



INSTITUTE OF ACTUARIAL
& QUANTITATIVE STUDIES

Subject: IDFM

Chapter:

Category: Assignment 1 Solutions

1. C

2. B

3. D

4. A

5. B

6.

2. Solution: C

$66.59 - 18.64 = 500 - K \exp(-0.06)$ and so $K = (500 - 66.59 + 18.64) / \exp(-0.06) = 480$.

7. Solution: D

To see that D does not produce the desired outcome, begin with the case where the stock price is S and is below 90. The payoff is $S + 0 + (110 - S) - 2(100 - S) = 2S - 90$ which is not constant and so cannot produce the given diagram. On the other hand, for example, answer E has a payoff of $S + (90 - S) + 0 - 2(0) = 90$. The cost is $100 + 0.24 + 2.17 - 2(6.80) = 88.81$. With interest it is 93.36. The profit is $90 - 93.36 = -3.36$ which matches the diagram.

8. Solution: B

Writing a covered call requires shorting the call option along with simultaneous ownership in the stock (i.e., the underlying asset).

9. Solution: D

The current stock price, 80, is higher than the strike price, 65. Since a call option provides the right (but not the obligation) to buy a share of the stock for only 65, a call option would have positive payoff if exercised immediately. So the option is in-the-money if it is a call option. Since a put option provides the right (but not the obligation) to sell a share of the stock for only 65, a put option would have negative payoff if exercised immediately. So the option is out-of-the-money if it is a put option. Therefore, the option is in-the-money if it is call option, but out-of-the-money if it is a put option.

10. C

11. B

12. D

13. B

14.

Consider buying the put and selling the call. Let x be the index price in one year. If $x > 1025$, the payoff is $1025 - x$. After buying the index for x you have $1,025 - 2x$ which is not the goal. It is not necessary to check buying the call and selling the put as that is the only other option. But as a check, if $x > 1025$, the payoff is $x - 1025$ and after buying the stock you have spent 1025. If $x < 1025$, the payoff is again $x - 1025$.

One way to get the cost is to note that the forward price is $1,000(1.05) = 1,050$. You want to pay 25 less and so must spend $25/1.05 = 23.81$ today.

15.

Only straddles use at-the-money options and buying is correct for this speculation.

16.

Let S be the price of the index in six months.

▮ The put premium has future value (at $t = 0.5$) of $74.20[1 + 0.02] = 75.68$.

The 6-month profit on a long put position is $\max(1,000 - S, 0) - 75.68$.

The 6-month profit on a short put position is $75.68 - \max(1,000 - S, 0)$.

$0 = 75.68 - \max(1,000 - S, 0)$.

▮ $75.68 = \max(1,000 - S, 0)$.

$75.68 = 1,000 - S$. $S = 924.32$.

17.

When there are discrete dividends, the pricing formula is $S(1 + i) - AV(\text{dividends})$, where S is the current stock price. Thus,

$$75 = S(1.06) - [1.5(1.06)^{0.5} + 1.5] = S(1.06) - 3.0443$$

$$S = 78.0433 / 1.06 = 73.626.$$

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