1. See BKM solutions manual.

2. See BKM solutions manual.

3. a. This is a collar:

   ![Collar Diagram]

   b. Bond(Par=90) + C(X=90) - C(X=115), with a total cost of
   
   \[90e^{-0.10} + 25.48 - 14.22 = 81.44 + 25.48 - 14.22 = 92.70\]

   c. If we already own the stock and don’t wish to get rid of it, an equivalent portfolio is
   
   \[S + P(X=90) - C(X=115)\].

   From put-call parity,
   
   \[S + P(X=90) = Bond(Par=90) + C(X=90),\]

   which are the first two components of the portfolio in part b. The total cost is therefore the same: 92.70.

4. a. From put-call parity, \(S + P = B + C\) \(\Rightarrow 100 + 2 = 95 \text{ PVIF}(10\%, 1) + C \Rightarrow C = 15.64\)

   b. \(100 + 4 = 100 \text{ PVIF}(10\%, 1) + C \Rightarrow C = 13.09\)

   c. (1) A bond with par value of 95 and a call with \(X=100\)

   OR

   (2) Stock, a put with \(X=100\) a short position in the bond (borrowing) with par value of 5.
   [You should verify that either of these portfolios will give the desired payoff.]

   d. The bank should buy either of the portfolios in part c on its own account. Then it can simply pass the cash flows through to you at the end of the year.

   e. Portfolio (1) in part c will cost 95 \text{ PVIF}(10\%, 1) + 1 = 99.45.

   Portfolio (2) in part c will cost \(100 + 4 - 5 \text{ PVIF}(10\%, 1) = 99.45\).

   Either way, the bank takes in 100 and spends 99.45. The remaining \(.55\) can be invested for one year, giving a year-end profit of \(.55 \text{ PVIF}(10\%, 1) = \$ .605\).

   (This is the bank’s profit per $100 invested in the portfolio insurance account)
5. See BKM solutions manual.


7. By fwd-spot parity, the forward price should be \( F = 10(1+.10+.03) = 11.30 \).
   At a market price of 12, the forward is *overvalued* relative to the spot.

   The arbitrage consists of:
   borrowing $10,
   buying Kryptonite spot,
   and entering into a (long) forward contract to deliver.

   In one year, the net cash flow is 12 - 10(1+.10+.03) = .70.

8. a. According to forward spot parity, \( F = 105(1.01/1.05) = 101 \), which is different
   from the market forward price of 103.

   b. $1 \rightarrow ¥105, invested for one year grows to ¥106.05, which converted back to $ at the
      forward rate gives $1.0296, which is less than the $1.05 that could have been obtained in
      the US. This is not attractive.

   c. The manager should arbitrage by doing the opposite of the last suggestion:
      borrow ¥, convert into $, invest $, and convert back only as much ¥ as are needed to repay
      the loan at the end of the year.

9. a. This (the question refers to announcements) does not violate the EMH. There’s no way to
   use the fact to make abnormal profits: If a company announces that it is splitting its stock,
   you can’t go back in time and buy the stock prior to the run-up.

   b. This does violate the EMH, in the sense that if it were true, you could realize abnormal
      profits by buying stock as soon as a split were announced.
Answers to Suggested Problems

S1. a. $S$ goes to 75 or 110, so $C(X=85)$ goes to 0 or 25.
   The hedge ratio is
   
   $H=25/35=0.71$.

   The (certain) payoff of the hedge portfolio is
   
   $H \times S - C = 0.71 \times 75 = 0.71 \times 110 - 25 = 53.25$.

   So $53.25/1.06 = 0.71 \times 100 - C \Rightarrow C=20.76$

b. This is a bond with par=85 and $C(X=85)$.
   The total cost is $85/1.06 + 20.76 = 100.95$

S2. Both strategies offer some downside protection. However the protection from the put option
   is both more flexible and more expensive. The put option doesn’t have to be exercised until
   maturity: if the stock drops below 100, you can wait to see if it will go back up again.
   Although the stop loss order costs nothing, it is a one-time deal: if a trade occurs at 100, your
   stock will be sold. Also note that the price you receive may not be 100. For example, if
   overnight negative news came out, and the stock opened at 75, you would receive something
   around 75.

S3. Suppose that we start with $US 1, convert into $AU (at the spot rate), invest at $r_{AU}$, and then
   convert back into $US forward. Our $US proceeds at the end are:
   
   $1 \times (1/0.80) \times (1.08) \times 0.78 = $US 1.053.$
   
   This is greater than the 4% return available in $US. I.e., if we have borrowed the $US 1
   initially, we would have had enough to pay off the 4% borrowing interest, with $US 0.013
   left as an arbitrage profit. In summary: borrow in US, invest in AU, and enter into a forward
   to buy $US and repay your loan.

S4. The firm should swap floating for fixed on a notional amount of $10 Million. The firm will
   then pay fixed payments to a dealer, in exchange of floating payments that will service the
   firm’s interest obligations to its bondholders. Effectively, by entering into the swap the firm
   synthesizes a fixed rate loan, where the “synthetic” interest rate is fixed. To trade LIBOR for
   a fixed rate, the dealers require a 7% rate. Hence to trade LIBOR+1% for fixed rate, the
   corresponding fixed rate will be 8% (the synthetic interest rate will be 1% above the swapped
   fixed rate 7%, for a total of 8%).