

HW 8.3 (b) Key

1. The following table gives information about two stocks and 6-month European put options on these stocks:

| | Current Price | Put Premium | Strike Price |
|---------|---------------|-------------|--------------|
| Stock A | \$80 | \$5.94 | \$80 |
| Stock B | \$95 | \$7.06 | \$95 |

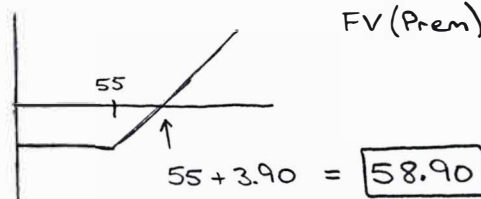
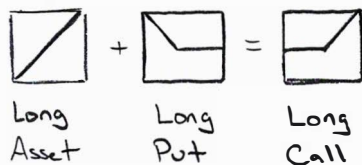
Carl buys one share of each stock and at the same time he buys a put on each stock. The risk-free nominal annual rate of interest is 4% compounded semiannually. The spot price at expiration of both stocks is \$90. X is the total profit at expiration on both stocks and both puts combined. Determine X . [15 #01]

- A)** -6.76 B) 3.24 C) -16.76 D) 19.76 E) -1.76

| | Cost at $t=0$ | PD at $t=\frac{1}{2}$ | |
|---------|---------------|-----------------------|--|
| Stock A | 80 | 90 | $\text{Prof.}_t = 185 - 188(1.02)$ $= \boxed{-6.76}$ |
| Stock B | 95 | 90 | |
| Put A | 5.94 | 0 | |
| Put B | 7.06 | 5 | |
| | <u>188</u> | <u>185</u> | |

2. Marie buys a share of stock for \$55 and buys a European 3-month 55-strike put at the same time. The premium for a European 3-month 55-strike call is \$3.82. The risk-free interest rate is 8% per annum compounded quarterly. The profit is 0 for a spot price at expiration of X . Determine X . [15 #04]

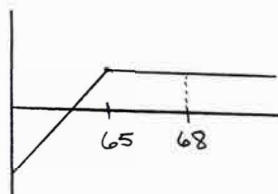
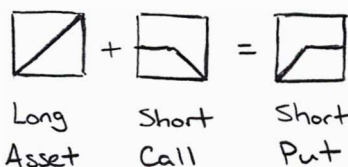
- A)** \$58.90 B) \$51.10 C) \$57.79 D) \$52.21 E) \$56.10



$$\begin{aligned} FV(\text{Prem}) &= 3.82(1.02) \\ &= 3.90 \end{aligned}$$

3. Abbey buys a stock for \$65 and writes a 65-strike one-year European call on the same stock. The premium for a 65-strike one-year put is \$5.86. The risk-free annual effective rate of interest is 5.9%. X is the profit for a spot price at expiration of \$68. Determine X . [15 #05]

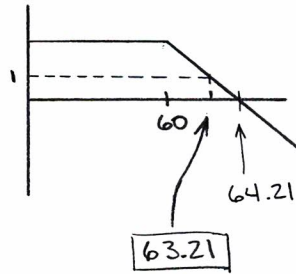
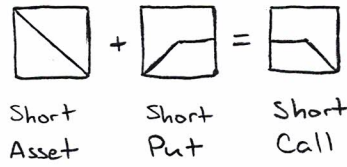
- A)** \$6.21 B) \$10.04 C) \$3.21 D) \$9.21 E) \$7.04



$$\begin{aligned} \text{Prof.}_t &= 5.86(1.059) \\ &= \boxed{6.21} \end{aligned}$$

4. Will sells a stock short for \$60 and writes a 3-month European 60-strike put at the same time. The premium for a 3-month 60-strike call is \$4.13. The risk-free interest rate is 7.5% compounded quarterly. For a spot price at expiration of X , the profit is \$1. Determine X . [15 #06]

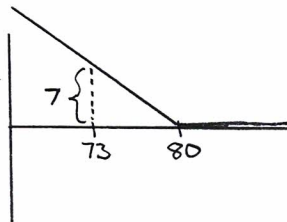
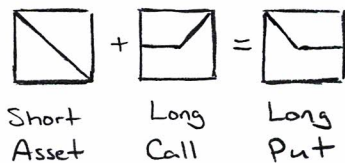
☒ A) \$63.21 B) \$65.21 C) \$62.09 D) \$64.09 E) \$54.79



$$FV(Prem) = 4.13(1.01875) = 4.21$$

5. Brad sells a stock short for \$80 and purchases a one-year European 80-strike call at the same time. The premium for a one-year 80-strike put is \$4.33. The risk-free interest rate is 4.5% effective per annum. For a spot price at expiration of \$73, Brad's profit is X . Determine X .

☒ A) \$2.48 B) \$1.56 C) \$11.52 D) \$12.44 E) \$-1.56



$$FV(Prem) = 4.33(1.045) = 4.52$$

$$Profit = 7 - 4.52 = 2.48$$