Errata and updates for ASM Exam 3L (Seventh Edition) sorted by date

Note: Practice exam 1 question 9 is defective. See below for a corrected version of the question.

[10/27/2009] On page 617, in the first displayed formula, replace $\text{Var}({}_tL \mid T(x) \geq t)$ with $\text{Var}({}_tL \mid T(x) > t)$.

[10/20/2009] On page 864, in question 21, replace the second line with

$$\mathbf{Q}_0 = \begin{pmatrix} 0.8 & 0.2 \\ 0.4 & 0.6 \end{pmatrix} \qquad {}_2\mathbf{Q}_0 = \begin{pmatrix} 0.38 & 0.62 \\ 0.44 & 0.56 \end{pmatrix}$$

[10/20/2009] On page 914, in the solution to question 22, on the fourth line, replace $\sqrt{3{,}335{,}337}\left(\frac{1}{130} + \frac{1}{80}\right)$ with $\sqrt{3{,}335{,}337\left(\frac{1}{130} + \frac{1}{80}\right)}$.

[10/20/2009] On page 922 the solution to question 21 is incorrect. The correct solution is

Let $\mathbf{Q}_1 = \begin{pmatrix} x & 1-x \\ y & 1-y \end{pmatrix}$. Since $\mathbf{Q}_0\,\mathbf{Q}_1 = {}_2\mathbf{Q}_0$,

$$\begin{pmatrix} 0.8 & 0.2 \\ 0.4 & 0.6 \end{pmatrix}\begin{pmatrix} x & 1-x \\ y & 1-y \end{pmatrix} = \begin{pmatrix} 0.38 & 0.62 \\ 0.44 & 0.56 \end{pmatrix}$$

Equating the left column vectors of both sides, we have

$$0.8x + 0.2y = 0.38$$
$$0.4x + 0.6y = 0.44$$

Doubling the second equation and subtracting the first from it, we get $y = 0.5$, $x = 0.35$. From ${}_2\mathbf{Q}_0$, we see that the state vector after two transitions for someone in state 1 is $(0.38, 0.62)$. Then the probability of being in state 2 after another transition is $0.38(1-x) + 0.62(1-y) = 0.38(0.65) + 0.62(0.5) = \boxed{\mathbf{0.557}}$. **(E)**

[10/12/2009] On page 783, on the first line of the answer to Example 53A, change $t \geq 4$ to $T \geq 4$.

[10/12/2009] On page 815, in question 56.12, on the first line, change X_n to X_N.

[10/12/2009] On page 820, in the solution to question 56.8, on the displayed line, change $\mathbf{E}[X \mid I]$ to $\mathbf{E}[S \mid I]$.

[10/6/2009] On page 704, in the solution to exercise 46.15, three lines from the end, replace the subscript $\overline{y:y} : \overline{n}|$ with $\overline{y:y} : \overline{10}|$.

[10/6/2009] On page 717, in the solution to exercise 47.13, on the first line, replace "voluntarily" with "leaving voluntarily in the second year".

[10/6/2009] On page 743, on the second line from the end of the first paragraph, change ${}_kQ^{(i,i)}$ to ${}_kQ^{(i,j)}$.

[9/29/2009] On page 808, in the solution to exercise 55.4, on the fourth line, delete the word "twice".

[9/25/2009] On page 706, in the solution to exercise 46.22, on the seventh line, $30E_{20}$ should be ${}_{30}E_{20}$.

[9/23/2009] On page 505, in exercise 33.3, on the first line, change fullY to fully.

[9/23/2009] On page 528, in the solution to exercise 33.25, on the 6th and 8th lines, put double-dots on the three a's that don't have them.

[9/23/2009] On page 563, in the solution to exercise 36.11, replace the third displayed line with

$$\Pr(S > 45) = \Pr\left(\frac{S-33}{\sqrt{36}} > \frac{45-33}{\sqrt{36}}\right) = \Pr\left(\frac{S-33}{6} > 2\right)$$

[9/23/2009] On page 569, in the answer to Example 37C part 2 two lines from the end, change ${}^{20}_{15}V_x$ to ${}^{20}_{15}V_{40}$.

[9/23/2009] On page 614, in the solution to exercise 39.24, on the first displayed line, change P_x to P_{36}.

[9/23/2009] On page 676, in the solution to exercise 44.11, change all eleven x's to t's.

[9/15/2009] On page 415, in the solution to exercise 28.7, on the 6th line, replace 0.09 + 0.3 = 0.09 with 0.09 + 0.03 = 0.12.

[9/15/2009] On page 487, in the solution to exercise 31.32, on the last line, replace $u(65)$ with $u(64)$.

[9/9/2009] On pages 318–319, the solution to exercise 23.13 should use continuously compounded rates of benefit growth rather than effective rates. The revised solution is:

Let A be the single benefit premium. The continuous rate of increase offsets the interest, so in effect we have $\delta = -0.04$ in the first 10 years and $\delta = 0.01$ thereafter. Then

$$\bar{A} = \frac{0.05}{0.05 - 0.04}(1 - e^{-0.01(10)}) + e^{-0.01(10)}\frac{0.05}{0.05 + 0.01} = \boxed{\mathbf{1.2298}} \qquad \textbf{(A)}$$

[9/9/2009] On page 338, in the solution to exercise 24.5, on the fourth line, change "interest rate" to "force of interest".

[9/9/2009] On page 356, in the solution to exercise 25.9, on the first line, replace λ with δ.

[9/9/2009] On page 374, in exercise 26.36, on the second line after the table, add "age 49" at the end of the sentence after "100 lives".

[9/9/2009] On page 441, in the solution to exercise 29.14, the last line should read

$$ia_{x:\overline{n}|} + (1 + i)A_{x:\overline{n}|} - 1 = 1 + i - i + i\,{}_nE_x - 1 = \boxed{\boldsymbol{i\,{}_nE_x}} \qquad \textbf{(B)}$$

[9/9/2009] On page 460, in the solution to exercise 30.2, on the second displayed line, move the double-dot off the E to $a_{x:\overline{30}|}$.

[9/9/2009] On page 462, in the solution to exercise 30.9, on the fourth line, change ${}_tq_{30}$ to ${}_{t|}q_{30}$.

[9/7/2009] On page 939, in the solution to question 23, on the last line, put a bar on P.

[9/3/2009] On page 298, in the solution to exercise 22.12, 4 lines from the end, delete one of the 1's after "are".

[9/3/2009] On page 298, in the solution to exercise 22.13, on the 6th line, the left hand side should be $\mathbf{E}[T^2 \wedge 2]$.

[8/31/2009] On page 30, in the solution to exercise 2.14, on the second line from the end, delete a plus sign between 0.0064 and 0.183125.

[8/31/2009] On page 218, replace the paragraph in the answer to part 3 of Example 4A with

This can be evaluated as ${}_{10}p_{40} - {}_{30}p_{40}$ or as ${}_{10}p_{40}\,{}_{20}q_{50}$; either way, we need two integrals to evaluate this. We'll use the former expression. We already saw in the previous two solutions that for this force of mortality, ${}_tp_x = (65 + x)/(65 + x + t)$.

[8/31/2009] On page 225, in exercise 18.21, on the third line, change q_x to q_{30}.

[8/25/2009] On page 166, in the solution to exercise 12.9, on the second displayed line, put a bar on X: $\sum(X_i - \bar{X})^2$.

[8/25/2009] On page 170, on the 8th line of Section 13.2, change $\sum \hat{\varepsilon}_i y_i$ to $\sum 2\hat{\varepsilon}_i(\hat{Y}_i - \bar{Y})$.

[8/25/2009] On page 171, replace the displayed line one line above Section 13.3 with

$$R^2 = \frac{\sum(x_i y_i)^2}{(\sum x_i)^2\,(\sum y_i)^2}$$

[8/25/2009] On page 178, in exercise 13.21, on the first line, remove the hat in the subscript from $\sigma^2_{\hat{\varepsilon}}$.

[8/25/2009] On page 183, in the solution to exercise 13.17, replace the last displayed line with

$$\sigma_{\hat{\beta}} = \frac{0.000379}{4.4102} = 0.00008588$$

[8/25/2009] On page 184, in the solution to exercise 13.25, on the first line, change $\sum Y_i - \bar{Y}$ to $\sum (Y_i - \bar{Y})^2$.

[8/25/2009] On page 184, in the solution to exercise 13.29, on the last line, the denominator should be $216.680 + 91.321$; change the minus sign to a plus sign.

[8/24/2009] On page 126, in the solution to exercise 8.10, on the displayed line, replace 0.04540 with 0.00004540.

[8/24/2009] On page 128, in the solution to exercise 8.29, on the last line, change 0.01 level to 0.10 level.

[8/24/2009] On page 128, in the solution to exercise 8.30, replace the displayed line with

$$1 - \Phi\left(\frac{7-1}{\sqrt{12.5}}\right) = 1 - \Phi(1.697) = 0.045$$

[8/24/2009] On page 144, in the solution to exercise 10.3, on the third line, change $N\sqrt{2}$ to $Z\sqrt{2}$.

[8/24/2009] On page 146, in the solution to exercise 10.18, on the second displayed line, change the denominator 1.3586 to 1.1656.

[8/24/2009] On page 157, in the solution to exercise 11.5, on the last line, change the last numerator to $(10-5)^2$.

[8/23/2009] On page 70, in the solution to question 4.22, on the second to last line, change 19.4470 to 19.4447.

[8/20/2009] On page 138, on the line above the second displayed equation, put a bar on the second X.

[8/20/2009] On page 166, in the solution to exercise 12.8, while 3.33, 18.95, and 16.74 are not the exact percentiles of the $\chi^2(9)$ distribution, if you divide 72 by the exact percentiles and round it to one decimal place, you get the corresponding numbers 21.6, 3.8, and 4.3 respectively.

[8/20/2009] On page 984, in the solution to question 6, on the second displayed line, change $\frac{x^2}{100}$ to $\frac{x^2}{10{,}000}$.

[8/20/2009] On page 987, in the solution to question 27, the heading of the fifth column of the table should be ${}_tp^{(\tau)}_{65} = {}_{t-1}p^{(\tau)}_{65}(1 - q^{(\tau)}_{65+t-1})$.

[8/20/2009] On page 997, in the solution to question 11, on the second line, $\frac{S^2_2}{S^1_2}$ should be $\frac{S^2_2}{S^2_1}$. Also, $F(12, 11)$ should be $kF(12, 11)$.

[8/20/2009] On page 1000, in the solution to question 40, on the third line, "change" should be "chance".

[8/20/2009] On page 1002, in the solution to question 12, on the second line, change $2(10^7)$ to $2(10^{14})$ in two places.

[8/19/2009] On page 941, in the solution to question 1, in the table, interchange the column headings ${}_tp_x$ and q_{x+t}.

[8/19/2009] On page 942, the solutions to questions 13 and 14 are misnumbered 12 and 13 respectively.

[8/19/2009] On page 943, in the solution to question 26:

- On the third line, change 2,358,256 in the numerator to 2,358,246.
- On the displayed line and the line after it, change 14,681,400,000 to 146,814,000.

[8/19/2009] On page 944, in the solution to question 37, in the table, interchange l_{x+20} and l_x at the heads of the third and fourth columns.

[8/19/2009] On page 969, in the solution to question 2, on the last line, remove the minus sign in front of $\frac{5}{1.7406}$.

[8/19/2009] On page 990, in the solution to question 4, the last denominator on the first displayed line is missing a pair of parentheses and should be $(1 - 0.0653)^2$.

[8/19/2009] On page 991, the second sentence is incorrect, since the premiums are paid at different times, resulting in different accumulated values. The correct solution to question 7 is:

From a retrospective viewpoint, the accumulated benefit is the same, so the higher the accumulated premium, the higher the reserve. In all cases, the premiums have a total of 10, so the earlier highest accumulated benefit will be from the premiums paid earliest, which accumulate more interest. (E) clearly has the earliest premiums, since all patterns have 6 in the first 3 years but only (E) collect 3 in the first year. **(E)**

[8/19/2009] On page 992, in footnote 1, delete one of the double vertical lines after 893.

[8/18/2009] On page 948, in the solution to question 23, on the first line, change ${}_kp_{xy}$ to ${}_kp_{\overline{xy}}$.

[8/18/2009] On page 977, in the solution to question 2, on the 4th displayed line, there should be a dt before the equal sign.

[8/18/2009] On page 982, in the solution to question 36, on the second line, change the denominator 796 to 776.

[8/17/2009] On page 809, in the solution to exercise 55.12, on the third line, change 0.7λ to 0.7 (delete λ).

[8/17/2009] On page 821, in the solution to exercise 56.10, on the last line, change 07422 to 0.7422.

[8/16/2009] On page 783, in the first sentence, change the phrase between dashes to "the time from when $N(t) = 0$ until $N(t) = n$".

[8/16/2009] On page 788, in the solution to Quiz 53-2, on the first displayed line, change 0.0108 to $\frac{1}{0.0108}$.

[8/16/2009] On page 789, in the solution to Example 54A, change the final answer from 0.04656 to 0.04653.

[8/14/2009] On page 81, in exercise 5.13, statement 2, change "form" to "from".

[8/14/2009] On page 109, on the last line of the solution to exercise 7.17, change the exponent 0.5314 to 0.05314.

[8/14/2009] On page 769, in the solution to exercise 51.9, change 0.04608 to 0.4608 on the line "No payment" and on the first white line of the table.

[8/8/2009] On page 317, in the solution to exercise 23.7, the proof is inadequate, since it is not given that force of mortality is constant. Replace the passage after **(B)** to the end of the solution with

To prove the inequalities:

First consider adding a constant to δ. Since $\bar{A}_x = \mathbf{E}[v^T]$, $\bar{A}''_x = \mathbf{E}[v^T e^{-cT}]$. For any two functions $g_1(t)$ and $g_2(t)$ of a random variable T, if $g_1(t) < g_2(t)$ always, then $\mathbf{E}[g_1(t)] < \mathbf{E}[g_2(t)]$. Here, $g_1(t) = e^{-ct}v^t$ and $g_2(t) = v^t$, and $g_1(t) < g_2(t)$ since $e^{-ct} < 1$. So $\mathbf{E}[v^T e^{-cT}] < \mathbf{E}[v^T]$ and we have proved that $\bar{A}''_x < \bar{A}_x$.

Now consider adding a constant to μ. For $\bar{a}_x$, adding a constant to μ results in a lower value, since $\bar{a}_x = \int_0^\infty v^t \, {}_tp_x \, \mathrm{d}t$, and adding a constant to μ lowers ${}_tp_x$. However, $\bar{A}_x = 1 - \delta\bar{a}_x$, so making $\bar{a}_x$ higher results in making $\bar{A}_x$ lower.

[8/6/2009] On page 452, on the last line of the page, (-1266.67^2) should be $(-1266.67)^2$.

[8/6/2009] On page 480, in the solution to exercise 31.6, on the last line, remove the minus sign from the exponent.

[8/5/2009] On page 642, in the solution to exercise 41.15, on the third line from the end, 1.05^{16} should be in the numerator, so that the right hand side is

$$\frac{107.1389(1.05^{16})}{0.044135}$$

[8/5/2009] On page 642, in the solution to exercise 41.17, on the first displayed line, change A_{x+20} to $1000A_{x+20}$.

[8/4/2009] On page 6, 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 18, one line after Example 2A, add the word "independent": "... from n independent identically distributed ...".

[8/4/2009] On page 611, in the solution to exercise 39.6, on the displayed line, change the ${}_t\bar{V}(\bar{A}_{x+t})$ to ${}_t\bar{V}(\bar{A}_x)$

[8/4/2009] On page 613, in the solution to exercise 39.17, on the last line, change ${}_{20}V_{35}$ to ${}_{20}V_{25}$.

[8/4/2009] On page 613, in the solution to exercise 39.18, on the second line from the end, change $1 - 0.1(0.4)$ to $1 - 0.1(4)$.

[8/3/2009] On page 567, on the fourth line of the second paragraph, delete the word "benefit".

[8/3/2009] On page 578, in the solution to exercise 37.12, on the 4th displayed line, change 0.46587 to 0.046587.

[8/3/2009] On page 595, in the solution to exercise 38.17, on the 4th line, change ${}^{(2)}_{V}$ to ${}_tV^{(2)}$.

[8/2/2009] On page 234, in the solution to exercise 18.34, put a negative sign before the integral in the first and second displayed lines.

[8/2/2009] On page 541, the solution to exercise 34.7 should read

$$1000A_{25} - \pi_b\,\ddot{a}_{25} = 1000(0.259800) - 31.1857\left(\frac{(1-0.259800)(1.05)}{0.05}\right) = \boxed{\mathbf{-224.96}}$$

[8/2/2009] On page 553, in the solution to exercise 35.16, on the fifth line from the end, change "v^T otherwise" to "v^n otherwise".

[7/31/2009] On page 537, on the last line of Example 34A, delete the word "benefit".

[7/29/2009] On page 562, in the solution to exercise 36.7, on the fourth displayed line, the line should end with 1.7763, and $\dfrac{P}{d} = 0.7763$ should be placed a separate line.

[7/28/2009] On page 520, in the solution to exercise 33.1, on the first displayed line, change ${}_{k-1}q_0$ to ${}_{k-1|}q_0$. On the third displayed line, change 0.5 to 0.05.

[7/28/2009] On page 521, in the solution to exercise 33.3, on the first displayed line, change the t's to k's:

$$A = \sum_{k=1}^{3} b_k\, q_{x+k-1} v^k$$

In the fourth displayed equation, change px to p_x.

[7/28/2009] On page 523, in the solution to exercise 33.7, on the last line, the denominator should be 14, not 13.236242.

[7/28/2009] On page 523, in the solution to exercise 33.9, on the third displayed line, the denominator should be 40(0.05) instead of 40.

[7/28/2009] On page 534, replace the last line of the solution to exercise 33.49 with

$$1000\left(\frac{dA'_{60}}{1-A'_{60}}\right) = 1000\left(\frac{0.06(0.36986)}{1.06(1-0.36986)}\right) = \boxed{\mathbf{33.22}}$$

[7/27/2009] On page 400, in the solution to exercise 27.22, on the first line, change vq_{50} to $1000vq_{50}$.

[7/26/2009] On page 450, on the 12th line under "Variance of a deferred annuity", replace $\text{Var}(Y \mid I)$ with $\text{Var}_I(\mathbf{E}[Y \mid I])$.

[7/26/2009] On page 483, in the solution to exercise 31.16, on the second displayed line, $e-0.02(20)$ should be $e^{-0.02(20)}$. On the 7th displayed line, $e^{-1.2}(0.08)$ should be $\dfrac{e^{-1.2}}{0.08}$.

[7/24/2009] On page 449, in equation (30.6), replace $\ddot{a}_{\overline{T(x)|}}$ with $\ddot{a}_{\overline{K(x)+1|}}$.

[7/24/2009] On page 455, in exercise 30.6, change "continous" to "continuous whole"

[7/20/2009] On page 386, change the third sentence of Section 27.2 to

The symbols for the actuarial present values for the functions paying at the end of the year of death are the same as for the functions paying at the moment of death, except there is no bar on the A.

[7/19/2009] On page 383, in the solution to exercise 26.34, on the second line from the end, change 0.21546 to 0.021546.

[7/17/2009] On page 341, in the solution to exercise 24.15, on the 5th displayed line, change $\dfrac{4}{15}$ to $\dfrac{4}{14}$.

[7/17/2009] On page 354 in the solution to exercise 25.3, on the 6th line, replace the second sentence with

We want $\Pr\left(1.864707e^{-0.06T} > 0.5\right)$, or $\Pr\left(e^{-0.06T} > 0.5/1.864707\right)$ and $0.5/1.864707 = 0.268139$, or $\Pr(T < -\ln 0.268139/0.06)$, and $-\ln 0.268139/.06 == 21.9375$.

[7/16/2009] On page 317, in the solution to exercise 23.8, on the second line, change $e^{-1.6}$ to $100{,}000e^{-1.6}$.

[7/16/2009] On page 322, in the solution to exercise 23.27, on the last line, remove the second of the three minus signs; $(7/3)^2$ should be multiplied by the parenthesized expression.

[7/14/2009] On page 280, in the solution to exercise 21.24, on the third line from the end, change $+\dfrac{0.6931}{2}$ to $-\dfrac{0.6931}{2}$.

[7/14/2009] On page 298, in the solution to exercise 22.14, the page reference should be page 287, not page 22.7.

[7/14/2009] On page 300, in the solution to exercise 22.18, on the first displayed line of the page, $\dfrac{5}{24}$ should be $-\dfrac{5}{24}$.

[7/13/2009] On page 215, in the solution to exercise 17.8, on the displayed line, change the subscript $x + t$ to $x + 5$.

[7/9/2009] On page 15, in the solution to exercise 1.14, on the 7th line, change $g(x)$ to $g(n)$.

[7/7/2009] On page 300, in the graph for the solution to exercise 22.19, change l_x to ${}_{x-20}p_{20}$.

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

[7/2/2009] On page 297, in the solution to exercise 22.11, on the second line from the end, change $1 - 0.5(0.6)$ to $1 - 0.5(0.06)$.

[7/2/2009] On pages 303–345, change "actuarial present value" to "present value" in:

- Section 23.1, third paragraph, third sentence.
- Solution to exercise 24.22, first sentence.
- Solution to exercise 24.23, first sentence.

[6/11/2009] On page 214, in the solution to exercise 17.6, on the third line, replace David with Dick.

[5/13/2009] On page 948, in the solution to question 21, on the second line of the page, put parentheses around $\omega - 30$.

[5/13/2009] On pages 978–979, in the solution to question 10, the second expression for $m(t)$ is incorrect. Replace all displayed lines with:

$$m(t) = \begin{cases} t/30 & t \le 45 \\ 45/30 + (t-45)/15 & t \ge 45 \end{cases}$$

$m(t)$ for $t > 45$ can be rearranged as follows:

$$m(t) = \frac{45}{30} + \frac{t-45}{15} = -\frac{3}{2} + \frac{t}{15}$$

Now we integrate the survival function.

$$\begin{aligned} \int_0^\infty s(x)\,\mathrm{d}x &= \int_0^{45} s(x)\,\mathrm{d}x + \int_{45}^\infty s(x)\,\mathrm{d}x \\ &= \int_0^{45} e^{-x/30}\,\mathrm{d}x + \int_{45}^\infty e^{3/2-t/15}\,\mathrm{d}x \\ &= 30\left(1 - e^{-3/2}\right) + 15e^{3/2}e^{-3} \\ &= 30 - 15e^{-3/2} = \boxed{\mathbf{26.653}} \qquad \textbf{(D)} \end{aligned}$$

[5/13/2009] On page 982, in the solution to question 34, on the third displayed line, change $A_{51:\overline{9}|}$ to $A_{50:\overline{10}|}$.

[5/7/2009] On page 730, in the solution to exercise 48.15, on the third displayed line, move the subscript x on the (τ) in the exponent to p: ${}_tp_x^{(\tau)}$.

[5/7/2009] On page 732, in the solution to exercise 48.21, on the last line, move the exponent outside the parentheses into the denominator and remove the parentheses:

$$\frac{6{,}616{,}155^2 - 6{,}396{,}609^2}{8{,}188{,}073^2}$$

[5/3/2009] On page 897, in the solution to question 20, there are a few minor errors on the first displayed line. It should read

$$\frac{\alpha_0^n 100^{n\alpha_0} / \prod (100 + x_i)^{\alpha_0+1}}{\alpha^n 100^{n\alpha} / \prod (100 + x_i)^{\alpha+1}} = \left(\frac{\alpha_0}{\alpha}\right)^n 100^{n(\alpha_0-\alpha)} \prod (100 + x_i)^{\alpha-\alpha_0}$$

[4/29/2009] On page 949, the solution to question 27 is incorrect after the second sentence. The correct solution, starting with the third sentence, is

Conveniently, $\mu_{50}^{(\tau)}(t) = 0.05$ for all t, so ${}_tp_{50}^{(\tau)} = e^{-0.05t}$.

$$\begin{aligned} {}_{10}q_{50}^{(1)} &= \int_5^{10} {}_tp_{50}^{(\tau)}\,\mu_{50}^{(1)}(t)\mathrm{d}t \\ &= 0.02\int_5^{10} e^{-0.05t}\mathrm{d}t \\ &= 0.02\left(\frac{e^{-0.25} - e^{-0.5}}{0.05}\right) = \boxed{\mathbf{0.06891}} \qquad \textbf{(A)} \end{aligned}$$

[4/27/2009] On page 796, in the solution to exercise 54.5, on the sixth displayed line, delete $\frac{1}{2}$ in front of $e^{-1/2}$.

[4/27/2009] On page 809, in the solution to exercise 55.13, on the second line, change $2(1 + 1) = 2$ to $2(1 + 1) = 4$.

[4/26/2009] On page 784, in the sentence after the boldfaced sentence, and the word "know" between "not" and "how". Also, Quiz 53-1 is the same as Example 53D.

[4/23/2009] On page 829, question 9 is defective. Replace it with the following:

A Normal random variable is known to have mean 5. For a sample of five observations from the variable, $\sum_{i=1}^{5}(x_i - 5)^2 = 175$.

Construct a 95% confidence interval of the form (a, ∞) for the variance.

Determine a.

(A) Less than 12
(B) At least 12, but less than 14
(C) At least 14, but less than 16
(D) At least 16, but less than 18
(E) At least 18

[4/23/2009] On page 887, replace the solution to question 9 with the following:

Let σ^2 be the true variance. Let $W = \sum_{i=1}^{5}(x_i - 5)^2/\sigma^2$. Then by the definition of the chi-square distribution, W is a chi-square random variable with 5 degrees of freedom. So

$$\sigma^2 \sim \frac{175}{W}$$

To find the lower bound a of a 95% confidence interval, we use the 95th percentile of W, or 11.070:

$$a = \frac{175}{11.070} = \boxed{\mathbf{15.808}} \qquad \textbf{(C)}$$

[4/19/2009] On page 668, in the solution to exercise 41.2, on the second line, change $0.2k^{-0.8t}$ to $0.2ke^{-0.8t}$.

[4/19/2009] On page 728, in the solution to exercise 48.2, on the second line, change $0.2k^{-0.8t}$ to $0.2ke^{-0.8t}$.

[4/17/2009] On page 1005, in the solution to question 24, on the displayed line, $\ddot{a}_{35:\overline{1}|}$ should be $\ddot{a}_{39:\overline{1}|}$.

[4/12/2009] On page 591, in the solution to exercise 38.3, on the third line, change "present value of future benefits" to "present value of future premiums".

[4/3/2009] On page 536, in the solution to exercise 33.53, move the right parenthesis of the second line past d:

$${}_{15}E_{30}\left(d + \frac{1}{\ddot{a}_{30:\overline{15}|}} - d\right) = \frac{1}{\ddot{s}_{30:\overline{15}|}}$$

[3/31/2009] On page 486, in the solution to exercise 31.31, on lines 5, 4, and 3 from the bottom of the page, change ${}_{9|}\ddot{a}_x$ to ${}_{9|}\ddot{a}_{x+1}$.

[3/25/2009] On page 831, in question 15, divide all the answer choices by 10:

(A) Less than 0.0045
(B) At least 0.0045, but less than 0.0055
(C) At least 0.0055, but less than 0.0065
(D) At least 0.0065, but less than 0.0075
(E) At least 0.0075

[3/24/2009] On page 339, in the solution to exercise 24.7, on the 3th line of the page, there should be a negative sign before the expression:

$$= -\left(\frac{0.02}{0.1}\right)\left(\frac{1}{1+0.1t}\right)\Bigg|_0^{50}$$

[3/24/2009] On page 577, in the solution to exercise 37.9, on the second to last line, change "end of the third year" to "end of the second year".

[3/10/2009] On page 396, the solution to exercise 27.2 is incorrect. The correct solution is

The benefit premium is

$$10{,}000A_{63} = \frac{5233}{1.12} = 4672.32,$$

so $A_{63} = 0.467232$. We use the equation

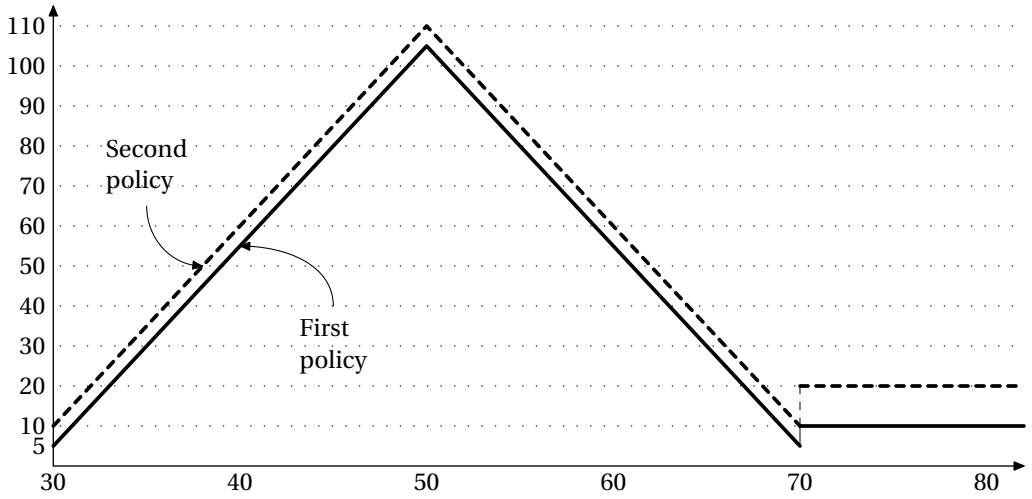
$$A_{63} = vq_{63} + v^2 p_{63}\, q_{64} + v^2\, {}_2p_{63}\, A_{65}$$

and the values of $q_{63} = 0.01788$, $q_{64} = 0.01952$, $l_{63} = 7{,}823{,}879$, $l_{65} = 7{,}533{,}984$ to obtain:

$$\begin{aligned}
{}_2p_{63} &= \frac{l_{65}}{l_{63}} = \frac{7{,}533{,}984}{7{,}823{,}879} = 0.962947 \\
0.467232 &= \frac{0.01788}{1.05} + \frac{(1-0.01788)(0.01952)}{1.05^2} + \frac{0.962947}{1.05^2}A_{65} \\
0.467232 &= 0.017029 + 0.017389 + 0.873422A_{65} \\
A_{65} &= \frac{0.467232 - 0.017029 - 0.017389}{0.873422} = 0.49554
\end{aligned}$$

The contract premium at 65 is $1.12(10{,}000)(0.49554) = 5550$. The earnings rate needed is $\left(\frac{5550}{5233}\right)^{1/2} - 1 =$ **0.030**. **(A)**

[3/4/2009] On page 379, Figure 26.1 is incorrect. The correct figure is



[3/4/2009] On page 799, delete the solution number 54.23.

[3/3/2009] On page 623, in the solution to exercise 40.2, on the first line, there should be a bar over the A.

[3/1/2009] On page 593, in the solution to exercise 38.7, on the third line, replace ${}_{15}\ddot{a}_{10:\overline{30}|}$ with ${}_{15|}\ddot{a}_{10:\overline{30}|}$.

[3/1/2009] On page 593, in the solution to exercise 38.8, "the insurance formula" refers to the insurance-ratio formula, equation (29.2).

[2/23/2009] On page 403, on the second line of the third paragraph, change "present variable" to "present value".

[2/21/2009] On page 177, in question 13.20, in the equation for s_Y^2, there should be a period, not a comma, between 3 and 5: 3.5.

[2/21/2009] On page 187, in exercise 14.3, on the second line, replace $g(x)$ with $g(y)$.

[2/14/2009] On page 261, in the solution to exercise 20.23, on the seventh displayed line, change $\text{Var}(T(30 \wedge 30)$ to $\text{Var}(T(30 \wedge 10)$.

[2/14/2009] On page 678, in the solution to exercise 44.15, on the first displayed line of the page, put negative signs in both numerators so it reads

$$= \frac{1}{5250}\left(\frac{-(75-x)^3}{3}\bigg|_0^{70} - \frac{-5(75-x)^2}{2}\bigg|_0^{70} \right)$$

[1/31/2009] On page 47, in the solution to exercise 3.22, on the last line, change 37,504.8 to 310.0782.

[1/28/2009] On page 151, in Example 11C, the table should have, for substandard classes B and C, 15 and 10 instead of 10 and 5 respectively. On the last displayed line of the answer, the sum of the last two fractions should be $\frac{(15-10)^2}{10} + \frac{(10-10)^2}{10}$.

[1/26/2009] On page 179, in exercise 13.28, there should be a summation sign before $(X_i - \bar{X})^2$.

[1/24/2009] On page 166, in the solution to exercise 12.9, on the fourth line, change "highest" to "lowest".

[1/24/2009] On page 182, in the solution to exercise 13.14, change $\sum X_i$ to $\sum X_i^2$.

[1/24/2009] On page 511, the information in the box at the top should be used for questions 33.20–33.23 (not just for 33.20 and 33.21).

[1/20/2009] On page 15, in the solution to exercise 1.12, 3 lines from the end, change the denominator x to m.

[1/15/2009] On page 420, on the last line of the solution to Example 29B, replace ${}_{30|}\ddot{a}_{35}$ with $\ddot{a}_{35:\overline{30}|}$.

[11/2/2008] On page 795, in exercise 54.20, on the first line after "guests arrive", add the words "in a Poisson process". Change the displayed line to

$$F(t) = t^2 \qquad 0 \le t \le 1$$

[11/2/2008] On page 799, replace the solution to exercise 54.20 with

We must determine the mean value for guests arriving and not being greeted.

Guests arriving from times $t = 0$ to 1 are always greeted. For guests arriving at time $t > 1$, the probability of not being greeted by time 2, since there is $2 - t$ minutes from time t to time 2, is the complement of $F(2-t)$, or $1 - (2-t)^2$. We must integrate 2 guests per minute times this function from 1 to 2. To make the integral easier, we'll change the variable $u = t - 1$ and integrate 2 guests per minutes times $1 - (1-u)^2$ from 0 to 1 to obtain the mean value:

$$\int_0^1 2\left[1-(1-u)^2\right]\mathrm{d}u = 2 + \frac{2}{3}(1-u)^3\bigg|_0^1 = \frac{4}{3}$$

The probability that at least 1 guest is ungreeted is $1 - e^{-4/3} = \boxed{\mathbf{0.736403}}$.

[10/29/2008] On page 537, on the first line of the answer to Example 34A, change "25th" to "75th".

[10/24/2008] On page 135, in the solution to exercise 9.4, on the second displayed line, change $\sqrt{50}n$ to $\sqrt{50/n}$.

[10/22/2008] On page 64, the final answer to exercise 4.2 should be $\boxed{\textbf{13/60}}$.

[10/22/2008] On page 98, in exercise 6.8 choice A, delete an equal sign.

[10/22/2008] On page 140, in exercise 10.4, on the first line, replace "by" with "be".

[10/22/2008] On page 449, in the paragraph before Example 30A, it is stated that all the formulas can be used for annuities-due by replacing δ with d. Actually, in the last formula, ${}^2\bar{A}_x = 1 - (2\delta)\,{}^2\bar{a}_x$, 2δ should be replaced with d at twice the force of interest, which is $2d - d^2$.

[10/4/2008] On page 173, the last 2 lines of the solution to Example 13F should read:

$$\begin{aligned} R^2 &= \frac{F_{1,N-2}}{N-2+F_{1,N-2}} \\ &= \frac{3.4596}{13+3.4596} = \boxed{\textbf{0.2102}} \end{aligned}$$

[9/13/2008] On page 756, in the solution to exercise 50.16, on the fifth line, change "is 0.1, for a product of 0.05" to "is 0.2, for a product of 0.1".

[9/7/2008] On page 139, on the first line, replace $\frac{\bar{X}}{S}$ with $\frac{\bar{X}-\mu}{S/\sqrt{n}}$.

[9/7/2008] On page 287, in the solution to Example 22E, on the second line, replace 0.9^k with 0.99^k.

[9/7/2008] On page 310, in exercise 23.9, replace all 7 λ's with δ's.

[8/24/2008] On page 146, in the solution to exercise 10.16, on the third line, change 5th to 2.5th.

[7/25/2008] On pages 215–216, in the solution to exercise 17.9, on the 4th displayed line, replace the denominator vw with uv. Replace 0.948574 with 0.948514 on the third from last line and the last line.

[7/21/2008] On page 355, in the solution to exercise 25.5:

- On the second and third lines, reverse the inequalities: $1.06^{-T(35)} > 0.7$ and $1.06^{-T(35)} > 0.35$.
- On the second line from the end, change $l_{35} +$ to $l_{35} =$.
- On the last two lines, change 9,184,051 to 9,164,051, which affects the final answer. The last line should read
$$1 + \frac{-9{,}283{,}908 + 9{,}164{,}051 - 8{,}778{,}004}{9{,}420{,}657} = \boxed{\textbf{0.05549}}$$

[7/21/2008] On page 357, the last 2 lines of the solution to exercise 25.12 are incorrect. The correct lines are

$$t = 60(0.4) = 24$$

The value of Z is $(40 - 24)e^{-24(0.05)} = \boxed{\textbf{4.8191}}$.

[7/21/2008] On page 360, in the solution to exercise 25.21, replace the final answer of 1.5125 with $e^{1.5125} = 4.5380$.

[7/20/2008] On page 347, in the boldfaced line, replace $1 - 100p^{\text{th}}$ with $100(1-p)^{\text{th}}$.

[7/20/2008] On page 354, in the solution to exercise 25.1, replace the last expression (starting after "which is") with $1 - e^{-0.01(10)-0.02(20)} = 1 - e^{-0.5} = \boxed{\textbf{0.3935}}$.

[7/20/2008] On page 695, on the 2nd and 4th lines of the page, change 7.142957 to 7.142857.

[7/14/2008] On page 478, in exercise 31.31, on the fifth line, change "the" to "then".

[7/13/2008] On page 277, in the solution to exercise 21.11, on the 4th displayed line, e_x should be e'_x.

[7/13/2008] On page 413, on the last line, SOA MLC-S07:24 belongs to lesson 29.