HW 7.3 (a) Key

1. Paul enters into a forward contract with Tim. Paul is obligated to sell the underlying asset to Tim at expiration at the forward price of F. If the spot price at expiration were S, Paul's payoff would be 32. If the spot price at expiration were 15% higher, Tim's payoff would be 36. Determine S. [11 #02]

[A] 453 B) 521 C) 589 D) 657 E) 725

Paul's Payoffs $\begin{cases} F - S = 32 \\ F - 1.15S = -36 \end{cases}$

$0.15S = 68 \rightarrow S = \boxed{453.33}$

2. Jason enters into a long forward based on Asset A, with a forward price of 85. He also enters into a short forward base on Asset B, with a forward price of 95. At a spot price of S for both assets, his payoffs under the two contracts would be the same. At a spot price of $S+8$, his payoff under Contract A would be X. Determine X. [11 #05]

[A] 13 B) 8 C) 10 D) 16 E) 18

$S_t = S: \quad S - 85 = 95 - S \rightarrow S = 90$

$S_t = 98: \quad 98 - 85 = \boxed{13}$

3. Suppose that the current spot price of corn is \$5.00 per bushel, and a six-month forward contract on corn has a forward price of \$5.20 per bushel. You, a farmer, decide to hedge the price you will get for your corn crop six months from now by shorting a 1,000-bushel forward contract on corn today. Suppose that the spot price of corn at maturity of the forward is \$5.45. Based on this information, what is the profit or loss to your short position at maturity? [11 #10]

[A] \$250 loss B) \$250 profit C) \$200 loss D) \$200 profit E) \$450 loss

Payoff $= 1000[5.20 - 5.45] = \boxed{-250}$

(5.20: F; 5.45: S_t)

4. You are given the following information:

** Spot price of a market index today = \$1240.
** Forward price of nine-month forward contract on market index = \$1300.
** Spot price of market index nine months from today = \$1380.
** A \$1,000 face value nine-month zero-coupon bond is selling for \$945.18.

Find the difference, nine months from today, between the profits associated with a long index strategy versus a long forward strategy. [11 #11]

[A] \$12 B) \$5 C) \$7 D) \$10 E) \$14

Interest Rate: $945.18(1+i)^{0.75} = 1000 \rightarrow i = 7.807\%$

Profit from buying stock: $1380 - 1240(1+i)^{0.75} = 68.08$

Profit from forward: $1380 - 1300 = 80$

$80 - 68.08 = \boxed{11.92}$

5. You are given the following information:

** Spot price of a market index today = \$1220.
** Forward price of nine-month forward contract on market index = \$1250.
** Spot price of market index nine months from today = \$1200.
** The nominal annual interest rate is 6.00%, convertible monthly.

Find the difference, nine months from today, between the profits associated with a long index strategy versus a long forward strategy. [11 #12]

[A] \$26 B) \$5 C) \$10 D) \$16 E) \$21

Profit from buying stock: $1200 - 1220(1.005)^9 = -76.01$

Profit from forward: $1200 - 1250 = -50$

$76.01 - 50 = \boxed{26.01}$