

## Errata for 9<sup>th</sup> Edition of Exam FM/2 Manual (Last updated 7/17/11)

**[7/17/11] Important note on immunization! Students have reported that there have been a surprising number of questions on immunization (including the topics of duration and convexity) on recent exams. The 5 practice exams in this manual contain very, very few questions on these topics. We suggest that you thoroughly review Sections 9c to 9n before you take the exam.**

[4/28/10] Page 21, Q. 7. This problem should actually appear at the end of Sections 1a(vi) to 1a(ix).

[7/17/11] Page 113, solution to Q. 7, 2<sup>nd</sup> line.  $R = 150.80$  (based on the number of decimal places used), not 150.08. The solution is based on the correct value.

[8/13/10] Page 129, solutions to Q. 7. On the last line, the denominator should be  $1 - .751315$ . The answer is based on the correct denominator.

[1/22/10] Page 130, solution to Q. 18, first line. On the right-hand side of the equation, the term of the annuity should be 20, not 10. The correct term is used in the solution.

[1/22/10] Page 203, items (2)(b) and (2)(c). There should be a Q in front of the second term of the AV.

[8/13/10] Page 215, solution to Q. 11. The way the question is worded, the correct answer is (A), not (B). As noted in the solution, the account balance at the end of the 8<sup>th</sup> year is \$46,921.66. Just after the 17<sup>th</sup> full scholarship of \$5,000 is awarded, the account balance is equal to  $(46,921.66)(1.08)^{17} - 5,000(s \text{ angle } 17)$  at 8% = \$4,859.86. According to the question, if there is less than \$5,000 in the account at the end of any year, the remaining amount (\$4,859.86) is immediately awarded as a smaller scholarship. Thus, only 17 full scholarships of \$5,000 are awarded. Note that the account balance of \$4,859.86 at the end of the 17<sup>th</sup> year would have grown to \$5,248.65 at the end of the 18<sup>th</sup> year at 8%. This would have permitted an 18<sup>th</sup> full scholarship to have been awarded, but this would not follow the requirements of the question.

[7/17/11] Page 294, first line under “b. Using the TVM registers”. 4,329.48 should be 4,329.38.

[7/17/11] Page 442, 8 lines from the bottom. Add the following sentence to the parenthesis: “In fact, in “Notation and terminology used for Exam FM/Exam 2”, which you can find on [www.BeAnActuary.org](http://www.BeAnActuary.org), the SOA/CAS says that, unless otherwise stated, “duration” means Macaulay duration.”

[7/17/11] Page 444, solution to (c), 3<sup>rd</sup> line. The reference to footnote 2 should be to footnote 3.

[7/17/11] Page 456, footnote 5. Insert the following sentence just after the 2<sup>nd</sup> sentence of the footnote: “In fact, in “Notation and terminology used for Exam FM/Exam 2, which you can find on [www.BeAnActuary.org](http://www.BeAnActuary.org), the SOA/CAS says that, unless otherwise stated, “convexity” means modified convexity.

[1/22/10] Page 463, just above the middle of the page, sentence beginning “But the first condition ... “. This sentence should read “But the second condition of Redington immunization is that  $P_A = P_L$  ... “.

[4/23/09] Page 469, solution to Example 1. The coefficient of (a angle 3) in the formulas for both P(.045) and P(.055) should be 5, not 3. The numerical results shown are correct.

- [7/17/11] Pages 482-483, “What about interest?” Note that the question of interest on the proceeds of a short sale is still not covered by the Study Notes. However, in a reply to an email sent by a student in 2010, the Education Staff noted that new exam questions will be based on McDonald, which assumes that this interest is paid. A number of questions on the 5 practice exams in this manual are based on the “no-interest” assumption. See the errata list below for pages 654 and subsequent.
- [1/22/10] Page 493, first sentence. Add “which does not pay dividends” to the end of this sentence.
- [1/22/10] Page 496, footnote 1. Revise the first sentence to read: “We are going to assume that the forward price for a non-dividend-paying stock is determined as the current spot price of \$100 accumulated with interest at the risk-free rate.”
- [7/17/11] Page 497, Fig. 11.2 and page 499, Fig. 11.3. The line showing the payoff on the long forward should intersect the y axis at -104, not -100.
- [1/22/10] Page 520, Section 13c, 3<sup>rd</sup> sentence beginning “For this reason . . . “. Delete “For this reason” and insert “If we own the underlying asset”. Also, in the “Conclusion” two sentences later, add “in the underlying asset” at the end of the sentence.
- [4/23/09] Page 523, item (1)(a). Should say “in which the short position is obligated to *sell*”, not “buy”.
- [1/22/10] Page 530, last column of the table (“Position”). Add “in Underlying Asset” to the heading.
- [1/22/10] Page 531, 2<sup>nd</sup> line. In the parentheses, add “at expiration”. 3<sup>rd</sup> line. Add “in the underlying asset” at the end of the paragraph.
- [1/22/10] Page 531, 7<sup>th</sup> line. In the parentheses, add “at expiration”. At the end of the next sentence, add “in the underlying asset”.
- [1/22/10] Page 531, Section 14c, 2<sup>nd</sup> line. Add “at expiration” just after “spot price”.
- [1/22/10] Page 532, table at the top of the page. In the first column, the position shown in parentheses is with respect to the *underlying asset*.
- [1/22/10] Pages 532-533, solution to Example 1. The positions shown in parentheses in (I), (II), (III) and (IV) are with respect to the *underlying asset*.
- [1/22/10] Page 533, first table. In the first column, the position shown in parentheses is with respect to the *underlying asset*.
- [1/22/10] Page 534, Section 14e, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> paragraphs. Replace these paragraphs by the following three paragraphs:
- “Suppose we have a short position in an asset (for example, we sell the asset short). We would lose money if the price of the asset increases. If we buy a call, it’s insurance against price increases, since the payoff under the long call increases as the price of the underlying asset increases. Thus, we can say that the strategy behind a long call (when we have a short position in the underlying asset) is insurance against a high price.”
- “A written call is like selling insurance against a high price.”
- “As we saw in Section 13c, a long put is insurance against a decrease in the price of the underlying asset. Thus, we can say that the strategy behind a long put (when we have a long position in the underlying asset, such as when we own it) is insurance against a low price.”

[4/23/09] Page 535, footnote (a) under the table at the top. Should say “*as discussed in Section 13a*”, not “as just discussed”.

[1/22/10] Page 537, first bullet (Taxes), 4<sup>th</sup> line. Delete “spot price at the time of exercise” and replace by “strike price”.

[1/22/10] Page 547, 1<sup>st</sup> paragraph. Add the following sentence to the end of the paragraph: “We will assume that the underlying asset does not pay dividends. 4<sup>th</sup> paragraph, 2<sup>nd</sup> line. Replace “Section 14d” by “Section 13a”.

[1/22/10] Page 559. Just before Q.1, insert the statement: “Assume that any stocks in the following questions do not pay dividends.”

[4/23/09] Page 560, Q. 13. Assume that interest is credited on the proceeds of the short sale.

[1/22/10] Page 561, Solution to Q. 2. Add the following note after the solution:

In Section 16b, we will cover a very important principle in option pricing known as **put-call parity**. You will find that using this principle, it is possible to determine X (the premium for a 48-strike call) directly:

$$\begin{aligned}\text{Put-call parity: } & \text{Call}(K, T) - \text{Put}(K, T) = S_0 - \text{PV}(K) \\ \text{Call}(48, 1 \text{ year}) - 4.18 & = 48 - (1.066^{-1})(48) \\ \text{Call}(48, 1 \text{ year}) & = 48 - 45.03 + 4.18 = 7.15 \text{ (rounding difference)}\end{aligned}$$

Put-call parity could also be used to solve several other problems in this set.

[1/22/10] Page 577, Q. 1, 1<sup>st</sup> line. After “forward contract”, insert “with a non-dividend-paying stock as the underlying asset and”. Also, delete the sentence beginning “The risk-free rate ...”, since this information is not required.

[1/22/10] Page 579, solution to Q. 1. Replace the solution by the following:

The combination of a long call and a short put with a strike price of K creates a synthetic forward with a forward price of K. The premium for this off-market forward is equal to the net premium for the long call and short put. Thus in this problem we have:

$$\begin{aligned}32.98 - X & = 18.18 \\ X & = 14.80\end{aligned}$$

[1/22/10] Page 579, solution to Q. 4. In the note to the solution, delete “borrowing money (with no market risk involved and repaying)” and replace by “lending money at the risk-free interest rate and receiving a payment of”.

[1/22/10] Page 586, item B near the top of the graph. It should say “after-tax profit at a price of \$130 = \$32.50”, not a price of \$110.

[7/17/11] Page 588-589, table at the bottom of 588 to the top of 589. The first 4 entries in the column headed “Profit on 100-110 Collar” should end in .30, not .26 or .36. The next 3 entries in this column should end in .70, not .74. All of the entries in the “Combined Profit” column should end in .30, not .26.

[4/28/10] Page 593, Q. 3. The problem should have made it clear that X and Y represent the highest and lowest profit, respectively, if the puts are *purchased*.

- [1/22/10] Page 619, 5<sup>th</sup> line of paragraph beginning “Note that the broker ... “. Add “with an outside party” just after “forward or futures contract”.
- [1/22/10] Page 619, item 1 of the table just below the middle of the page (“Arrangement #4”). Delete the last sentence beginning “(Broker’s short forward ...)” and replace by “(Broker’s short position in the forward contract with the buyer is offset by broker’s long position in another forward contract with an outside party.)”
- [7/17/11] Page 622, the line just before Section 19d. The result of the calculation is \$7.55, not \$7.51.
- [1/22/10] Page 632, solution to Q. 8. The symbol  $f_2$  as used in this solution represents the annual effective interest rate for the 2-year period from  $t = 1$  to  $t = 3$ . (This is not how  $f_2$  was defined in the text of the manual.)
- [7/17/11] Page 637. We suggest that you do Practice Exams 4 and 5 first, since most students think they are easier than Practice Exams 1 to 3.
- [4/28/10] Page 648, solution to Q. 20, last 2 lines. 1035.45 should be 1030.45. The final answer of 10.36 is correct.
- [7/17/11] Page 654, Q.11, page 670, Q.7, page 686, Q. 23 and page 700, Q. 27. All of these questions should say that you should assume that no interest is paid to the short-seller on the proceeds of the short sale. Note that if this is not stated, you should assume that this interest *is* paid. (See pages 482-483, “What about interest?”)
- [4/23/09] Page 658, 1<sup>st</sup> line. “2007” should be “**2008**”.
- [1/22/10] Page 680, solution to Q. 29. On the 3<sup>rd</sup> line, a division bar was omitted from the 2<sup>nd</sup> term on the left-hand side of the equation, which should read:  $51.21/(1 + x)^2$ . On the 4<sup>th</sup> line, the factor (1.09) should be (1.29). The result for  $1 + x$  is correct.
- [7/17/11] Page 681, solution to Q. 34, 3<sup>rd</sup> equation. The number in the angle-bracket should be 282 (=  $360 - 78$ ), not 360. The result is based on the correct value.
- [4/28/10] Page 685, Q. 15. The put options in this problem are priced incorrectly, since the premiums should increase as the strike price increases. The solution is based on the premiums as shown.
- [4/23/09] Page 687, Q. 33. The first bullet should read  $K_c = K_p - 20$ .
- [7/17/11] Page 699, Q. 19. The question should ask for the non-zero value of X.
- [4/28/10] Page 699, Q. 20. The question should make it clear that the production cost of 17.50 is incurred at the time of sale, i.e., one year from now.
- [7/17/11] Page 700, Q. 23. The question should make it clear that the bond was originally purchased to yield a *minimum* of 8%. Also, it should say that the bond matures at par in 30 years.
- [8/13/10] Page 705, solution to Q. 17. On the last line, P should be equal to 122,215.3. The answer is still (D).

[7/17/11] Page 706, solution to Q. 23. To find the price at which the bond was originally purchased to yield a minimum of 8%, we must find the lowest price for all possible redemption dates. The price assuming maturity at par in 30 years, as shown in the solution, is \$943.711. If we assume that the bond is called at \$1,050 at the end of 6 to 29 years, the price would be greater than \$943.711. (This can be seen by looking at the premium/discount formula for the price, or by a couple of trial calculations.) Thus, the original price was \$943.711, as shown in the solution.