Errata and updates for ASM Exam C/Exam 4 Manual (Seventh Edition) sorted by page

Warning: Practice exam questions 5:6 and 5:16 are changed below.

[5/18/2009] On page 11, replace part 4 of the answer to Example 1F with

Any number x such that $\Pr(X < x) \le 0.8$ and $\Pr(X \le x) \ge 0.8$ is an 80th percentile. This is true for $3 \le x \le 5$. In fact, the graph of the distribution is horizontal between 3 and 5. So the set of 80th percentiles is $\boxed{\{x : 3 \le x \le 5\}}$.

[12/21/2008] On page 20, in the solution to exercise 1.17, on the second displayed line, insert a minus sign in front of $\frac{\mathrm{d} \ln S(x)}{\mathrm{d}x}$.

[1/20/2009] On page 21, in the solution to exercise 1.19, 3 lines from the end, change the denominator x to m.

[12/21/2008] On page 22, in the solution to exercise 1.22, on the last line, the SOA rounding convention requires replacing the last equality with $1 - \Phi(0.61) = \boxed{\mathbf{0.2709}}$.

[9/28/2008] On page 22, in the solution to exercise 1.23, on the 7th line, change "X can't be negative" to "Y can't be negative".

[1/7/2009] On page 35, in the list of additional released exam questions, delete CAS3-F05:32.

[1/15/2009] On page 38, in the solution to exercise 2.17, on the second displayed line, delete l in $S(x|l\lambda)$. On the third displayed line, replace $E[X \mid \Lambda]$ with $S(x \mid \Lambda)$. On the fifth displayed line, replace the exponent α with $-\alpha$. You will then have

$$\begin{aligned} S(x) &= E_\Lambda\left[S(x \mid \Lambda)\right] = E_\Lambda\left[e^{-\Lambda x^{1/3}}\right] \\ &= M_\Lambda\left(-x^{1/3}\right) \\ &= \left(1 + \theta x^{1/3}\right)^{\alpha} \end{aligned}$$

[12/2/2007] On page 51, 5 lines above "Exercises", add the word "payment" between "expected" and "per loss".

[2/16/2008] On page 64, on the second line, replace "it if" with "if it".

[11/27/2008] On page 66, on the first line after the second displayed line, put "dx" after $S(x)$.

[2/4/2009] On page 76, in the solution to exercises 5.17, on the first line, change $F(200)$ to $S(200)$.

[2/4/2009] On page 77, in the paragraph beginning "Let $f_2(x)\ldots$", at the end of the first line, change the numerator $(3)(500^2)$ to $(3)(500^3)$.

[4/17/2008] On page 81, replace the second line of Section 6.3 with

α be the expected continuously compounded rate of return on a stock,

[12/4/2007] On page 81, on the second displayed line, 2 t's are missing from the last expression, which should read

$$\mathcal{N}((\alpha - \delta - 0.5\sigma^2)t, \sigma^2 t)$$

[8/6/2008] On page 83, the paragraph after Definition 1, there are 2 typos in the first 3 sentences. The following replacement is clearer:

To calculate $E[S_t|S_t < K]$, we carry out two steps. The first step is to integrate the lognormal random variable S_t/S_0 over its probability density function from 0 to K/S_0, and multiply it by S_0. The result of S_0 times the integral is the partial expectation of S_t.

[12/26/2007] On page 84, on the fourth line, change S to S_0.

[2/4/2009] On page 84, on the third line of the answer to Example 6D, change $\frac{S_t}{K}$ to $\frac{K}{S_t}$.

[8/6/2008] On page 85, on the last line before the exercises, a t is missing from the first exponent: $S_0 e^{(\alpha-\delta)t}$.

[1/24/2009] On page 85, in line with McDonald's recent errata, the phrase "mean annual continuously compounded return" in exercises 6.1 and 6.2 should be replaced with "continuously compounded mean annual return".

[12/9/2007] On page 86, in exercise 6.9(v), change 25% to 24%.

[8/2/2008] On page 89, in the second paragraph, change the first sentence to

A *franchise deductible d* means that if the loss is less than or equal d, nothing is paid, but if the loss is higher than d, the full amount is paid.

[12/2/2008] On page 105, in the solution to exercise 7.16, on the second line, delete one of the "such that $E[X \wedge d]$"'s.

[2/9/2008] On page 106, in the solution to exercise 7.20, on the first displayed line, replace $X \wedge \theta$ with $X \wedge d$.

[2/7/2009] On page 136, in the solution to exercise 7.36, on the first two displayed lines, change X to X'.

[1/24/2008] On page 110, in the solution to exercise 7.37, the right hand side of the first line on the page should be 0.2245 instead of 0.2469, affecting the solution. Replace the first four lines of the page with

$$\Phi\left(\frac{\ln x - \ln 1.1 - 9}{2}\right) = \frac{935.54 - 1.1e^7}{-1.1e^7} = 0.2245$$
$$\frac{\ln x - \ln 1.1 - 9}{2} = \Phi^{-1}(0.2245) = -0.76$$
$$\ln x = 2(-0.76) + 9 + \ln 1.1 = 7.575$$
$$x = e^{7.575} = \boxed{\mathbf{1949}}$$

[2/16/2008] On page 111, in the solution to exercise 7.42, on the third displayed line, replace $\frac{x^2}{3}$ with $\frac{x^3}{3}$.

[3/3/2009] On page 116, there are two references to the textbook's Theorem 5.14, which is based on the second edition. In the third edition of *Loss Models*, it is Theorem 8.8.

[7/7/2008] On page 120, in exercise 8.16, add after "You are given:": "X has a continuous distribution. Some values for X's distribution function and limited expected values are given in the following table:".

[2/7/2008] On page 127, in the solution to exercise 8.13, on the first line, put parentheses around $X \wedge 10{,}000$.

[2/16/2008] On page 127, in the solution to exercise 8.17, on the first line, replace 2002 with 2001.

[9/28/2008] On page 132, on the second line, change "must by" to "must be".

[2/16/2008] On page 136, in the solution to exercise 9.4, on the third displayed line, in the expression $(500 + K)$, K should be capitalized.

[9/7/2008] On page 142, on the 5th line of the answer to Example 10B, replace "Then $c \ldots$" through the end of the paragraph with

Then the ratio of each modified probability to the $(a, b, 0)$ probability is $\frac{c}{1-p_0}$, so $\frac{c}{1-p_0} = \frac{p_1^M}{p_1} = \frac{0.4}{0.25} = \frac{8}{5}$. By the definition of c as $1 - p_0^M$,

[2/4/2008] On page 153, in the solution to exercise 10.24, on the second line, replace p_n with $\frac{p_n}{p_{n-1}}$.

[2/16/2008] On page 157, in exercise 11.10(i), replace a with α.

[4/2/2009] On page 164, the paragraph after Example 12A up to the end of the lesson are incorrect. Replace them with the following:

The same parameter that gets multiplied by v in the $(a, b, 0)$ class gets multiplied by v in the $(a, b, 1)$ class. p_0 is then the balancing item, $1 - \sum_{k=1}^{\infty} p_k$. The textbook gives formulas for p_0^M in all cases (Table 8.3). Rather than memorizing the table, use the following formula:

$$1 - p_0^{M*} = (1 - p_0^M)\left(\frac{1 - p_0^*}{1 - p_0}\right)$$

where asterisks indicate distributions with revised parameters. This formula works even when the unmodified distribution is improper (so that unmodified probabilities are negative or greater than 1), as in the ETNB family. This is illustrated in the following example:

Example 12B Frequency of claims per year follows a zero-modified negative binomial distribution with $r = -0.5$, $\beta = 1$, and $p_0^M = 0.7$. Claim size follows a Pareto with $\alpha = 1$, $\theta = 1000$, and is independent of claim frequency.

A deductible of 500 is imposed.

Calculate the probability of no claims payments in a year.

Answer: The probability of a payment given a claim is the Pareto survival function at 500:

$$S(500) = \frac{\theta}{\theta + 500} = \frac{1000}{1500} = \frac{2}{3}$$

The revised negative binomial parameters are $r* = -0.5, \beta^* = 2/3$. By the equation above:

$$\begin{aligned}
1 - p_0^M &= 0.3 \\
1 - p_0 &= 1 - \left(\frac{1}{1+\beta}\right)^r = 1 - \left(\frac{1}{2}\right)^{-0.5} = -0.4142 \\
1 - p_0^* &= 1 - \left(\frac{1}{5/3}\right)^{-0.5} = -0.2910 \\
1 - p_0^{M*} &= 0.3\left(\frac{-0.2910}{-0.4142}\right) = 0.2108 \\
p_0^{M*} &= 1 - 0.2108 = \boxed{\mathbf{0.7892}}
\end{aligned}$$

□

[2/13/2008] On page 176, on the first displayed line, change $\Phi(1.11)$ to $\Phi(1.00)$.

[12/4/2007] On page 180, exercise 13.13 is the same as exercise 3.3.

[9/28/2008] On page 192, some of the notation is inaccurate. Replace the paragraph starting with "Let U be claim size" and the following 3 displayed lines with

Let U be claim size. We would like to calculate

$$\text{Var}(U) = \text{Var}_I(E_U[U \mid I]) + E_I[\text{Var}_U(U \mid I)]$$

Let's calculate $\text{Var}_I(E_U[U \mid I])$.

$$\begin{aligned}
E_I[E_U[U \mid I]] &= E_I[200, 1000, 100, 1500] \\
&= 0.2(200) + 0.3(1{,}000) + 0.4(100) + 0.1(1{,}500) = 530 \\
E_I[E_U[U \mid I]^2] &= E_I[200^2, 1000^2, 100^2, 1500^2] \\
&= 0.2(200^2) + 0.3(1{,}000^2) + 0.4(100^2) + 0.1(1{,}500^2) = 537{,}000 \\
\text{Var}_I(E_U[U \mid I]) &= E_I[E_U[U \mid I]^2] - E_I[E_U[U \mid I]]^2 \\
&= 537{,}000 - 530^2 = 256{,}100
\end{aligned}$$

[2/21/2009] On page 194, in the solution to exercise 13.8, the conditional variance formula is used, not the compound variance formula. On the first line, change "compound distribution" to "conditional". On the 5th displayed line, replace the second $E[\beta^2]$ with $E[\beta]^2$.

[5/4/2009] On page 194, the solution to exercise 13.10 is incorrect. The correct solution is:

For each insured, the Poisson parameter over two years is $\Lambda = 2\lambda$. Since $\mathbf{E}[\Lambda] = 2\,\mathbf{E}[\lambda]$ and $\text{Var}(\Lambda) = 4\,\text{Var}(\lambda)$, the parameter Λ follows a gamma distribution with mean 1 and variance 2. Let N be the number of losses over the two-year period. Then $\mathbf{E}[N] = E[E[N \mid \Lambda]] = \mathbf{E}[\Lambda] = 1$ and the variance of N is

$$\text{Var}(N) = \mathbf{E}[\text{Var}(N \mid \Lambda)] + \text{Var}(\mathbf{E}[N \mid \Lambda]) = E[\Lambda] + \text{Var}(\Lambda) = 1 + 2 = 3$$

For 1500 insureds, the aggregate mean is 1500 and the aggregate variance is $1500(3) = 4500$. We make a continuity correction and check the probability that a normal distribution with these parameters is greater than 1600.5:

$$\begin{aligned}\Pr(N > 1600) &= 1 - \Phi\left(\frac{1600.5 - 1500}{\sqrt{4500}}\right) \\ &= 1 - \Phi(1.50) = 1 - 0.9332 = \boxed{\mathbf{0.0668}}\end{aligned}$$

[9/20/2008] On page 200, in the solution to exercise 13.26, on the last two lines, change 0.6085 to 0.60 in 2 places.

[1/21/2009] On page 206, in the solution to exercise 13.49, a continuity correction is needed. Replace the sentence beginning with "The probability of paying out" with the following

We need the probability of paying out more than 250. Since the aggregate distribution is discrete, this is the same as the probability of paying out at least 500, and we need to make a continuity correction. We'll calculate the probability of paying out more than 375, the midpoint of (250, 500).

$$1 - \Phi\left(\frac{375 - 43.13}{\sqrt{23{,}906.25}}\right) = 1 - \Phi(2.15) = 1 - 0.9842 = \boxed{\mathbf{0.0158}} \qquad \textbf{(A)}$$

[12/21/2008] On page 207, in the solution to exercise 13.52, on the last line, there should be an equals sign before the final answer: $1 - 0.6293 = \boxed{\mathbf{0.3707}}$.

[2/7/2008] On page 208, in the solution to exercise 13.56, the final answer is 990,944.

[8/5/2008] On pages 215–216, the solution to exercise 14.3 starting with "The Poisson rate" is incorrect. The correct solution starting from that point is

Let N be the number of coins picked up in half an hour. Then

$$\begin{aligned}
\Pr(N=0) &= \frac{1}{11}\sum_{\lambda=0}^{\infty}\left(\frac{10}{11}\right)^{\lambda}e^{-0.5\lambda} \\
&= \frac{1}{11}\sum\left(\frac{10}{11e^{0.5}}\right)^{\lambda} \quad \text{a geometric series} \\
&= \frac{1}{11}\left(\frac{1}{1-10/11e^{0.5}}\right) = 0.20265 \\
\Pr(N=1) &= \frac{1}{11}\sum_{\lambda=0}^{\infty}0.5\lambda\left(\frac{10}{11}\right)^{\lambda}e^{-0.5\lambda} \\
&= \frac{1}{22}\sum_{\lambda=1}^{\infty}\lambda\left(\frac{10}{11e^{0.5}}\right)^{\lambda} \\
&= \frac{1}{22}\left(\frac{10/11e^{0.5}}{(1-10/11e^{0.5})^2}\right) = 0.12454 \\
\Pr(N\geq 2) &= 1-0.20265-0.12454 = \boxed{\mathbf{0.6728}}
\end{aligned}$$

[8/5/2008] On page 222, on the 4th line, change $\Pr(S \geq 2.8)$ to $\Pr(S > 2.8)$.

[7/19/2008] On the last line of page 222, the formula is incorrect. The upper bound of the sum should be one lower, and a parenthesis is missing after the last S. The corrected formula is

$$E[S \wedge d] = \sum_{j=0}^{u-1} hS(hj) + (d-hu)S(hu)$$

where $u = \lceil d/h - 1 \rceil$. If $u - 1 < 0$ (for example if $d = 1$ and $h = 2$), the sum is empty and only the second term is used.

[1/26/2009] On page 225, in exercise 15.7, on the displayed line, $f(x)$ should be $f(n)$.

[2/16/2008] On page 230, in the solution to exercise 15.1, on the first displayed line, replace 0.135336 with 0.135335.

[10/17/2008] On page 231, in the solution to exercise 15.4, on the 5th displayed line, add "1 + after the left parenthesis:

$$\Pr(S \geq 20) = 1 - (1 + 2.5 + 4.625 + 6.35417)e^{-5} = 0.9024$$

[9/8/2008] On page 241, in exercise 16.2, add the word "binomial" after the word "negative" on the second line.

[9/8/2008] On page 243, in the solution to exercise 16.5, on the last line of the page, replace 0.0966745 with 0.225871.

[2/21/2009] On page 291, in the solution to exercise 20.13, on the third line, replace $1 - S(2)$ with $S(2)$.

[3/1/2008] On page 310, in the solution to exercise 21.23, the final answer should be 0.3556 instead of 0.3555.

[12/4/2007] On page 319, exercise 22.1 is the same as exercise 4.1.

[9/28/2008] On page 351, in the last bullet, $f()$ should be $f(x)$.

[12/10/2008] Concerning lesson 25 (pages 361–364), the third edition of *Loss Models*, which is now the official edition for the syllabus (although you may still use the second edition), no longer has the notation P_j, α, and β, so you are no longer responsible for their meanings. Instead, you should determine from the circumstances what is an appropriate assumption. For deductibles and limits, it is reasonable to assume that all observations occur above the deductible

and below or at the limit. For a time-to-failure study, lives entering at the beginning may be assumed to enter before failure and lives surviving at the end of the study may be assumed to leave after all failures. For other lives, you must determine whether it is more reasonable to assume they enter and leave uniformly within each interval or they enter before all failures in the interval and leave after all failures in the interval.

The third edition does not provide double-decrement formulas, so you are not responsible for the displayed equation in Section 25.2, nor for Example 25D and exercise 25.7. You are still responsible for estimating single-decrement rates ($q'^{(i)}$) in a multiple-decrement table.

[8/14/2008] On page 363, in the second line of the answer to Example 25B, replace r_1 with r_0.

[8/2/2008] On page 364, in the first displayed line on the page, $q_j^{(\tau)}$ and $p_j^{(\tau)}$ should have only one set of parentheses in the exponent.

[2/28/2009] On page 364, in the answer to Example 25D, change the four "1" subscripts on p's and q's to "0"'s, and the eight "2" subscripts to "1"'s. Four lines from the bottom of the page, replace $q_2'^{(d)}$ with $q_1'^{(w)}$. However, as indicated above, you can skip this example since it is not on the syllabus any more.

[12/26/2007] On page 365, on the fourth line, after (0.880064), replace 0.147573 with 0.l13548.

[12/26/2007] On page 373, in the displayed line of Example 26E, replace $F(x)$ with $f(x)$.

[4/7/2009] On page 375, in the first sentence of the answer to Example 26G, replace "harmonic mean" with "average of the reciprocals".

[1/7/2008] On page 389, in the solution to exercise 26.16, the final answer is **(B)** instead of (D).

[3/16/2008] On page 391, on the last line of the solution to exercise 26.25, add the word "not" between "would" and "result".

[3/26/2008] On page 391, on the 5th displayed line of the solution to exercise 26.26, delete the coefficient 2 before θ_2^2.

[3/26/2008] On page 413, on the first line, delete "at".

[8/2/2008] On page 437, on the second line of the paragraph under "Weibull distribution", the first word should be "then" instead of "the".

[9/8/2008] On page 451, in exercise 29.41, the column "Years of Disability" should be $(1, 2)$ instead of $(0, 1)$ and $[2, \infty)$ instead of $[1, \infty)$.

[2/24/2008] On page 468, on the fifth line, change 0.001108 to 0.0001108.

[7/10/2008] On page 468, delete the footnote, and replace the last complete paragraph on the page with the following:[1]

The estimate for μ is based purely on the first and last observations. Thus it is not improved by more frequent observations, only by a longer time period. As a result it is not very accurate. We can see this mathematically. If the time from the first to last observation is t and the period is broken up into n periods, the mean of the lognormal for each interval is $\frac{\mu t}{n}$ and the variance for each interval is $\frac{\sigma^2 t}{n}$. The estimator for $\frac{\mu t}{n}$, the sample mean of the logs, has variance equal to the variance of the distribution divided by n, or $\frac{\sigma^2 t}{n^2}$. Thus the variance of the estimate of μ is $\left(\frac{n^2}{t^2}\right)\left(\frac{\sigma^2 t}{n^2}\right) = \frac{\sigma^2}{t}$, which does not depend on n.

For example, if the period is one year and we knew that the standard deviation $\sigma = 0.3$ the standard deviation of the estimator for μ, would be 0.3 and there would be a 95% probability of the sample mean being in an interval of width $2(1.96)(0.3) = 1.176$ centered at μ. This is a huge interval.

[4/2/2008] On page 500, in the solution to exercise 32.10(ii), on the second line, replace the numerator 1145 with 1445.

[1/27/2009] On page 595, in the solution to exercise 40.10, on the last line, in the last numerator, 2 should be an exponent: $(10 - 5)^2$.

[1] I thank Ken Burton for pointing this out to me.

[3/8/2008] On page 603, on the first displayed line, the last denominator is missing a factorial: $\prod_{i=1}^{n} x!$.

[3/16/2008] Replace the second to last paragraph on page 619 with the following:

On pre-2000 exams, Poisson frequency was virtually the only case tested on; as a result, this lesson has lots of old exam questions. Between 2000 and 2004, however, questions on non-Poisson frequency, discussed in the next lesson, were more frequent. At this point, it is unclear whether non-Poisson frequency is still on the syllabus, so I once again expect most of the limited fluctuation credibility questions to be based on Poisson frequency.

[3/1/2009] On page 619, on the last line of the answer to Example 42A, there should be 200 before the brackets of $\dfrac{10000/6}{(100/3)^2}$.

[12/4/2007] On page 621, exercise 42.4 is the same as exercise 13.14.

[3/26/2008] On page 677, in the solution to exercise 45.16, on the first line of the table, interchange "Red Urn" and "Blue Urn".

[9/13/2008] On page 677, in the solution to exercise 45.18, in the table, on the second line, the number under Side Wall should be 2 instead of 1.

[1/7/2009] On page 683, in the solution to exercise 45.29, on the third line of the page, the left hand side should be $E(X_2 \mid X_1)$. Also, on the third line of the table, put 0.5 in front of e^{-5} in the second column.

[2/6/2008] On page 701, in the solution to exercise 46.9, the first displayed line should read

$$\frac{1}{\theta}\frac{2\theta^2}{200^3} = \frac{2\theta}{200^2} \qquad 0 < \theta \le 200$$

and on the fourth line replace $\frac{1}{200^3}$ with $\frac{2}{200^3}$.

[3/26/2008] On page 704, in the solution to exercise 46.22, on the second line, change = to -.

[4/11/2008] On page 705, in the solution to exercise 46.22, on the first line of the page change 3 to 2, and on the second lines of the page, change the first 3 to 2.

[12/4/2007] On page 717, exercise 47.22 is the same as exercise 11.3.

[12/4/2007] On page 718, exercise 47.24 is the same as exercise 11.4.

[12/4/2007] On page 718, exercise 47.25 is the same as exercise 11.6.

[2/6/2008] On page 721, in the solution to exercise 47.20, at the end, replace $m =$ **30** with $x =$ **30**.

[1/24/2009] On page 741, in exercise 50.8, on the second displayed line, change $g(x)$ to $g(\theta)$.

[3/11/2009] On page 762, in the first displayed equation on the page, change the numerator 14.5 to 3.36.

[3/26/2008] On page 788, in the solution to exercise 52.32, on the third line, change $\frac{2}{2+1} = 3$ to $\frac{2}{2+1} = \frac{2}{3}$.

[3/26/2008] On page 792, in the solution to exercise 52.45, on the last line, change the first $-$ to $+$.

[3/26/2008] On page 818, in the solution to exercise 53.38, on the last line of the page, add E before $\left[e^{\sigma^2}\right]$.

[2/17/2009] On page 839, on the two lines before Example 56A, replace $\bar{X}$ with $E[X]$ in two places, and replace $\bar{Y}$ with $E[Y]$. (The same replacement should be made in the solution to exercise 56.1, but it so happens that in that exercise $E[X] = \bar{X}$ and $E[Y] = \bar{Y}$.)

[4/23/2008] On page 855, in exercise 57.6, remove the space in the word Bühlmann.

[4/10/2008] On page 860, in the solution to exercise 57.2, on the last line of the page, delete the coefficient 2 of $\left(1 - \frac{5}{8}\right)^2$.

[9/26/2008] On page 872, replace the first paragraph of Section 58.2 after the word "cryptic" with

Suppose θ_i is the probability of submitting a claim for group i. Either only one claim is possible or we are not interested in the number of claims. Then the number of members in group i submitting claims in period j, assuming it has m_{ij} members in that period, is binomial with parameters m_{ij} and θ_i. We have that the hypothetical mean for each member of group i is θ_i and the process variance is $\theta_i(1-\theta_i)$. Then we can relate a, the variance of the hypothetical means, to μ and v as follows:

$$\begin{aligned}\mu &= E[\theta_i] \\ v &= E[\theta_i(1-\theta_i)] = E[\theta_i] - E[\theta_i^2] \\ a &= \text{Var}(\theta_i) = E[\theta_i^2] - E[\theta_i]^2 \\ &= -v + \mu - \mu^2\end{aligned}$$

[4/7/2009] On page 885, in the solution to exercise 58.14, on the second displayed line, change two minus signs to plus signs:

$$\hat{a} = \frac{\sum_{i=1}^{r} m_i(\bar{x}_i - \bar{x})^2 - (\hat{a} + \hat{\mu} + \hat{\mu}^2)(r-1)}{D}$$

[2/7/2008] On page 888, 3 lines from the end, delete the parenthetical remark "(on which they almost ...)". This is now a frequent exam topic.

[3/7/2009] On page 897, in exercise 59.16, on the third line, change n to m.

[1/17/2009] On page 905, in the solution to exercise 59.13, capitalize "Integrate" on the first line. The last two lines should read

$$\begin{aligned}x &= 2\sqrt[3]{u} \\ &= 2\sqrt[3]{0.125} = 1 \qquad \textbf{(E)}\end{aligned}$$

[2/24/2008] On page 926, in exercise 61.17(ii), delete 0 from the set {1,2,3,4,5}.

[4/3/2008] On page 936, the solution to exercise 61.28 is not labeled. It begins with the paragraph starting with "The stock price". There are a couple of typos in the solution. The correct solution, starting with the third line, is

$$\begin{aligned}\mu + 1.18\sigma &= \ln(40.886/40) = \ln 1.02215 = 0.02191 \\ \mu - 0.53\sigma &= \ln(40.549/40.886) = \ln 0.99102 = -0.00902 \\ \sigma &= \frac{0.02191 + 0.00902}{1.18 + 0.53} = 0.01809 \\ \mu &= 0.02191 - 1.18(0.01809) = 0.0005682\end{aligned}$$

Then the annual return is

$$365[\mu + 0.5\sigma^2] = 365[0.0005682 + 0.5(0.01809^2)] = \boxed{\textbf{0.267}}$$

and the annual volatility is

$$0.01809\sqrt{365} = \boxed{\textbf{0.346}}$$

[2/25/2008] On page 945, one line after the second displayed formula, change "variances" to "standard deviations". The third displayed formula should be

$$\ln(S_{ti}) = \ln(S_{0i}) + (\alpha_i - 0.5\sigma_i^2)t + \sigma_i\sqrt{t}\,Z(i)$$

[3/1/2008] On page 957, in the solution to exercise 63.15, on the second to last line, replace -0.1076 with -0.1085 and $36e^{-0.0236}$ with $36e^{-0.0242}$.

[1/28/2008] On page 960, on the last line of the answer to Example 64B, replace 1.282 with 1.122 and 42.5% with 42.6%.

[4/2/2008] On page 961, replace the last 2 lines of the answer to Example 64C with

The payoff of the put is $28.40 - 23.18 = 5.22$, and the present value, discounting at 5% for three months, is $5.22e^{-0.0125} = \boxed{\mathbf{5.16}}$.

[1/30/2008] On page 983, at the very end of the second paragraph in Section 67.1, change Q_α to CTE_α.

[3/8/2009] On page 984, in Figure 67.1, add $(1 - 0.95)$ before the second $\text{CTE}_{0.95}$: The shaded area is $(1 - 0.95)\,\text{CTE}_{0.95}$ ....

[9/7/2008] On page 985, on the third displayed line, change $\ln x$ to $\ln Q_\alpha$.

[9/7/2008] On the last 3 lines of page 985, Q_α is the α quantile of a standard normal distribution, not of Z.

[3/20/2009] On page 987 three lines from the bottom, replace $dF(d)$ with $dS(d)$.

[4/6/2008] On page 992, in the solution to exercise 67.5, replace the first displayed line on the page with

$$1.078189 + (0.9 - 0.868313)(5) = 1.236626$$

and the second displayed line with

$$(2 - 1.236626)/0.1 = 7.63375$$

The final answer is $\boxed{\mathbf{7633.75}}$.

[9/7/2008] On page 994, in the solution to exercise 67.12, on the last two lines, replace the two 86.40's with 85.40 and replace the final answer with 25.40.

[1/30/2008] On page 996, on the second line, the negative sign of the exponent should be outside the parentheses: $e^{-(x/\theta)^\tau}$.

[3/14/2009] On page 1008, in the solution to exercise 68.13, on the second displayed line, delete 100 before dy.

[10/11/2008] On page 1026, in question 13, change $\widehat{\Pr}(3 < X < x|X < 10)$ to $\widehat{\Pr}(3 < X < x \mid X < 10)$.

[5/13/2009] On page 1058, in question 15, on the last line, change "number of dental" to "number of major dental".

[11/2/2008] On page 1054, in question 6, add the word "annual" on the first line before "number of claims". On the third line, change "number of claims" to "number of years of experience".

[4/16/2008] On page 1056, change the last line of question 16 to

Given that the option pays off, determine the expected value of S_1.

[10/11/2008] On page 1093, in the solution to question 13, on the third and fourth displayed lines, change dq to dq'.

[4/24/2008] On page 1103, on the first line of the page, change $\frac{1-w}{10}$ to $\frac{1-w}{5}$.

[5/12/2009] On page 1105, in the solution to question 9, on the second displayed line, add an r_u to the denominator:

$$\sum_{u \le t} \frac{s_u}{r_u(r_u - s_u)} = \frac{0.0024}{0.81}$$

[1/24/2009] On page 1107, in the solution to question 13:

1. Change $\widehat{\Pr}(3 < X < x|X < 10)$ to $\widehat{\Pr}(3 < X < x \mid 3 < X < 10)$ in the six places it appears.
2. In the first table, on the line $y = 8$, change 0.28333 to 1.28333.
3. On the third line after the first table, change "Dividing these by 0.8" to "Dividing these by 0.6".

4. In the first two displayed lines, change the denominators 0.722888 to 0.541619.

[10/19/2008] On page 1114, in the solution to question 35, on the 5th line, there should be a radical over the second $\text{Var}(X)\,\text{Var}(Y)$: $\rho\sqrt{\text{Var}(X)\,\text{Var}(Y)} \le \sqrt{\text{Var}(X)\,\text{Var}(Y)}$.

[9/28/2008] On page 1137, in the solution to question 22, on the fifth line, change "must by" to "must be".

[1/26/2009] On page 1139, in the solution to question 28, on the 5th through 3rd lines from the bottom of the page, replace 0.055268 with 0.052268 and replace 0.55268 with 0.52268 three times.

[4/14/2008] On page 1142, in the solution to question 37, on the second line of the page, change the right hand side to $e^{-2y_1/\theta}$.

[11/2/2008] On page 1146, in the solution to question 9, on the third displayed line, change the denominator of the second integral from k to x.

[1/27/2009] On page 1148, in the solution to question 16, on the first displayed line, change K/S_0 to S_0/K.

[11/2/2008] On page 1149, in the solution to question 18, on the third displayed line, replace $E[HM^2]$ with $E\left[(N \mid \alpha)^2\right]$, where N is the number of claims.

[5/11/2009] On page 1158, in the answer key, the answer to 18 should be D instead of C.

[5/11/2009] On page 1168, the solution to question 22 is incorrect starting with the first line on the page, where -1.59 should be -1.58. Replace the four lines on top of the page with:

$$= e^{0.15}\Phi(-1.58)$$
$$= (1.162)(1 - 0.9429) = 0.06634$$

Dividing by the probability of being below the 10th percentile (0.1), we get 0.6634. $\mathbf{E}[S_t \mid S_t < 30.243] = 0.6634S_0 = 0.649(40) = 26.54$, so the average payoff is $35 - 26.54 = \boxed{\mathbf{8.46}}$. **(A)**

[4/23/2008] On page 1178, in the solution to question 8, on the first line of the page, the right hand side should be $e^{-1}(0.0603375)$.

[1/27/2009] On page 1181, in the solution to question 14, on the first line, change $\Pr(S_1/S_0)$ to $\Pr((S_{1/2}/S_0) > 1)$.

[5/11/2009] On page 1215, in the solution to question 37, replace the phrase starting with "with mean" to the end of the sentence with:

with mean $F(300) = 1 - e^{-3}$ and variance $F(300)(1 - F(300)) = (1 - e^{-3})e^{-3}$, so the coefficient of variation squared is $e^{-3}/(1 - e^{-3}) = 0.05240$.

[2/28/2009] On page 1218, change the following entries, which are currently NS:

- F00:32 should be 13
- SOA exams F04:19 should be 17
- SOA exams F05:38 should be 13

[12/30/2008] In Table C.3 on page 1219, lessons 4, 5, and 6 are interchanged. A corrected version of the table is at the end of this list.

Table C.3: Lessons corresponding to practice exam questions

Question Number	Practice Exams						
	1	2	3	4	5	6	7
1	1	1	1	23	37	47	17
2	19	40	43	18	7	29	62
3	23	28	47	47	35	3	22
4	42	2	18	8	53	46	47
5	40	29	29	40	67	57	31
6	45	17	3	28	55	37	48
7	52	61	26	26	40	54	4
8	4	28	24	18	18	22	14
9	62	23	61	24	9	15	20
10	52	57	57	37	25	24	52
11	28	14	50	21	15	61	41
12	25	28	10	65	21	8	10
13	49	21	58	49	23	45	57
14	59	27	33	23	62	20	6
15	26	10	22	2	28	2	28
16	52	49	15	45	6	26	52
17	17	62	4	10	61	28	40
18	61	13	28	31	53	26	16
19	22	30	45	4	16	46	5
20	10	20	52	33	31	7	56
21	58	21	17	9	29	62	61
22	66	22	21	17	46	67	43
23	34	25	7	54	29	35	15
24	13	7	25	2	61	17	61
25	38	55	29	28	57	46	67
26	63	38	61	54	32	27	36
27	29	21	27	46	45	10	22
28	24	45	63	12	10	18	7
29	28	35	41	24	7	64	52
30	12	24	41	37	36	26	8
31	57	54	9	53	44	44	29
32	33	31	28	45	3	13	29
33	53	5	16	23	60	21	21
34	6	26	20	59	42	61	24
35	31	68	6	66	58	37	35
36	8	53	68	14	46	53	46
37	28	61	46	27	41	23	27
38	18	46	53	45	22	33	18
39	27	52	31	42	13	5	59
40	37	44	59	68	17	44	49