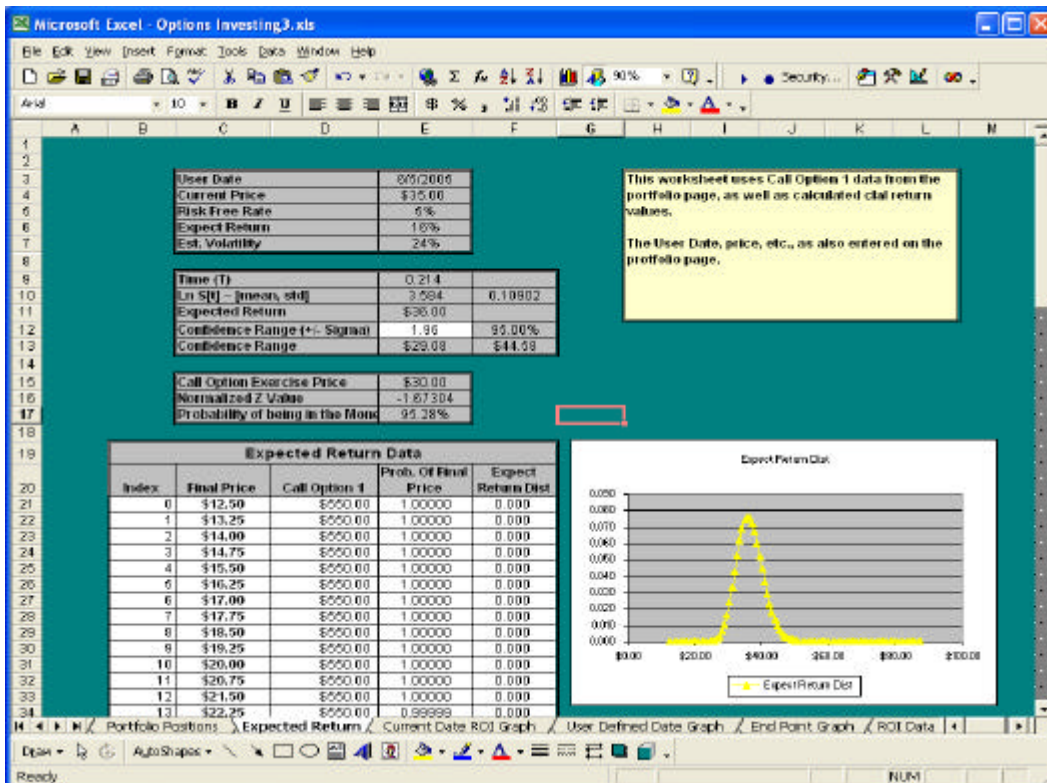
Time Splits

This spreadsheet can be used to evaluate different combinations of expiration dates, but some interpretation is required. In each case the Stock price is assumed to be applied to ALL options, but if options have previously expired and/or been sold, that assumption will not be true.

Expected Returns

The following image shows the Expected returns calculations page. All of the gray cells are either imported from the Portfolios page, or are calculated. All data in the Expected Returns table is calculated results.

The only user value typically change on this page is the Confidence range sigma value. Any other changes should be made at the data source on the Portfolio sheet.



Other Portfolios

This section includes a few additional Examples...

The screenshot shows a Microsoft Excel spreadsheet titled "Options Investing3.xls". The spreadsheet is organized into several sections:

- Input Parameters (Rows 2-5):**
 - Date: 3/19/2005
 - Stock: INTC
 - Current Price: \$35.00
 - Risk Free Rate: 5%
 - Expect Return: 16%
 - Est. Volatility: 24%
 - Start Date: 3/19/2005
 - End Date: 8/22/2005
 - User Date: 6/5/2005
 - Graph Midpoint: \$50.00
 - Graph Step Size: 1.5%
- STOCK - LONG (SHORT) Table (Rows 7-10):**

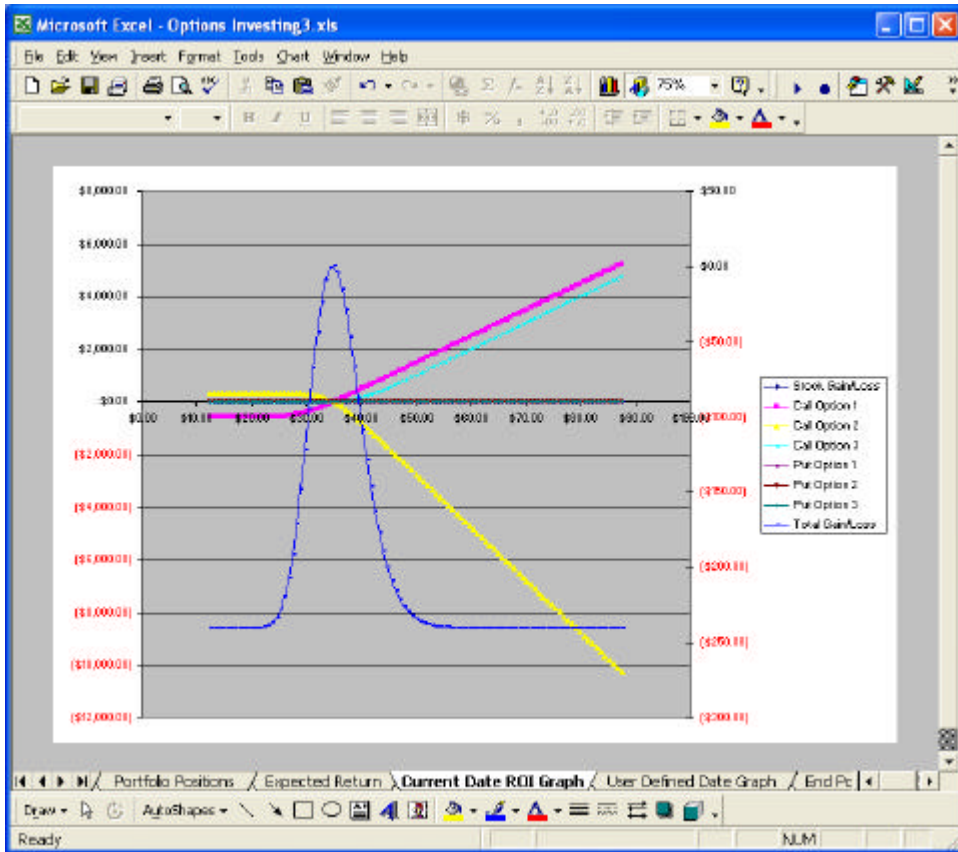
#	Quantity	Trade Cost	Cur. Price
1	0	\$0.00	\$0.00
2	0	\$0.00	\$0.00
3	0	\$0.00	\$0.00
- CALL OPTIONS - LONG (SHORT) Table (Rows 12-16):**

#	Quantity	Trade Cost	Strike Price	Price	Expiration	Implied Volatility
1	1	\$0.00	\$30.00	\$5.50	6/17/2005	23.58%
2	2	\$0.00	\$35.00	\$1.75	6/17/2005	22.12%
3	1	\$0.00	\$40.00	\$0.40	6/17/2005	24.96%
- PUT OPTIONS - LONG (SHORT) Table (Rows 18-22):**

#	Quantity	Trade Cost	Strike Price	Price	Expiration	Implied Volatility
1	0	\$0.00	\$35.00	\$2.00	6/17/2005	32.08%
2	0	\$0.00	\$35.00	\$0.00	5/22/2005	0.75%
3	0	\$0.00	\$35.00	\$0.00	8/22/2005	1.03%

A "SOLVE VALUES" button is located in the center of the spreadsheet, with a red box around it. The spreadsheet also includes a menu bar (File, Edit, View, Insert, Format, Tools, Data, Window, Help) and a toolbar with various icons. The status bar at the bottom shows "Ready" and "NUM".

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Microsoft Excel - Options Investing3.xls

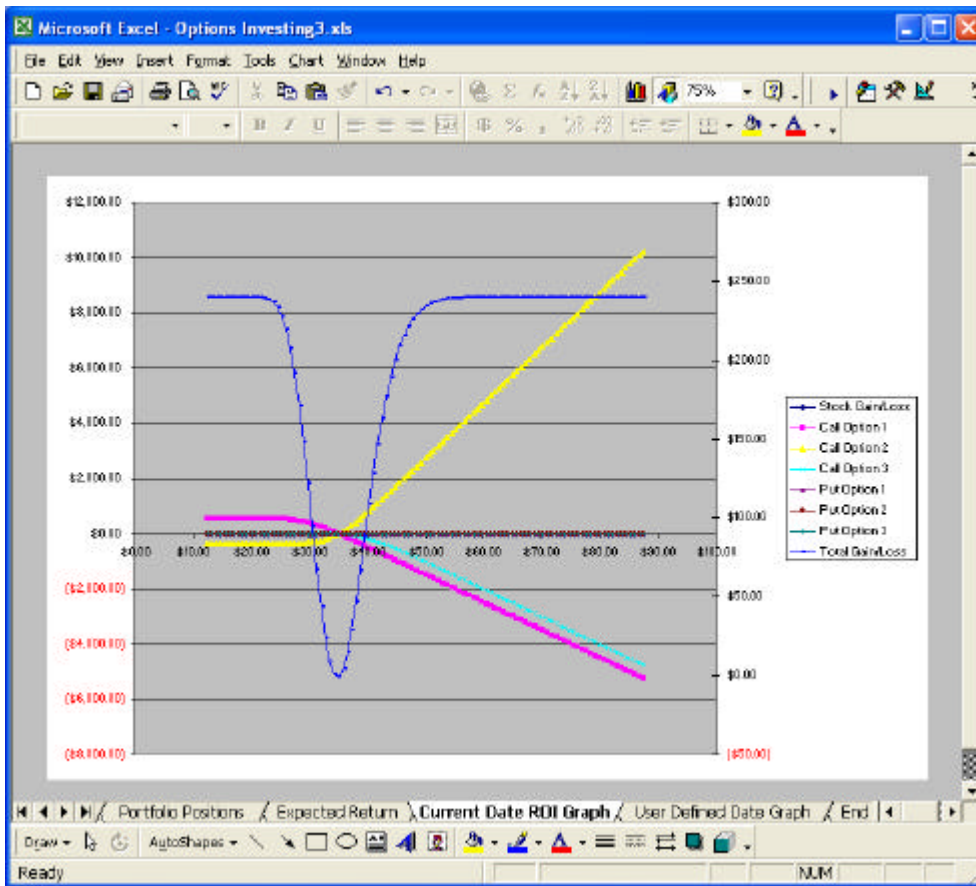
Date	3/19/2005	Risk Free Rate	5%	Start Date	3/19/2005
Stock	INTC	Expect Return	16%	End Date	8/22/2005
Current Price	\$35.00	Est. Volatility	24%	User Date	6/5/2005
				Graph Midpoint	\$50.00
				Graph Step Size	1.5%

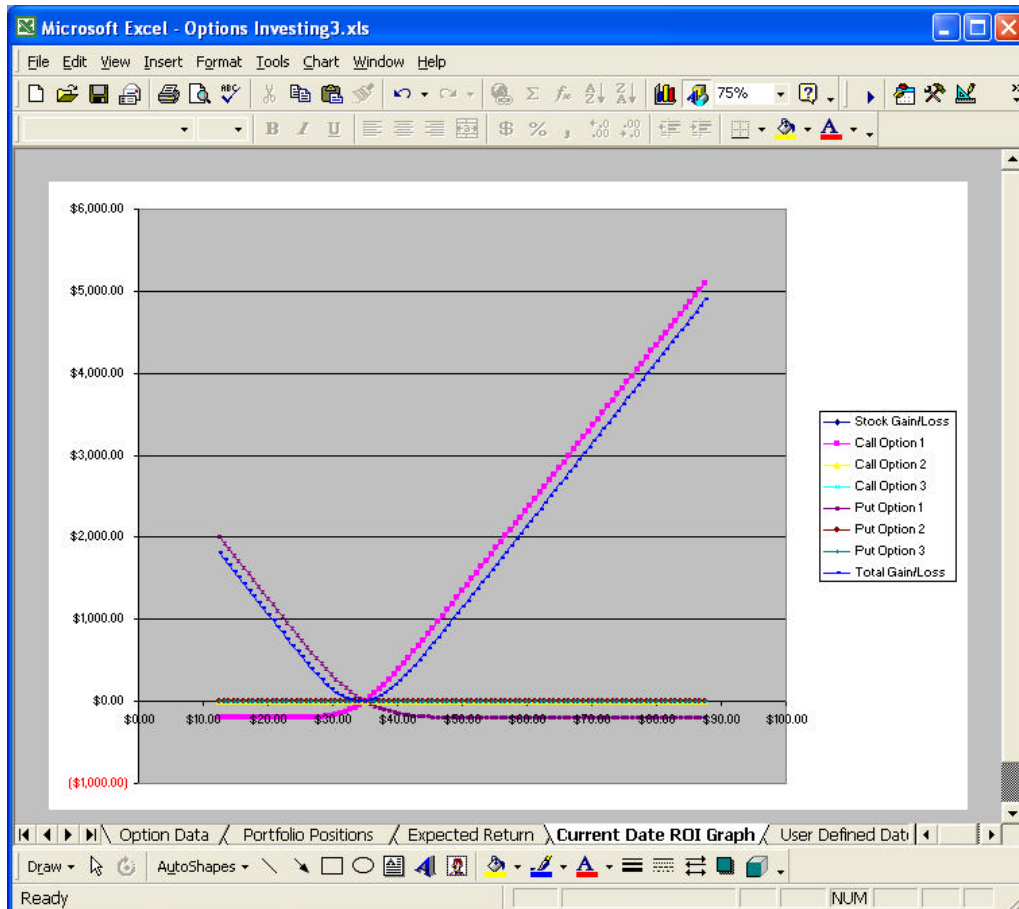
STOCK - LONG (SHORT)			
#	Quantity	Trade Cost	Curr. Price
1	0	\$0.00	\$0.00
2	0	\$0.00	\$0.00
3	0	\$0.00	\$0.00

CALL OPTIONS - LONG (SHORT)							
#	Quantity	Trade Cost	Strike Price	Price	Expiration	Implied Volatility	
1	(1)	\$0.00	\$30.00	\$5.50	6/17/2005	23.58%	
2	2	\$0.00	\$35.00	\$1.75	6/17/2005	22.12%	
3	(1)	\$0.00	\$40.00	\$0.40	6/17/2005	24.96%	

PUT OPTIONS - LONG (SHORT)							
#	Quantity	Trade Cost	Strike Price	Price	Expiration	Implied Volatility	
1	0	\$0.00	\$35.00	\$2.00	6/17/2005	32.08%	
2	0	\$0.00	\$35.00	\$0.00	5/22/2005	0.73%	
3	0	\$0.00	\$35.00	\$0.00	8/22/2005	1.03%	

SOLVE VALUES





9. Observe the End-Point graph.

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