

4. One way to create a bull spread positions is by purchasing a low strike call option and selling a high strike call option. Identify a strategy with put options that creates a similar bull spread-shaped profit profile.
5. One way to create a bear spread positions is by purchasing a high strike put option and selling a low strike put option. Identify a strategy with call options that creates a similar bear spread-shaped profit profile.

The following option prices were observed for calls and puts on a stock on July 6 of a particular year. Use this information for problems 6 through 24. The stock was priced at 165.13. The expirations are July 17, August 21, and October 16. The continuously compounded risk-free rates associated with the three expirations are 0.0503, 0.0535, and 0.0571, respectively. The standard deviation is 0.21.

Strike	Calls			Puts		
	Jul	Aug	Oct	Jul	Aug	Oct
160	6.00	8.10	11.10	0.75	2.75	4.50
165	2.70	5.25	8.10	2.40	4.75	6.75
170	0.80	3.25	6.00	5.75	7.50	9.00

For problems 6 through 10 and 13 through 16, determine the profits for the holding period indicated for possible stock prices of 150, 155, 160, 165, 170, 175, and 180 at the end of the holding period. Answer any other questions as indicated. Note: Your Excel spreadsheet *Stratlyz9e.xls* will be useful here for obtaining graphs as requested, but it does not allow you to calculate the profits for several user-specified asset prices. It lets you specify one asset price and a maximum and minimum. Use *Stratlyz9e.xls* to produce the graph for the range of prices from 150 to 180, but determine the profits for the prices of 150, 155, ..., 180 by hand for positions held to expiration. For positions closed prior to expiration, use the spreadsheet *BSMbin9e.xls* to determine the option price when the position is closed; then calculate the profit by hand.

6. Construct a bear money spread using the October 165 and 170 calls. Hold the position until the options expire. Determine the profits and graph the results. Identify the breakeven stock price at expiration and the maximum and minimum profits.

7. Repeat problem 6, but close the position on September 20. Use the spreadsheet to find the profits for the possible stock prices on September 20. Generate a graph and use it to identify the approximate breakeven stock price.
8. Construct a collar using the October 160 put. First, use the Black-Scholes-Merton model to identify a call that will make the collar have zero up-front cost. Then close the position on September 20. Use the spreadsheet to find the profits for the possible stock prices on September 20. Generate a graph and use it to identify the approximate breakeven stock price. Determine the maximum and minimum profits.
9. Suppose you are expecting the stock price to move substantially over the next three months. You are considering a butterfly spread. Construct an appropriate butterfly spread using the October 160, 165, and 170 calls. Hold the position until expiration. Determine the profits and graph the results. Identify the two breakeven stock prices and the maximum and minimum profits.
10. Construct a calendar spread using the August and October 170 calls that will profit from high volatility. Close the position on August 1. Use the spreadsheet to find the profits for the possible stock prices on August 1. Generate a graph and use it to estimate the maximum and minimum profits and the breakeven stock prices.
11. Using the Black-Scholes-Merton model, compute and graph the time value decay of the October 165 call on the following dates: July 15, July 31, August 15, August 31, September 15, September 30, and October 16. Assume that the stock price remains constant. Use the spreadsheet to find the time value in all of the cases.
12. Consider a riskless spread with a long position in the August 160 call and a short position in the October 160 call. Determine the appropriate hedge ratio. Then show how a \$1 stock price increase would have a neutral effect on the spread value. Discuss any limitations of this procedure.
13. Construct a long straddle using the October 165 options. Hold until the options expire. Determine the profits and graph the results. Identify the breakeven stock prices at expiration and the minimum profit.