Problem 4.1. (5 points) The price of a stock is $52.00. Lacking additional information, what is the difference between the prices of at-the-money put options and call options on this stock? Assume 38 days to expiration and 6.0% continuously compounded interest rate.

(a) 0.16  
(b) 0.32  
(c) 0.48  
(d) 0.64  
(e) None of the above.

Solution: (b)
In our usual notation,

\[ V_C(0) - V_P(0) = 52(1 - e^{-0.06 \times \frac{38}{365}}) \approx 0.32. \]

Problem 4.2. (5 points) Source: Problem #2 from the Sample FM(DM) questions.
You are given the following information:
(1) The current price to buy one share of XYZ stock is 500.
(2) The stock does not pay dividends.
(3) The risk-free interest rate, compounded continuously, is 6%.
(4) A European call option on one share of XYZ stock with a strike price of \( K \) that expires in one year costs \$66.59.
(5) A European put option on one share of XYZ stock with a strike price of \( K \) that expires in one year costs \$18.64.

Determine the strike price \( K \).

(a) \$449  
(b) \$452  
(c) \$480  
(d) \$559  
(e) None of the above.

Solution: (c)
This problem is a simple application of put-call parity. In our usual notation,

\[ C - P = S_0 - e^{-rT}K \Rightarrow K = e^{rT}(S_0 - C + P) = e^{0.06 \times \frac{1}{2}}(500 - 66.59 + 18.64) = 480. \]

Problem 4.3. (5 points) Jafee Corp. common stock is priced at \$36.50 per share. The company just paid its \$0.50 quarterly dividend. Interest rates are 6.0%. A \$35.00 strike European call, maturing in 6 months, sells for \$3.20. What is the price \( V_P(0) \) of a 6-month, \$35.00 strike put option?

(a) 0 \leq V_P(0) < \$1.25  
(b) \$1.25 \leq V_P(0) < \$1.45  
(c) \$1.45 \leq V_P(0) < \$1.55  
(d) \$1.55 \leq V_P(0) < \$1.76  
(e) \$1.76 \leq V_P(0)

Solution: (d)

\[
V_P(0) = V_C(0) + Ke^{-rT} - F_{0,T}(S) = V_C(0) + Ke^{-rT} - S(0) + De^{-rt_1} + De^{-rt_2} 
= 3.20 + 35e^{-0.06/2} - 36.50 + 0.50e^{-0.06/4} + 0.50e^{-0.06/2} \approx 1.64.
\]