

53. A 1-month European put on a non-dividend-paying stock is currently selling for \$2.50. The stock price is \$47, the strike price is \$50, and r is 6%. What opportunities are there for an arbitrageur?
54. Find the stock price on the exercise date for a European put with strike price \$36 and exercise date in three months to produce a profit of \$3 if the option is bought for \$4.50 and financed by a loan at 12% (cc).
55. Find the expected gain (or loss) for a holder of a European call with strike price \$90 to be exercised in six months if the stock price on the exercise date may turn out to be \$87, \$92, or \$97 with probability $1/3$ each, given that the option is bought for \$8 and financed by a loan at 9% (cc).
56. The price of a non-dividend-paying stock is \$19 and the price of a 3-month European call on the stock with a strike price of \$20 is \$1. If r is 4%, what is the price of a 3-month European put with a strike price of \$20?
57. European call and put options with strike price \$24 and exercise date in six months are trading at \$5.09 and \$7.78. The price of the underlying stock is \$20.37 and the interest rate is 7.48%. Find an arbitrage opportunity.
58. The price of an American call on a non-dividend-paying stock is \$4. The stock price is \$31, the strike price is \$30, the expiration date is in 3 months, and r is 8%. Derive upper and lower bounds for the price of an American put on the same stock with the same strike price and expiration date.
59. Suppose that c_1 , c_2 , and c_3 are the prices of European (a) calls and (b) puts with strike prices K_1 , K_2 , and K_3 , where $K_3 > K_2 > K_1$ and $K_3 - K_2 = K_2 - K_1$. All options have the same maturity. Show (a) $c_2 \leq 0.5(c_1 + c_3)$ and (b) the corresponding result.
60. A European call and put on a stock both have a strike price of \$20 and expire in 3 months. Both sell for \$3, r is 10%, the current stock price is \$19, and a \$1 dividend is expected in 1 month. Identify the arbitrage opportunities open to a trader.