HW 8.3 (a) Key

1. We are given the following information about one-year derivatives for a certain underlying asset:

   * Forward Price = \$310.63
   * 295-strike European call premium = \$42.22
   * 295-strike European put premium = \$27.37

   Determine the risk-free annual effective rate of interest. [16 #02]

   [A] 5.3% B) 4.2% C) 4.5% D) 4.8% E) 5.0%

$$\text{Call} - \text{Put} = S_0 - PV(K)$$
$$\text{Call} - \text{Put} = F_v - K v$$
$$42.22 - 27.37 = (310.63 - 295) v$$
$$i = \boxed{5.25\%}$$

2. The spot price of a share of XYZ Corp. stock (a non-dividend-paying stock) is \$55. The premium for a 12-month European put with an exercise price of \$65 on that stock is \$10.15. The effective annual interest rate is 7%. Find the price of a 12-month European call option with a strike price of \$65 on XYZ Corp. stock. [16 #10]

   [A] \$4.40 B) \$3.96 C) \$4.18 D) \$4.62 E) \$4.84

$$\text{Call} - \text{Put} = S_0 - PV(K)$$
$$\text{Call} - 10.15 = 55 - 65(1.07)^{-1}$$
$$\text{Call} = \boxed{4.40}$$

3. Consider a stock that does not pay dividends. You are given:

   i. The current stock price is 60
   ii. A call option with a strike price of 70 and maturity in one year has a current price of 4.78
   iii. The short-term risk-free interest expressed as an annual effective rate of interest is 5.55%

   Calculate the price of a put option with a strike price of 70 that matures in one-year.

   [A] 11.10 B) 10.54 C) 11.65 D) 12.21 E) 12.76

$$\text{Call} - \text{Put} = S_0 - PV(K)$$
$$4.78 - \text{Put} = 60 - 70(1.0555)^{-1}$$
$$\text{Put} = \boxed{11.10}$$

4. You are given the following information:

   * The forward price for delivery of one share of XYZ stock in one year is 154.74.
   * XYZ stock does not pay dividends.
   * The risk-free interest rate, compounded, continuously is 6.5%.
   * A K-strike one-year European call option on one share of XYZ stock costs 24.27.
   * A K-strike one-year European put option on one share of XYZ stock costs 10.46.

   Determine the strike price, K.

   [A] 140 B) 136 C) 144 D) 148 E) 153

$$\text{Call} - \text{Put} = S_0 - PV(K)$$

$$24.27 - 10.46 = (154.74 - K)e^{-0.065}$$

$$K = \boxed{140.00}$$

5. The price for a one-year 87-strike put option on Stock A is \$7.81.
   The price for a one-year 87-strike call option on Stock A is \$13.22.
   The risk-free continuously compounded rate of interest is 4%.
   Find the one-year forward price of the stock.

   A) 92.63 B) 87.07 C) 89.85 D) 95.41 E) 98.19

$$\text{Call} - \text{Put} = S_0 - PV(K)$$

$$13.22 - 7.81 = S_0 - 87e^{-0.04}$$

$$S_0 = 89.00$$

$$F = 89e^{0.04} = \boxed{92.63}$$