Errata and updates for ASM Exam C/Exam 4 Manual (Ninth Edition) sorted by date

Warning: Note the correction to practice exam 3:2 below. Practice exam 3:34 is defective. Practice exam 4:13 is missing a line; see the errata for page 984. Practice exam 6:15 is flawed in that none of the 5 answer choices is correct. In practice exam 9:34, multiply the ranges by 10 as noted below in the correction for page 1038. In practice exam 10:11, none of the 5 answer choices is correct. Practice exam 10:32 should be replaced as indicated below.

[11/7/2010] On page 8, in Theorem 2, change $\sum_i \Pr(B_i) = 1$ to $\Pr(\cup_i B_i) = 1$.

[11/4/2010] On page 1185, on the 3rd line of the page, the bias is $-1/11\theta$, not $-1/\theta$.

[10/31/2010] On page 894, on the line between the two tables, delete "would" after "rule".

[10/26/2010] On page 856, in exercise 51.14, two lines under the table, change m_j to m_i.

[10/16/2010] On page 270, on the 7th line of Section 17.2, the first word should be "and" instead of "an". The sentence is describing the confidence interval for the mean, and therefore, $z_{\alpha/2}s$ should be $z_{\alpha/2}s/\sqrt{n}$. In general, the square root of the estimated variance of the estimate would be added and subtracted from the estimate.

[10/10/2010] On page 1195, in the solution to question 16, on the last line of the page, add a factor n_0 before $\dfrac{N-P}{P}$.

[9/21/2010] On page 1179, the solutions to questions 20 and 21 should be interchanged.

[9/14/2010] On page 366, in the solution to exercise 23.15, on the fourth and fifth lines, change Y and Y^2 to X and X^2.

[8/31/2010] On page 777, on the line before "Solutions", delete "C-S07:36" and the preceding comma. This question is a Bühlmann- Straub question

[8/31/2010] On page 825, on the line before "Solutions", add ",36" at the end of the line.

[8/31/2010] On page 837, on the line below the first displayed line (equation for $\bar{Y}_i$), change "in such as way" to "in such a way".

[8/31/2010] On page 1230, change the entry for Spring 2007 question 36 from 46 to 48.

[8/26/2010] On page 684, in the last displayed equation, the denominator of the exponent should be $2\sigma^2$. Three lines lower, change θ^2 to σ^2.

[8/20/2010] On page 281, one line below equation (18.1), change $(c_{j=1}, c_j)$ to $[c_{j-1}, c_j)$. The textbook arbitrarily makes the histogram right continuous.

[8/17/2010] On page 475, in the solution to exercise 28.36, on the fourth displayed line, add "x_i" after the product sign before the equals sign.

[8/15/2010] On page 269, on the second line, replace "Since the variance of the estimator is finite" with "Since the variance of the estimator goes to 0 as n goes to infinity".

[8/12/2010] On page 647, replace the sentence after the first displayed equation with:

You know that to calculate (biased) sample variance, you can use the definition, $\sum (x_i - \bar{x})^2/n$, or you can use an alternative formula, $\sum x_i^2/n - \bar{x}^2$.

[8/12/2010] On page 915, 7 lines above Example 54C, replace $\lfloor np \rfloor$ with $\lfloor nq \rfloor$.

[8/12/2010] On page 916, replace the fourth bullet in Table 54.1 with "s_n is the square root of the unbiased sample variance after n runs."

[8/12/2010] On page 971, in question 2, interchange "'policies" and "claims" in the head of the table.

[8/12/2010] On page 1073, in the solution to question 29, on the last line of the page, add x after 2(0.035625).

[8/12/2010] On page 1080, in the solution to question 16, on the last displayed line, change 0.5478 to 0.5517 and 0.4522 to 0.4483.

[8/12/2010] On page 1232, Practice Exam 3:34's lesson should be 47, not 46.

[8/11/2010] On page 913, on the second line under the heading "**Mean**", change s^2 to s_n^2.

[8/11/2010] On page 1067, in the solution to question 7, 2 lines from the end, change 1.775123 in the denominator to 1.775173.

[8/11/2010] On page 1067, in the solution to question 9, one line below the first displayed equation, change the comma after "point" to a period.

[8/11/2010] On page 1069, in the solution to question 15, on the last line, change $p_0^M = 0.2$ to $p_0^M = 0.25$.

[8/11/2010] On page 1071, in the solution to question 20, on the second and fourth displayed lines, change 101.25 to 100.25. On the second line from the end, replace 527 with 531 and add the word "is" before $531 - 517$.

[8/11/2010] On page 1188, in the solution to question 32, on the 11th line, change $\mathbf{E}[Y_1 + Y_2]$ to $\mathbf{E}[Y_2]$.

[8/10/2010] On page 333, in formula (22.1), delete the upper bound j on the sum.

[8/9/2010] On page 493, once apiece on each of the three displayed lines of the answer to Example 29J, change x to θ.

[8/9/2010] On page 1056, in the solution to question 11, 6 lines from the bottom of the page, change $(1-x)^2$ to $(1-x^2)$.

[8/8/2010] On page 484, one line under formula (29.2), put a prime on $\left(\frac{\partial g}{\partial x_1}, \ldots, \frac{\partial g}{\partial x_k}\right)$.

[8/8/2010] On page 486, 6 lines above Example 29D, delete the sentence beginning "If so", which goes to the end of that paragraph.

[7/26/2010] On page 1212, in the solution to question 9, on the second to last line, replace $\frac{\theta a}{b}$ with $\frac{\theta a}{a+b}$.

[7/25/2010] On page 872, on the second line of the answer to Example 52D, change "twice the mean" to "1.4 times the mean".

[7/25/2010] On page 914, on the fifth line of the subsubsection headed "Probabilities", add the word "the" before "estimator".

[7/20/2010] On page 831, on the third line of the second paragraph, delete the first appearance of the word "a".

[7/18/2010] On page 1222, in the solution to question 14, on the first displayed line, remove the product symbol in the denominator. On the third displayed line, change the $\sum \ln(x_i + 7) + \sum \ln(x_i + 3.1)$ to $\sum \ln(x_i + 7) - \sum \ln(x_i + 3.1)$

[7/8/2010] On page 869, starting with the first displayed formula and through the ensuing paragraph, all n's (there are six of them) should be changed to r's, where r is the number of policyholders (consistent with the meaning of r in the previous lesson).

[7/5/2010] On page 61, in the solution to exercise 4.18, add $d\lambda$ after $e^{-\lambda}$ on the two displayed lines.

[7/2/2010] On page 280, in the solution to exercise 17.21, replace the fifth line from the end (beginning $\text{bias}_{\hat\theta}(\theta)$) with

$$\left(\text{bias}_{\hat\theta}(\theta)\right)^2 = \text{Var}(\hat\theta)$$

[6/30/2010] On page 280, on the first line of the solution to exercise 17.20, add "unbiased" between "variance" and "estimator", and also between "an" and "estimator".

[6/28/2010] On page 131, in exercise 8.23(D), change $5000 < X_i \le 631{,}250$ to $6250 < X_i \le 631{,}250$.

[6/28/2010] On page 552, in the solution to exercise 32.7, on the first line of the table, in columns 3 and 4, $F^-(x_j)$ should be $F_5^-(x_j)$ and $F(x_j)$ should be $F_5(x_j)$.

[5/22/2010] On page 153, on the second line of Section 10.2, delete the right parenthesis after 2007. The sentence containing this error is ambiguous; here's a rewritten sentence:

When they moved severity, frequency, and aggregate loss material to Exam C/4 in 2007, they added material on the $(a,b,1)$ class back to the syllabus.

[5/17/2010] On page 1071, for the solution to question 21, change the reference from Section 2.3 to Section 2.4.

[5/2/2010] On page 1066, in the solution to question 6, 4 lines from the end of the page, change 50^8 to $50^{8\alpha}$.

[5/1/2010] On page 752, in the solution to question 45.12, replace λ (once on the second line and twice apiece on the first four displayed lines) with θ.

[4/27/2010] On page 1221, in the solution to question 10, on the second displayed line, change $\theta \ln 0.5$ to $-\theta \ln 0.5$.

[4/26/2010] On page 1101, in the solution to question 3, on the second line, change $(1+e^{-x})$ to $(x+e^{-x})$.

[4/26/2010] On page 1103, in the solution to question 13, on the last line, replace $\frac{(}{8}/9)\theta$ with $(8/9)\theta$.

[4/8/2010] On page 593, 2 lines above Section 35.1, delete "there are".

[4/7/2010] On page 869, in formula (52.3), v should be $\hat{v}$.

[3/18/2010] On page 943, in exercise 56.3, on the second line, change x^2 to s^2.

[3/17/2010] On page 893, two lines above Example 53C, change x_i to x_j.

[3/16/2010] On page 886, in the solution to exercise 52.12, the last paragraph is incorrect. 3 exposures, not 30, should be used. However, the simpler formula for $\hat{\mu}$ and $\hat{v}$ also considers each cell as 1 exposure rather than as 10, so that $\hat{v}$ is 10 times as high. Here is the correct paragraph:

Notice that since there were the same number of exposures for both policyholders, the uniform exposures formula for $\hat{a}$, equation (51.3) could also have also been used. But then, each cell would be treated as one exposure. The mean and expected process variance would be estimated as 2.

$$\hat{a} = (3-2)^2 + (1-2)^2 - \frac{4}{3}$$

Then the credibility factor is $\hat{Z} = \dfrac{3\hat{a}}{3\hat{a}+\hat{v}} = \dfrac{3(4/3)}{3(4/3)+2} = \boxed{\mathbf{\dfrac{2}{3}}}$.

[2/27/2010] On page 1070, in the solution to question 18, change $\max[0, X - 0.6(7500)]$ to $\max[0, 0.6(7500) - X]$

[2/23/2010] On page 914, six lines from the bottom of the page, an n^2 is missing from the denominator:

$$n \ge \frac{z_\pi^2 P_n/n\left(1 - P_n/n\right)}{k^2 P_n^2/n^2}$$

[2/23/2010] On page 924.3, second paragraph of answer to Example 55C, first two lines, change $\mathrm{TVaR}_{0.95}$ to $\mathrm{TVaR}_{0.99}$ and change $\widehat{\mathrm{TVaR}}_{0.95}$ to $\widehat{\mathrm{TVaR}}_{0.99}$.

[2/20/2010] On page 895, delete the second line "-12pt". On the second line of Table 53.1, equation (53.2), insert a minus sign in the radical: $\theta \sqrt[\tau]{-\ln(1-u)}$.

There is no need to memorize this table. The tables you get at the exam list $\mathrm{VaR}_p(X)$. Each entry in the table is the u^{th} percentile of the distribution, and $\mathrm{VaR}_p(X)$ is the p^{th} percentile of the distribution, so set $p = u$ and you will have the required formula for the inversion method.

[2/16/2010] On page 492, on the second line of the third paragraph, change pth to $100p$th.

[2/14/2010] On page 255, in the displayed formula, change the two n's in the summand to j's, so that the fraction is $\dfrac{(x/\theta)^j}{j!}$. Also change $F_X(s)$ to $F_X(x)$.

[2/14/2010] On page 510, in the solution to exercise 29.34, 5 lines from the end, reverse the order of the summands in the numerator of the first expression:

$$\frac{\sum(\ln x_i - \mu')^2 - (\ln x_i - 5)^2}{4}$$

[2/14/2010] On page 516, on the third and second lines from the bottom, change 5(1) to 1(5) and $5(1^2)$ to $1(5^2)$.

[2/14/2010] On page 528, in the solution to exercise 30.20, on the second line, change $e - \lambda$ to $e^{-\lambda}$.

[2/11/2010] On page 506, in the solution to exercise 29.25, on the first line, $g(x)$ should be $g(\mu,\sigma)$. On the last line, $g(X,y)$ should be $g(\mu,\sigma)$.

[2/11/2010] On page 507, in the solution to exercise 29.26, in the three displayed equations, change all four L's to $\ln L$'s.

[2/9/2010] On page 279, on the first line of the solution to exercise 17.16, move the first left parenthesis into the sum and put a bar on the X: $\frac{\sum(X_i - \bar{X})^2}{n-1}$.

[2/5/2010] On page 334, on the last line of Example 22B, delete the comma after "interval".

[2/5/2010] On page 342, in the solution to exercise 22.11, change $z_{0.025}$ to $z_{0.95}$ and $z_{0.05}$ to $z_{0.975}$ in two places.

[2/4/2010] On page 666, on the second line from the end of the page, after $\boxed{\textbf{53,409}}$, add **(C)**.

[1/30/2010] On page 549, in exercise 32.16, on the third line, change "payments of 10,000" to "payments of 9,500".

[1/30/2010] On page 553, in the solution to exercise 32.10, on the last line of the table, change 0.0057 to 0.0053.

[1/24/2010] On page 36, in the solution to exercise 2.4, on the fourth line, change $\mathrm{Var}(mn)$ to $\mathrm{Var}(mN)$.

[1/21/2010] On page 91, in the solution to exercise 6.5, on the second line, change the dummy integration variable from x to u, so that the expression after the first equals sign is $\displaystyle\int_0^x \frac{2u\,\mathrm{d}u}{1000^2}$.

[1/15/2010] On page 155, in the equation for r (the 8th displayed line of the page), change the right hand side to $1 + \dfrac{-0.9}{0.75} = -0.2$

[12/14/2009] On page 893, on the last line of the answer to Example 53B, change 17.1 to 21.1.

[12/10/2009] On page 838, in Section 50.2, on the first line of 1, change "expected observations" to "predictive expected value". On the second line of Example 50B, change "expected number of observations" to "expected number of claims".

[12/10/2009] On page 851, on the 8th and 9th lines of Subsection 51.2.2, change page 599 to page 629 and example 16.36 to example 20.34. On the last line of the subsection, change example 16.37 to example 20.35.

[12/10/2009] On page 860, in the solution to exercise 51.3, on the 7th line, change 80,000 in the numerator to 180,000.

[12/10/2009] On page 873, on the 4th line after the table at the top of the page, change 16.5.2 to 20.4.2 and 16.39 to 20.37.

[12/10/2009] On page 891, delete ", plus *Derivatives Markets 19.2–19.3*" from the first line.

[12/9/2009] On page 809, in the solution to exercise 47.18, three lines from the end, change 0.375 to 0.0375.

[12/9/2009] On page 814, in the solution to exercise 47.35, on the second line, add the words "the square of" before "the length".

[12/8/2009] On page 679, in the Reading paragraph at the top, there should be an "or" after *Loss Models* Third Edition 20.3.1–20.3.3; SN C-21-01 4 is a distinct option.

[12/8/2009] On page 679, on the last line of the page, change 12.28 to 15.17.

[12/8/2009] On page 684, on the first line of Section 40.5, change 12.4.3 to 15.5.3.

[12/8/2009] On page 700, in the solution to exercise 40.25, on the fourth line of the page, replace "and 4" with "$\alpha = 2$ and $y = 4$".

[12/8/2009] On page 700, in the solution to exercise 40.28, replace the second displayed line with

$$= -\frac{e^{-2\theta}}{2(1-e^{-k})}\bigg|_0^k$$

[12/8/2009] On page 701, on the last line of the solution to exercise 40.29, replace the fraction with $\frac{0.021845-0.014006}{0.021845-0.007776}$.

[12/8/2009] On page 710, exercise 41.19 is the same as exercise 11.5.

[12/8/2009] On page 714, in the solution to exercise 41.21, on the second line, change both y's to n's.

[12/8/2009] On page 726, 2 lines from the bottom of the page, change $4(0.6)^4$ to $3(0.6)^4$.

[12/7/2009] On page 563, on the first line of the second paragraph, add "is" after "it".

[12/7/2009] On page 625, in the answer to Example 37C, replace 41 with 11.

[12/7/2009] On page 643, in the solution to exercise 38.15, on the fifth line, replace 41 with 11.

[12/7/2009] On page 670, in the solution to exercise 39.21, on the line after "We are given that the weighted posterior sum ...", change $\dfrac{1}{12}(3)$ to $\dfrac{2}{12}(3)$.

[12/7/2009] On page 671, in the solution to exercise 39.24, on the fourth line, change 0.2(60,000) to 0.1(60,000).

[12/6/2009] On page 408, in footnote 1, change $f(1000^-)$ and $f(1000)$ to $F(1000^-)$ and $F(1000)$.

[12/2/2009] On pages 215–216, the solution to exercise 13.22 is too complicated, and has some typos. Here is a better solution:

This exercise is harder than the previous one, since the deductible now affects claim frequency. There are two ways we can do the exercise:

1. We can let N_P be the number of payments and Y^P the payment per payment.
2. We can let N be the number of losses and Y^L the payment per loss, or

Both methods require work. I think the first method is easier, but will demonstrate both ways.

First method The negative binomial has $r\beta = 0.3$ and $r\beta(1+\beta) = 0.6$, so $\beta = 1$, $r = 0.3$. The probability of a loss above 3000 is

$$\Pr(X > 3000) = \left(\frac{\theta}{3000}\right)^\alpha = \left(\frac{2000}{3000}\right)^3 = \frac{8}{27}$$

The modified negative binomial has $r = 0.3$, $\beta = 8/27$, so its moments are

$$\mathbf{E}[N_2] = \frac{2.4}{27} = 0.088889 \qquad \operatorname{Var}(N_2) = \frac{0.3(8)(35)}{27^2} = 0.115226$$

$$\mathbf{E}[N^P] = \frac{2.4}{27} = 0.088889 \qquad \operatorname{Var}(N^P) = \frac{0.3(8)(35)}{27^2} = 0.115226$$

Y^P is a two-parameter Pareto with modified parameters with parameters $\theta = 3000$ and $\alpha = 3$. Using the tables to calculate its mean and variance:

$$\mathbf{E}[(Y^P)] = \frac{\theta}{\alpha - 1} = \frac{3000}{3-1} = 1500$$
$$\mathbf{E}\left[(Y^P)^2\right] = \frac{2\theta^2}{(\alpha-1)(\alpha-2)} = \frac{2(3000^2)}{2} = 3000^2$$
$$\mathrm{Var}(Y^P) = 3000^2 - 1500^2 = 6{,}750{,}000$$

The variance of aggregate payments is

$$\mathrm{Var}(S) = \mathbf{E}[N^P]\,\mathrm{Var}(Y^P) + \mathrm{Var}(N^P)\,\mathbf{E}\left[(Y^P)^2\right]^2 = (0.088889)(6{,}750{,}000) + (0.115226)(1500^2) = \boxed{\mathbf{859{,}259}}$$

Second method We computed the mean and variance of Y^P in the first method. Therefore,

$$\mathbf{E}[Y^L] = \mathbf{E}[Y^P]\,\Pr(X > 3000) = \left(\frac{8}{27}\right)(1500) = 444.444$$

The variance is computed by treating Y^L as a compound distribution. The primary distribution is Bernoulli with $q = \Pr(X > 3000)$ and the secondary is Y^P.

$$\mathrm{Var}(Y^L) = \left(\frac{8}{27}\right)(6{,}750{,}000) + \left(\frac{8}{27}\right)\left(\frac{19}{27}\right)(1500^2) = 2{,}469{,}136$$

The variance of aggregate payments is

$$\mathrm{Var}(S) = 0.3(2{,}469{,}136) + 0.6(444.444^2) = \boxed{\mathbf{859{,}259}}$$

[12/2/2009] On page 251, in the solution to exercise 15.12, on the fifth line, change 0.1 to 0.01.

[12/2/2009] On page 260, on the line above equations (16.1), change m_k^0 and m_k^1 to m_0^k and m_1^k.

[12/1/2009] On page 175, in the solution to exercise 11.11, change "if" to "it".

[12/1/2009] On page 213, in the solution to exercise 13.16, on the third displayed line, change 0.596 to 0.6.

[12/1/2009] On page 220, in the solution to exercise 13.36, on the last line, change the 79,875 in the denominator to 79,375.

[12/1/2009] On page 1187, in the solution to question 18, on the second line from the end, change ruls to rule.

[11/30/2009] On page 46, in the solution to exercise 3.6, on the second line of the second paragraph, in the sentence beginning "The expected value …", delete "by the Bernoulli shortcut". On the second line from the end, delete a plus sign between 0.0064 and 0.183125.

[11/30/2009] On page 84, 3 lines below equation (6.2), change "b is 0" to "b is 1".

[11/30/2009] On page 114, in the solution to exercise 7.22, on the third line of the page, change 1.5147^2 to 1.5174^2.

[11/30/2009] On page 120, in the solution to exercise 7.48, on the fourth line, change "them" to "the". On the second displayed line, change the denominator $2000 + 5000$ to $2000 + 500$.

[11/30/2009] On page 136, in the solution to exercise 8.14, on the second line, put an **E** before $[X \wedge d]$.

[11/30/2009] On page 137, in the solution to exercise 8.15, change the second word to "question".

[11/30/2009] On page 147, in the solution to exercise 9.1, on the fourth line from the end, delete the extra 0 at the end of 440,0000.

[11/30/2009] On page 148, in the solution to exercise 9.6, on the second displayed line, insert an equal sign between 100 and c.

[11/30/2009] On page 212, in the solution to exercise 13.14, on the 5th line, replace "variance" with "second moment".

[11/29/2009] On page 19, in the solution to exercise 1.10, change "Generalized Pareto" to "Burr".

[11/29/2009] On page 21, in the solution to exercise 1.17, on the last line, $\ln 0.06$ should be $\ln 0.6$.

[11/29/2009] On page 23, on the last line of the solution to exercise 1.23, change 0.035764 to 0.035674.

[11/11/2009] On page 531, on the first line, delete "plus *Derivatives Marekts* 18.6". On the first line of the second paragraph, change 13.2 to 16.2.

[11/10/2009] On pages 123–124, in the answer to Example 8A, $F_Y(2)$ should be $F_Y(0)$. This error occurs three times: 2 lines from the bottom of page 123, second non-display line on page 124, and last displayed line of the answer.

[11/10/2009] In the first table on page 371, both tables on page 372, and the first and third tables on page 373, the subscripts on d, u, x, and r should be $j-1$ instead of j.

[11/10/2009] On page 372, in Example 24C, on the first line, add the word "study" after mortality.

[11/10/2009] On page 374, on the last line, change $100-75$ to $100-25$.

[11/10/2009] On page 480, in the solution to exercise 28.50, on the last line, change $e^{-23{,}500.18/100{,}000}$ to $1-e^{-23{,}500.18/100{,}000}$.

[11/9/2009] On page 346, in the solution to exercise 22.31, on the last line, change 0.1439 to 0.01439.

[11/8/2009] On page 296, in the solution to exercise 19.11, on the fifth displayed line, the right parenthesis after θ should be before θ.

[11/8/2009] On page 1051, in the solution to question 21, on the first line, replace "variance" with "standard deviation".

[11/8/2009] On page 1196, in the solution to question 18, on the 4th displayed line, remove the minus sign before $\dfrac{1}{3\theta^2}$.

[11/7/2009] On page 978, question 34 is defective.

[11/7/2009] On page 1087, the solution to question 34 is incorrect. The second moment of the hypothetical means of aggregate losses is not the product of the second moment of the hypothetical means of frequency and severity. Discard this question.

[11/6/2009] On page 383, on the fifth line of Subsection 25.1.2, change "the the" to "to the".

[11/4/2009] On page 893, on the 6th line, change $F(u)\le 500$ to $u\le F(500)$.

[11/4/2009] On page 915, on the fifth line after the itemized list, replace Y_{996} with Y_{951}. Also in the last sentence of that paragraph, replace Y_{995} with Y_{950} and Y_{996} with Y_{951}.

[11/4/2009] On page 916, in Table 54.1, on the "Mean" line, change the two denominators of the confidence interval from n to $\sqrt{n}$, and change the number of runs from n_0CV to n_0CV^2. On the "$F(x)$" line, change the P_n after the left parenthesis and the P_n after the comma to $\dfrac{P_n}{n}$. On the "π_q" line, put $\lfloor$ and $\rfloor$ around the expression for a and $\lceil$ and $\rceil$ around the expression for b.

[11/4/2009] On page 1049, questions 32 and 35 are the same. Replace question 32 with:

A random variable X has the following properties:

(i) The probability that X is less than 1 is a.
(ii) If $X<1$, then X is uniformly distributed on $[0,1]$.
(iii) $F(x)=1-(1-a)/x$ for $x\ge 1$.

X is simulated using the inversion method. The random numbers uniformly distributed on $[0,1]$ used for 2 runs of the simulation are 0.3 and 0.8. The sum of the two simulated values of X that are generated is 4.3375.

Determine a

(A) 0.25 (B) 0.32 (C) 0.33 (D) 0.35 (E) 0.39

[11/4/2009] On page 1173, replace the solution to question 32 with

[**Lesson 53**] The distribution function of X on $[0,1]$ is a straight line starting at 0 and ending at a; in other words, $F(x)=ax$ in this interval. Then inversion would take u to $x=\frac{u}{a}$. For $X>1$, we have

$$u = 1 - \frac{1-a}{x}$$
$$x = \frac{1-a}{1-u}$$

If a is greater than 0.8, we would have

$$\frac{0.3}{a}+\frac{0.8}{a}=\frac{1.1}{a}=4.3375,$$

from which it would follow $a<0.8$, a contradiction. If $a<0.3$, then

$$\frac{1-a}{0.2}+\frac{1-a}{0.7}=4.3375$$
$$\frac{90(1-a)}{14}=4.3375$$
$$a=0.3253,$$

once again a contradiction. This leaves $0.3<a<0.8$, giving:

$$\frac{0.3}{a}+\frac{1-a}{0.2}=4.3375$$
$$0.06+a(1-a)=4.3375(0.2)(a)=0.8675a$$
$$0.06+a-a^2-0.8675a=0$$
$$a^2-0.1325a-0.06=0$$
$$a=\frac{0.1325\pm 0.5075}{2}$$
$$a=\boxed{\mathbf{0.32}} \qquad \textbf{(B)}$$

[11/1/2009] On page 924, in equation (55.1), the parenthesized term on the right should be squared:

$$\widehat{\mathrm{Var}}\Big(\widehat{\mathrm{TVaR}}_q(X)\Big)=\frac{s_q^2+q\Big(\widehat{\mathrm{TVaR}}_q(X)-\widehat{\mathrm{VaR}}_q(X)\Big)^2}{n-k+1}$$

[11/1/2009] On page 924, replace the last two lines with

$$\widehat{\mathrm{Var}}\Big(\widehat{\mathrm{TVaR}}_{0.99}(X)\Big)=\frac{0.438+0.99(365.76-365.1)^2}{5}=0.17385$$

The confidence interval is $365.76\pm 1.645\sqrt{0.17385}=\boxed{\mathbf{(365.1, 366.4)}}$.

[11/1/2009] On page 940, in the solution to exercise 55.27, replace the last two lines with

$$\widehat{\mathrm{Var}}\left(\widehat{\mathrm{TVaR}}_{0.95}(X)\right)=\frac{78.7+0.95(88.2-78)^2}{5}=35.508$$

The confidence interval is $88.2\pm1.96\sqrt{35.508}=\boxed{\mathbf{(76.52,99.88)}}$.

[11/1/2009] On page 940, in the solution to exercise 55.28, replace the last two lines with

$$\widehat{\mathrm{Var}}\left(\widehat{\mathrm{TVaR}}_{0.95}(X)\right)=\frac{24^2+0.95(325-302)^2}{100}=10.7855$$

and $1.645\sqrt{10.7855}=5.402$, so the confidence interval is $325\pm5.402=\boxed{\mathbf{(319.6,330.4)}}$.

[11/1/2009] On page 1163, in the solution to question 11, the final line should be

$$\widehat{\mathrm{Var}}\left(\widehat{\mathrm{TVaR}}_{0.95}(X)\right)=\frac{12{,}482.5+0.95(9588-9421)^2}{5}=\boxed{\mathbf{7795}}$$

None of the five answer choices is correct.

[10/31/2009] On page 996, in question 27, the fifth line

$$Y=w_1X_1+w_2X_2+w_3X_3$$

with

$$f_Y(y)=w_1f_{X_1}(y)+w_2f_{X_2}(y)+w_3f_{X_3}(y)$$

[10/31/2009] On page 1150, in the solution to question 13, on the last line of the page, replace 0.5 in the denominator with 0.4.

[10/27/2009] On page 1148, in the solution to question 7, on the second line from the end, change $1-0.99$ to $1-0.01$.

[10/27/2009] On page 1153, in the solution to question 20, add σ before $\phi(z_p)$.

[10/25/2009] On page 240, on the third displayed line of the page, the upper limit $\lceil d/h\rceil-1$ should be replaced with $\lfloor d/h\rfloor$.

[10/15/2009] On page 1054, in the solution to question 6, on the second displayed line, replace A with B.

[10/14/2009] On page 1102, two lines from the end of the solution to question 7, change $\Pr(X>10\mid\Theta)=e^{-10\theta/10}=e^{\theta}$ to $\Pr(X>10\mid\Theta)=1-e^{-10\theta/10}=1-e^{-\theta}$. The final answer is the complement of what's shown, or $1-0.329155=0.670845$. **(E)**

[10/13/2009] On page 914, three lines from the bottom of the page, change 90% to 95%.

[10/13/2009] On page 1126, the answer key for question 9 should be **(A)** instead of (D). The answer key on page 1123 should be corrected as well.

[10/11/2009] On page 739, in the solution to exercise 44.6, on the last line of the page, remove the last two minus signs in the exponent, replacing the last one with a plus, so that the exponent is $-\theta\left(\frac{1}{100}+\sum\frac{1}{x_i}\right)$.

[10/11/2009] On page 787, in the solution to exercise 46.38, replace the last sentence with

$$Z=\frac{138/49}{138/49+22/21}=\frac{414}{414+154}=\frac{414}{568}=\frac{207}{284}>\frac{18}{29}$$

[10/5/2009] On page 1038, in question 34, the ranges should be multiplied by 10 so that they are

(A) Less than 0.1
(B) At least 0.1, but less than 0.2
(C) At least 0.2, but less than 0.3
(D) At least 0.3, but less than 0.4
(E) At least 0.4

[10/5/2009] On page 1151, in the solution to question 13, the last two lines of the solution are incorrect and should be replaced with

Claim counts conditional on λ are a mixture of a Poisson with mean λ and a Poisson with mean 2λ, so $\mathbf{E}[X \mid \lambda] = 0.6\lambda + 0.4(2\lambda) = 1.4\lambda$. Therefore, we integrate 1.4λ times the posterior. It is helpful to note that $\int_0^\infty \lambda e^{-c\lambda}\mathrm{d}\lambda = \frac{1}{c^2}$.

$$\mathbf{E}[X_2 \mid X_1 = 0] = 1.4\left(\frac{\frac{0.6}{11^2}+\frac{0.4}{12^2}}{\frac{0.6}{11}+\frac{0.4}{12}}\right) = 1.4\left(\frac{0.00773646}{0.0878788}\right) = \boxed{\mathbf{0.12325}} \qquad \mathbf{(E)}$$

[10/5/2009] On page 1157, in the solution to question 34, the final answer should be 0.39223.

[10/4/2009] On page 673, in the solution to exercise 39.28, on the displayed line, replace the two 24's in the numerator and denominator with 32's.

[10/4/2009] On page 984, in question 13, add the following paragraph before "Which of the following choices...":

The data are fitted to an exponential distribution with mean θ using maximum likelihood.

[10/2/2009] On page 913, on the fourth line under the heading "**Mean**", change $z_\pi s_n^2/n$ to $z_\pi s_n/\sqrt{n}$. Two lines further down, change $z_q s_n^2$ to $z_\pi s_n/\sqrt{n}$.

[9/30/2009] On page 1140, the solution to question 19, starting with the eighth line, is incorrect. The correct solution starting with the eighth line is

The process variance is

$$v(\Theta) = e^{2\Theta+2\sigma^2} - (e^{\Theta+0.5\sigma^2})^2 = e^{2\Theta}(e^8 - e^4)$$

The expected process variance is

$$v = (e^8 - e^4)\mathbf{E}[e^{2\Theta}] = (e^8 - e^4)e^{2(5)+2(3)} = e^{24} - e^{20}$$

For 20 observations, the credibility factor is

$$Z = \frac{20a}{20a+v} = \frac{20(e^{20}-e^{17})}{20(e^{20}-e^{17})+e^{24}-e^{20}} = 0.261758$$

The credibility premium is

$$P_C = 0.261758(10{,}000) + (1-0.261758)(e^{8.5}) = \boxed{\mathbf{6246}} \qquad \mathbf{(A)}$$

[9/28/2009] On page 722, in the solution to exercise 42.9, on the third displayed line, put a division sign between $\sum \ln x_i$ and 10.

[9/28/2009] On page 723, in the solution to exercise 42.10, replace the third and later lines with

$$\frac{(1500)(900)}{900+1500n} \le 100$$

$$135 \le 9 + 15n$$
$$n \ge \frac{126}{15}$$

and since n must be an integer, $n \ge \boxed{\mathbf{9}}$.

[9/28/2009] On page 831, in Table 49.1, on the first line (Poisson model, Gamma prior), switch the v and a columns: $v = \alpha\theta$ and $a = \alpha\theta^2$.

[9/25/2009] On page 749, in the solution to exercise 45.2, on the first displayed line, change 0.2(1) to 0.1(2).

[9/25/2009] On page 751, in the solution to exercise 45.8, replace the second paragraph with

$Z = n/(n + v/a)$. Decreasing a will increase k, increase the denominator, and decrease the fraction, so the second statement is true. Decreasing v will decrease k, decrease the denominator, and increase the fraction, so the third statement is false.

[9/24/2009] On page 227, two lines above the second displayed line, change 6.17 to 9.9. One line above the fourth displayed line, change 6.16 to 9.8. Two lines below that displayed line, change 4.52 to 6.14. However, Theorem 6.14 is not on the syllabus.

[9/24/2009] On page 229, one line after the answer to Example 14B, change 6.6.2–6.6.4 to 9.9.2–9.9.4.

[9/24/2009] On page 924, on the 5th line of the answer to Example 55C, replace "floor" brackets $\lfloor 475.5 + 8.071 \rfloor$ with "ceiling" brackets $\lceil 475.5 + 8.071 \rceil$. On the sixth line, the final answer should be $\boxed{\mathbf{(350.7, 358.0)}}$.

[9/24/2009] On page 1115, the solution to question 15 is incorrect. The correct solution is

The posterior is proportional to

$$\theta^4 e^{-\theta/1000} \theta^3 e^{-\theta\left(\frac{1}{1000} + \frac{1}{2000} + \frac{1}{5000}\right)} = \theta^7 e^{-0.0027\theta}$$

This is the integrand for a gamma distribution with $\alpha = 8$ and scale parameter $\frac{1}{0.0027}$, so its mean is $\frac{8}{0.0027} = \boxed{\mathbf{2962.96}}$.

[9/23/2009] On page 272, on the 6th line, delete "a" before "boundary points".

[9/23/2009] On page 809, in the solution to exercise 47.19, replace the last line on the page with

$$\mathbf{E}\left[P^2\right] = \mathbf{E}[P] - v = 0.1 - \frac{106}{1200} = \frac{7}{600}$$

[9/22/2009] On page 920, the solution to exercise 54.8 is incorrect. The correct solution is

The formula for the subscript of the order statistic for the lower bound is

$$a = \left\lfloor 0.5(500) + 0.5 - 1.645\sqrt{(500)(0.5)(0.5)} \right\rfloor = \lfloor 232.11 \rfloor = 232$$

so the answer is $Y_{232} = \boxed{\mathbf{329}}$.

On page 923, two lines from the bottom, add the following sentence before "However":

Since $TVaR_q(X)$ is the *mean* of the upper tail of the distribution, we might think that all we need to do is divide s_q^2 by n, the same way we estimate the variance of the sample mean.

On the last line, replace s_q^2 with s_q^2/n.

[9/17/2009] On page 1088, in the answer key, change the answers for 23 and 24 to C and E respectively.

[9/17/2009] On page 1145, in the answer key, change the answer for 7 to D.

[9/16/2009] On page 1076, in the answer key, change the answer for 6 to B.

[9/15/2009] On page 444, in the solution to exercise 27.17,

- On the first displayed line, put an exponent 8 on $S(10;k)$.
- On the third displayed line, replace θ with k.

[9/15/2009] On page 470, in the solution to exercise 28.21, on the 3rd and 2nd lines from the end of the page, replace 10,000 with 100,000 in four places.

[9/15/2009] On page 514, 6 lines from the bottom of the page, change 0.15990 to 0.31981. Replace the last line of the page with

$$=-13.86294+10.98612-15.96056-6.16604+3.77900=-21.2244$$

[9/15/2009] On page 695, in the solution to exercise 40.9, on the first displayed line of the page, change $\dfrac{1}{3(4^{x_4+1})}$ to $\dfrac{3}{4^{x_4+1}}$.

[9/15/2009] On page 778, in the solution to exercise 46.3, on the second line from the end, change $\dfrac{4a}{4a+v}$ to $\dfrac{3a}{3a+v}$.

[9/11/2009] On page 735, replace the last two lines of the solution to Example 44B with

The expected value of $1/\Delta$ is $\theta/(\alpha-1) = 880/21 = 41.9048$. The expected size of the next loss is the shape parameter times the expected value of $1/\Delta$, or $4(41.9048) = \boxed{\mathbf{167.62}}$.

[9/10/2009] On page 469, in the solution to exercise 28.12, on the displayed line, replace the first $\mathbf{E}[X\wedge 100]$ with $\mathbf{E}[X\wedge 1000]$.

[9/9/2009] On page 528, in the solution to exercise 30.19, on the last line, replace 8/19 with 10/19. The final answer is 9/10, not 9/8.

[9/6/2009] On page 721, in the solution to exercise 42.5, on the first line, change 20,000 to 2000.

[9/4/2009] On page 177, on the 4th line of Subsection 12.2, delete "or a claim limit". Frequency is unaffected by a claim limit.

[9/4/2009] On page 608, on the third line after the enumerated list, replace "average" with "expected" and replace "800" with "900".

[9/2/2009] On page 90, change the solution to exercise 6.1 to

- **Translation invariance.**

$$\rho(X+c)=\frac{\ln\mathbf{E}[e^{\alpha(X+c)}]}{\alpha}=\frac{\ln e^{\alpha c}+\ln\mathbf{E}[e^{\alpha X}]}{\alpha}=c+\rho(X)\quad\checkmark$$

- **Positive homogeneity.**

$$\rho(cX)=\frac{\ln\mathbf{E}[e^{c\alpha X}]}{\alpha}$$

A simple counterexample for $\alpha=1$ is if X only assumes the values 0 and 1 with probabilities 0.5 and $c=2$. Then

$$\rho(2X)=\ln 0.5(1+e^2)\neq 2\rho(X)=2\ln 0.5(1+e)\quad\times$$

- **Subadditivity.**
$$\rho(X+Y)=\frac{\ln \mathbf{E}[e^{\alpha(X+Y)}]}{\alpha}$$
If X and Y are independent, then $\rho(X+Y)=\rho(X)+\rho(Y)$. However, if X and Y are not independent, there is no reason $\rho(X+Y)\le\rho(X)+\rho(Y)$. For example, if we use the counterexample for positive homogeneity for X and let $Y=X$, then $\rho(2X)=\ln 0.5(1+e^2)=1.4338>2\rho(X)=2\ln 0.5(1+e)=1.2402$. $\times$

- **Monotonicity.** If $X\le Y$ always, then $e^{\alpha X}\le e^{\alpha Y}$, from which it follows that $\mathbf{E}[e^{\alpha X}]\le\mathbf{E}[e^{\alpha Y}]$. $\checkmark$

Only translation invariance and monotonicity are satisfied.

[9/2/2009] On page 985, in question 19, on the second line, change 60 to 30.

[9/2/2009] On page 1094, in the solution to question 19, on the second line, change 60 to 30.

[8/29/2009] On page 452, change the third and fourth displayed lines to

$$2^\tau=\frac{\ln 0.05}{\ln 0.35}$$
$$\tau=\frac{\ln\frac{\ln 0.05}{\ln 0.35}}{\ln 2}=\boxed{\mathbf{1.512764}}$$

[8/29/2009] On page 476, in the solution to exercise 28.40, on the last displayed line of the solution, change the last numerator to $6\sum\ln y_i$.

[8/29/2009] On page 480, in the solution to exercise 28.48, on the second displayed line, change $14\ln 0.6$ to $6\ln 0.6$.

[8/29/2009] On page 490, on the first displayed line, change the numerator from θ to θ^n.

[8/27/2009] On page 861, in the solution to exercise 51.4, the first two lines on the page should read

$$\frac{36-x}{2}=\pm 8$$
$$x=\boxed{\mathbf{20,52}}$$

[8/25/2009] On page 268, 4 lines below the answer to Example 17B, change 9.2 and 9.5 to 12.2 and 12.5.

[8/25/2009] On page 488, in the first sentence of Subsection 29.2.2, add the word "negative" before "the expected value".

[8/25/2009] On page 489, on the fifth displayed line of the page, replace $I(\mathbf{x})$ with $I(\theta)$, and put a negative sign before $\mathbf{E}$. On the seventh displayed line, change $\frac{2\bar{x}}{\theta^3}$ to $\frac{2n\bar{x}}{\theta^3}$.

[8/24/2009] On page 259, on the 12th line from the bottom of the page, change m_1^0 to m_0^1.

[8/24/2009] On page 491, the last 5 lines of the solution to Example 29H are incorrect. Replace them with:

$$\frac{\mathrm{d}g}{\mathrm{d}a}=0.5^a\ln 0.5$$
$$\widehat{\mathrm{Var}}\Big(\widehat{\Pr}(X<0.5)\Big)=\Big(0.5^{\hat{a}}\ln 0.5\Big)^2(0.76645)=0.02441$$

The confidence interval is $0.25745\pm 1.96\sqrt{0.02441}=(-0.04876,0.56366)$. Since probabilities can't be less than 0, the actual confidence interval would be $\boxed{\mathbf{[0,0.56366)}}$ This is a pretty wide confidence interval, but there were only five observations in the sample.

[8/24/2009] On page 601, in the solutions to exercises 35.8 and 35.9, on the first displayed line of each, in the denominator, change 3^{100} to 2.5^{100}.

[8/22/2009] On page 89, change the displayed line of exercise 6.1 to

$$\rho(X) = \frac{\ln \mathbf{E}[e^{\alpha X}]}{\alpha}, \quad \alpha > 0$$

[8/21/2009] On page 184, in the solution to exercise 12.11, change $\frac{b-d}{d}$ to $\frac{b-d}{b}$.

[8/18/2009] On page 427, on the 5th and 6th lines of the answer to Example 27B, change 50! to 60!

[8/12/2009] On page 376, in exercise 24.7, on the second line from the end, change "loss" to "paid claim".

[8/11/2009] On page 76, the solution to exercise 5.18 does not reflect SOA normal distribution rounding rules. A corrected solution is

We need to calculate a. First we calculate $F(100)$.

$$\Phi\left(\frac{\ln 100 - 3}{2}\right) = \Phi(0.80) = 0.7881$$

For the given Pareto, $S(100) = \left(\frac{3}{4}\right)^2 = 0.5625$. Therefore, a must be $(1-0.7881)/0.5625 = 0.3767$. Then

$$\Pr(X > 200) = 0.3767\left(\frac{300}{300+200}\right)^2 = (0.3767)(0.36) = \boxed{\mathbf{0.1356}}$$

[8/9/2009] On page 85, in the caption of Figure 6.1, change $e(TVaR_{0.95}(X))$ to $e\left(\mathrm{VaR}_{0.05}(X)\right)$. In the figure itself, $Q_{0.95}$ means $\mathrm{VaR}_{0.95}$.

[8/8/2009] On page 225, in the solution to exercise 13.55:

- On the third displayed line, change $\mathbf{E}[N]$ to $\mathrm{Var}(N)$.
- On the fourth displayed line, change $\mathbf{E}[X]$ to $\mathbf{E}[X \wedge 20{,}000]$.
- On the fifth displayed line, change $\mathbf{E}[X^2]$ to $\mathbf{E}[(X \wedge 20{,}000)^2]$

[8/6/2009] On page 623, one line above equation (37.3), delete a redundant "number of".

[8/5/2009] On page 717, in the second displayed equation, change the last numerator from a to v:

$$\mu_* = Z\bar{x} + (1-Z)\mu = \left(\frac{na}{na+v}\right)\bar{x} + \left(\frac{v}{na+v}\right)\mu$$

[8/4/2009] On page 8, in Section 1.3, $\Pr(B) \neq 0$ and $f(y) \neq 0$ are necessary for the definitions of conditional probability.

[8/4/2009] On page 10, at the end of the third line of Section 1.4, add "independent": "...if X is the sum of independent random variables ...". On the second line from the end of the page, add "independent": "...if X is the sum of independent random variables ...".

[8/4/2009] On page 26, one line after Example 2A, add the word "independent": "...from n independent identically distributed ...".

[8/3/2009] On page 384, on the 4th lines of Examples 25B and 25C, delete "are assumed".

[8/1/2009] On page 179, in Table 12.1, there should be parentheses around $1-p_0^M$ on the right hand side of formula (12.1): $(1-p_0^M)(\frac{1-p_0^*}{1-p_0})$.

[8/1/2009] On page 369, on the second line of the paragraph beginning d_j, change "s study" to "a study". On the 7th line from the bottom of the page, change "an including" to "and including".

[7/30/2009] On page 358, on the line before the third displayed equation, change "from the variance" to "from the second moment".

[7/29/2009] On page 26, on the third line of Section 2.2, change "determines" to "determine".

[7/28/2009] On page 136, in the solution to exercise 8.12, on the second displayed line, 5^2 should be 5.

[7/22/2009] On pages 248–249, in the solution to exercise 15.2, on the 6th and 7th lines, change p_0 to f_0. On the first displayed line of page 249, change f_1 to p_1.

[7/17/2009] On page 113, in the solution to exercise 7.21, on the second line, replace $\Pr(X > 1000)$ with $\Pr(X > 500)$. On the fourth line, replace $\Pr(X > 2000)$ with $\Pr(X > 500)$>

[7/17/2009] On page 154, in Example 10B, change p_0 to p_0^M.

[7/16/2009] On page 30, in the third paragraph of Section 2.4, change the beginning of the second sentence to

"Recall from page 4 that $H(x) = \int_0^x h(t)\mathrm{d}t$,"

In the second displayed equation of Section 2.4, change the exponent of the middle term from $H(x)$ to $H(x) \mid \Lambda$. In the third displayed equation, make three corrections to the integrand of the integral: Pr should not be italicized, λ should not be capitalized, and dx should be dλ, so it should be $\Pr(X > x \mid \lambda) f(\lambda)\mathrm{d}\lambda$.

[7/14/2009] On page 139, make the following corrections to the solution to exercise 8.22:

- Replace the passage "We can temporarily ignore the 250 ..." up to but not including the displayed equation with "The partial expectation of the amount of a payment for the loss above 1081.14, given that the loss is greater than 1081.14 is"
- On the 3rd line from the end, replace 490.09 with 409.09.
- Replace the last sentence of the solution with "In addition, the insurer pays $0.8(1081.14-250) = 664.91$ on each loss above 1081.14. Therefore, the Tail-Value-at-Risk of annual payments is $1401.245+664.91 = \boxed{\mathbf{2066.16}}$."

[7/10/2009] On page 126, in exercise 8.1, delete the word "average" on the last line.

[7/10/2009] On page 133, in the solution to exercise 8.1, change both highlighted boxes, 5,104,000 and 5,104,975, to $\boxed{\mathbf{5{,}054{,}400}}$.

[7/9/2009] On page 22, in the solution to exercise 1.21, on the 7th line, change $g(x)$ to $g(n)$.

[7/9/2009] On page 27, on the second displayed line, change 0.4889 to 0.5367.

[7/9/2009] On page 136, in the solution to exercise 8.13, 1151.29 is not the final answer. Add the following line at the end of the solution:

With 3 expected losses per year, expected annual claim payments are $3(1151.29) = \boxed{\mathbf{3453.87}}$.

[7/8/2009] On page 124, replace "Calculating the variance..." to the bottom of the page with the following:

Calculating the variance of payment in the presence of a deductible is not so straightforward. We can temporarily ignore inflation and coinsurance, since each of these multiply the random variable by a factor, and we can adjust the variance by multiplying by that factor squared. So let's calculate the variance of the payment per loss random variable Y^L, defined by

$$Y^L = X\wedge u^* - X\wedge d^*$$

where u^* and d^* are the maximum covered loss and the deductible respectively, adjusted for inflation rate r by dividing by $1+r$. We can calculate the second moment of Y^L as follows:

$$\begin{aligned}(Y^L)^2 &= (X\wedge u^* - X\wedge d^*)^2\\ &= (X\wedge u^*)^2 - 2(X\wedge u^*)(X\wedge d^*) + (X\wedge d^*)^2\end{aligned}$$

Now, we would prefer a formula starting with $(X\wedge u^*)^2 - (X\wedge d^*)^2$, so we'll subtract and add $2(X\wedge d^*)^2$.

$$\begin{aligned}(Y^L)^2 &= (X\wedge u^*)^2 - (X\wedge d^*)^2 + 2(X\wedge d^*)^2 - 2(X\wedge u^*)(X\wedge d^*)\\ &= (X\wedge u^*)^2 - (X\wedge d^*)^2 + 2\underbrace{(X\wedge d^*)}_{*}(X\wedge d^* - X\wedge u^*)\end{aligned}$$

We can replace the $X\wedge d^*$ with the star below it with d^*. Because if $X < d^*$, then $X\wedge d^* - X\wedge u^* = 0$, since both $X\wedge d^*$ and $X\wedge u^*$ are X, so the factor doesn't matter. And if $X \ge d^*$, then $X\wedge d^* = d^*$.

Making this replacement and taking expectations on both sides, we get the final formula

$$\mathbf{E}\Big[(Y^L)^2\Big] = \mathbf{E}\Big[(X\wedge u^*)^2\Big] - \mathbf{E}\Big[(X\wedge d^*)^2\Big] - 2d^*\Big(\mathbf{E}[X\wedge u^*] - \mathbf{E}[X\wedge d^*]\Big)$$

[7/7/2009] On page 84, on the line after equation (6.1), add "and" between $\mathrm{VaR}_y(X)$ and $\mathrm{d}y$.

[7/5/2009] On page 89, in exercise 6.11, change $\mathrm{VaR}_{0.99}$ to $\mathrm{TVaR}_{0.99}(X)$ and $\mathrm{TVaR}_{0.95}$ to $\mathrm{TVaR}_{0.95}(X)$.

[7/5/2009] On pages 96–97, in the answer to Example 7B, on the fourth displayed line, replace 0.44444 with 0.55556. On the first displayed line on page 97, replace 0.47266 with 0.52734. Replace the second displayed line with

$$0.52734 - 0.55555 = \boxed{\mathbf{-0.02822}}$$

[7/2/2009] On page xiv, on the third line of the fourth paragraph of "Tables", change 0.8859 to 0.8860.

[7/2/2009] On page 85, the word "ln" needs to be added to the first two lines as follows:

We derived above that $\mathrm{VaR}_p(X) = -\theta\ln(1-p)$. Therefore

$$\mathrm{TVaR}_p(X) = -\theta\ln(1-p) + \theta = \theta\Big(1 - \ln(1-p)\Big)$$

[7/2/2009] On page 373, the last line of the answer to Example 24D should read

$${}_5\hat{q}_0^{\prime(d)} = 1 - (7.5/8.5)(5.5/6.5) = \boxed{\mathbf{0.2534}}$$

[6/8/2009] On page 446, in the solution to exercise 27.24, the second displayed line has three errors, and should read

$$\frac{1}{2}\frac{\mathrm{d}g}{\mathrm{d}\theta} = -\frac{30}{\theta^2}\left(\frac{30}{\theta} - 5\right) - \frac{45}{\theta^2}\left(\frac{45}{\theta} - 5\right) + \frac{75}{\theta^2}\left(10 - \frac{75}{\theta}\right) = 0$$

[6/3/2009] On page 915, on the third line after the itemized list, replace $100r$th with $100q$th.

[5/26/2009] On page 377, in exercise 24.10, α/β notation is no longer used in the syllabus. Delete the phrase "with $\alpha = 1$ and $\beta = 0$".

[5/26/2009] On page 1233, in Table C.4, question 12 should refer to page 853, and question 13 should refer to 4-F03:16, page 580. Also note that the non-syllabus questions in Tables C.4 and C.5 were deleted from the revised list of 289 questions.