Errata and updates for ASM Exam MLC (Eighth Edition) sorted by page

Practice exam 4:20 and 8:27 are defective in that none of the five answer choices is correct.

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

[8/4/2009] On pages 5–6, in Section 1.3, $\Pr(B) \neq 0$ and $f(y) \neq 0$ are necessary for the definitions of conditional probability.

[7/9/2009] On page 16, in the solution to exercise 1.14, on the 7th line, change $g(x)$ to $g(n)$.

[8/4/2009] On page 20, one line after Example 2A, add the word "independent": "... from n independent identically distributed ...".

[7/29/2009] On page 20, on the third line of Section 2.2, change "determines" to "determine".

[7/9/2009] On page 21, on the second displayed line, change 0.4889 to 0.5367.

[1/24/2010] On page 29, in the solution to exercise 2.4, on the fourth line, change Var(mn) to Var(mN).

[8/31/2009] On page 32, in the solution to exercise 2.14, on the second line from the end, delete a plus sign between 0.0064 and 0.183125.

[7/22/2010] On page 37, on the third line of the paragraph starting with "2" in Section 3.2, change "on starts" to "one starts".

[6/11/2009] On page 42, in the solution to exercise 3.6, on the third line, replace David with Dick.

[7/13/2009] On page 43, in the solution to exercise 3.8, on the displayed line, change the subscript $x + t$ to $x + 5$.

[7/13/2009] On page 44, in the solution to exercise 3.9, replace 0.948574 with 0.948514 on the third from last line and the last line.

[8/31/2009] On page 46, 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, ${}_tp_x = (65 + x)/(65 + x + t)$.

[7/12/2009] On page 50, in Table 4.1, on the second to last line, replace ${}_tp_x\, e^k$ with ${}_tp_x\, e^{-kt}$. On the last line, replace $\mu x(t)$ with $\mu_x(t)$ and "for all k" with "for all t".

[8/31/2009] On page 54, in exercise 4.22, on the third line, change q_x to q_{30}.

[8/24/2009] On page 60, in the solution to exercise 4.15 part 2, put dx after the integrand $0.05(1.01)^x$.

[6/28/2010] On page 62, in the solution to exercise 4.25, 3 lines from the end, change "legs of lengths 0 and 1" to "legs of length 0.5 and 1".

[8/2/2009] On page 64, in the solution to exercise 4.35, put a negative sign before the integral in the first and second displayed lines.

[1/24/2010] On page 68, on the second line of the answer to Example 5A, change $\omega = 70$ to $\omega - x = 70$.

[8/31/2009] On page 87, in the solution to exercise 6.1, replace "negative the exponentiated integral" with "the exponential of the negative integral".

[7/14/2009] On page 111, in the solution to exercise 7.25, on the third line from the end, change $+\dfrac{0.6931}{2}$ to $-\dfrac{0.6931}{2}$.

[7/14/2009] On page 122, in Table 8.1, on the third row under "Constant force of mortality", change p_x^2 to p_x^s.

[9/3/2009] On page 122, in Table 8.1, on the sixth row under "Constant force of mortality", put a minus sign before (p_x^s).

[9/3/2009] On page 122, on the third line, add ds after the left hand side integral.

[7/2/2009] On page 134, in the solution to exercise 8.12, on the second line from the end, change $1 - 0.5(0.6)$ to $1 - 0.5(0.06)$.

[9/3/2009] On page 135, in the solution to exercise 8.13, 4 lines from the end, delete one of the 1's after "are".

[5/25/2010] On page 135, in the solution to exercise 8.14, on the 6th line, the left hand side should be $\mathbf{E}[(T \wedge 2)^2]$.

[7/14/2009] On page 135, in the solution to exercise 8.15, the page reference should be page 117, not page 8.8.

[7/14/2009] On page 137, in the solution to exercise 8.19, on the second displayed line of the page, $\frac{5}{24}$ should be $-\frac{5}{24}$.

[7/7/2009] On page 137, in the graph for the solution to exercise 8.20, change l_x to ${}_{x-20}p_{20}$.

[6/28/2010] On page 138, in the solution to exercise 8.22, on the second line, delete the period in 7,126,0.36.

[8/20/2009] On page 141, in the solution to exercise 8.38, in II, change the numerator from $13q_x$ to $\frac{1}{3}q_x$.

[7/8/2009] On page 141, in the solution to exercise 8.40, on the second displayed line, change ${}_{2|0.5}q_{x+2}$ to ${}_{2|0.5}q_x$.

[7/15/2009] On page 145, on the first 2 displayed lines of the page, change 9,683,267 to 9,683,297.

[7/15/2009] On page 151, in exercise 9.19, in the second table, delete the word "midrule".

[7/15/2009] On page 156, in the solution to exercise 9.9, on the fifth line, change l_{98} to q_{98}.

[7/2/2009] On pages 161–203, change "actuarial present value" to "present value" in:

- Section 10.1, third paragraph, third sentence.
- Example 10D, the sentence starting "Let Z be".
- Example 10D answer, second sentence.
- Example 10F, the sentence starting "Z is".
- Solution to exercise 11.22, first sentence.
- Solution to exercise 11.23, first sentence.

[7/16/2009] On page 163, 4–5 lines from the bottom, add dt after the integral and delete the line with ddt.

[7/16/2009] On page 165, 3 lines from the bottom, change "prsent" to "present".

[2/24/2010] On pages 166–167, replace the last three lines of page 166 and the first three lines of page 167 with

For the deferred insurance, we will use formula

$$\bar{A}_x = {}_xE_x\, A_{x+n}$$

First we calculate the 5-year pure endowment at δ and 2δ; $\mu = 0.01$ in this period.

$$\begin{aligned} {}_5E_x &= e^{-5(0.01+0.06)} = 0.704688 \\ {}^2_5E_x &= e^{-5(0.01+0.12)} = 0.522046 \end{aligned}$$

Then we calculate A_{x+5} at δ and 2δ; $\mu = 0.02$ in this period.

$$\bar{A}_{x+5} = \frac{\mu}{\mu+\delta} = \frac{0.02}{0.02+0.06} = 0.25$$
$$^2\bar{A}_{x+5} = \frac{\mu}{\mu+2\delta} = \frac{0.02}{0.02+0.12} = \frac{1}{7}$$

[9/25/2009] On page 168, in the answer to Example 10F, on the second displayed line, change the first exponent to $-[0.01 + 2(0.03)](10)$

[7/16/2009] On page 177, in the solution to exercise 10.5, on the first line, change $\bar{A}_{x+t}$ to $\bar{A}_{x+3}$.

[8/8/2009] On page 177, in the solution to exercise 10.7, 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.

[7/16/2009] On page 177, in the solution to exercise 10.8, on the second line, change $e^{-1.6}$ to $100{,}000e^{-1.6}$.

[9/9/2009] On pages 178–179, the solution to exercise 10.13 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

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

[7/16/2009] On page 181, in the solution to exercise 10.27, on the last line, remove the second of the three minus signs; $(7/3)^2$ should be multiplied by the parenthesized expression.

[6/14/2010] On page 182, in the solution to exercise 10.29, on the first displayed line, change 0.4 to 0.04.

[1/21/2010] On page 196, in the solution to exercise 11.5, on the second line, delete $\int_0^{60} e^{-0.06t}\mathrm{d}t$. On the fourth line, change "interest rate" to "force of interest".

[1/21/2010] On page 197, in the solution to exercise 11.9, replace $\bar{a}_{\overline{75}|}$ with $\bar{a}_{\overline{25}|}$ on the first and fourth displayed lines.

[7/17/2009] On page 199, in the solution to exercise 11.15, on the 5th displayed line, change $\frac{4}{15}$ to $\frac{4}{14}$.

[7/17/2009] On page 213 in the solution to exercise 12.3, 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 $-\ln 0.268139/.06 = 21.9375$.

[9/9/2009] On page 214, in the solution to exercise 12.10, on the first line, replace λ with δ.

[9/8/2010] On page 216, in the solution to exercise 12.16, on the second displayed line, replace the integrand $e^{-0.01t}\mathrm{d}t$ with $0.01t\,\mathrm{d}t$.

[5/4/2010] On page 222, on the third line before the answer to Example 13A, change "or" to "of".

[9/9/2009] On page 235, in exercise 13.36, on the second line after the table, add "age 49" at the end of the sentence after "100 lives".

[7/19/2009] On page 243, in the solution to exercise 13.34, on the second line from the end, change 0.21546 to 0.021546.

[7/20/2009] On page 246, change the third sentence of Section 14.2 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.

[7/27/2009] On page 260, in the solution to exercise 14.23, on the first line, change vq_{50} to $1000vq_{50}$.

[7/21/2009] On page 268, in the solution to exercise 15.3, delete the half-sentence "We calculate ... formula".

[7/21/2009] On page 268, in the solution to exercise 15.4, on the sixth line, change ${}_{10}^{2}E38$ to ${}_{10}^{2}E_{38}$.

[2/21/2010] On page 273, on the first line, replace $a_{\overline{T}|}$ with $\bar{a}_{\overline{T}|}$.

[9/15/2009] On page 282, in the solution to exercise 16.7, on the 6th line, replace 0.09 + 0.3 = 0.09 with 0.09 + 0.03 = 0.12.

[9/9/2009] On page 309, in the solution to exercise 17.14, the last line should read

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

[9/20/2010] On page 313, in the solution to exercise 17.31, on the second line, interchange the subscripts on the A's:

$$= \frac{1 - A_{25:\overline{20}|}}{d} - \frac{1 - A_{20:\overline{10}|}}{d}$$

[7/24/2009] On page 317, in equation (18.6), replace $\ddot{a}_{\overline{T(x)}|}$ with $\ddot{a}_{\overline{K(x)+1}|}$.

[7/26/2009] On page 318, on the 12th line under "Variance of a deferred annuity", replace $\text{Var}(Y \mid I)$ with $\text{Var}_I(\mathbf{E}[Y \mid I])$.

[8/6/2009] On page 320, on the last line of the page, (-1266.67^2) should be $(-1266.67)^2$.

[7/24/2009] On page 323, in exercise 18.6, change "continous" to "continuous whole"

[11/18/2009] On page 328, in the solution to exercise 18.1, in the second bullet, change $E[T(x)]^2$ to $\mathbf{E}[T(x)^2]$.

[9/9/2009] On page 328, in the solution to exercise 18.2, on the second displayed line, move the double-dot off the E to $a_{x:\overline{30}|}$.

[9/9/2009] On page 330, in the solution to exercise 18.9, on the fourth line, change ${}_tq_{30}$ to ${}_{t|}q_{30}$.

[8/31/2010] On page 334, in the solution to exercise 18.22, on the fourth line, the lower limit of the sum should be 0 instead of 1.

[4/9/2010] On page 336, in the solution to exercise 18.27, change "is" to "if".

[9/15/2009] On page 339, on the last line (twice), and on page 340, line 6, replace $\bar{a}_{x:\overline{n}|}$ with $\bar{a}_{\overline{n}|}$.

[7/17/2009] On page 341, in Example 19A(ii), change $\dfrac{60-x}{x}$ to $\dfrac{60-t}{60}$.

[8/6/2009] On page 352, in the solution to exercise 19.6, on the last line, remove the minus sign from the exponent.

[12/5/2009] On page 354, in the solution to exercise 19.14, on the 6th displayed line, change t to T.

[4/21/2010] On page 354, in the solution to exercise 19.15, change the left hand side of the second displayed line from ${}_{3|}\bar{a}_t$ to ${}_{3|}\bar{a}_{\overline{t-3}|}$.

[7/26/2009] On page 355, in the solution to exercise 19.16, 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 $\dfrac{e^{-1.2}}{0.08}$.

[9/15/2009] On page 359, in the solution to exercise 19.32, on the last line, replace $u(65)$ with $u(64)$.

[7/26/2009] On page 366, in the solution to exercise 20.5, on the third and fourth lines, replace 0.095897 by 0.0956897, once on each line.

[9/15/2009] On page 368, in the solution to exercise 20.14, on the first displayed line, interchange $\bar{A}_{70}$ and A_{70}.

[9/23/2009] On page 387, in exercise 22.3, on the first line, change fullY to fully.

[7/28/2009] On page 402, in the solution to exercise 22.1, 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.

[4/7/2010] On page 403, in the solution to exercise 22.3, on the first displayed line, change the t's to k's, and insert ${}_{k-1}p_x$:

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

In the fourth displayed equation, change px to p_x.

[7/28/2009] On page 405, in the solution to exercise 22.7, on the last line, the denominator should be 14, not 13.236242.

[7/28/2009] On page 405, in the solution to exercise 22.9, on the third displayed line, the denominator should be 40(0.05) instead of 40.

[9/23/2009] On page 410, in the solution to exercise 22.25, on the 6th and 8th lines, put double-dots on the three a's that don't have them.

[11/18/2009] On page 416, in the solution to exercise 22.47, on the first line of the page, change $\dfrac{1}{\ddot{a}_2 0}$ to $\ddot{a}_{20}$.

[7/28/2009] On page 416, replace the last line of the solution to exercise 22.49 with

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

[7/31/2009] On page 419, on the last line of Example 23A, delete the word "benefit".

[8/2/2009] On page 423, the solution to exercise 23.7 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 436, in the solution to exercise 24.16, on the fourth line of the page, change "v^T otherwise" to "v^n otherwise".

[7/29/2009] On page 446, in the solution to exercise 25.7, on the fourth displayed line, the line should end with 1.7763, and $\dfrac{P}{d} = 0.7763$ should be placed a separate line.

[9/23/2009] On page 447, in the solution to exercise 25.11, replace the third displayed line with

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

[5/16/2010] On page 449, in the solution to exercise 25.17, on the second line, change "loss exceeds" to "gains exceed".

[8/17/2009] On page 451, in the solution to Example 26A:

- Change $A_{60} - {}_{20}E_{60}A_{80}$ to $1000A_{60} - 1000\,{}_{20}E_{60}\,A_{80}$ on the first displayed line.
- Change $\bar{A}_{60:\overline{20|}}$ to $1000\bar{A}_{60:\overline{20|}}$ on the last displayed line.

[8/3/2009] On page 459, on the fourth line of the second paragraph, delete the word "benefit".

[9/23/2009] On page 461, in the answer to Example 27C part 2 two lines from the end, change ${}^{20}_{15}V_x$ to ${}^{20}_{15}V_{40}$.

[8/3/2009] On page 470, in the solution to exercise 27.12, on the 4th displayed line, change 0.46587 to 0.046587.

[8/23/2010] On page 485, in the solution to exercise 28.7, on the fourth line, put a double-dot over $a_{x:\overline{3|}}$.

[8/3/2009] On page 486, in the solution to exercise 28.13, on the 4th line, change $\overset{(2)}{V}$ to ${}_tV^{(2)}$.

[2/10/2010] On page 488, in the solution to exercise 28.19, on the second to last line, change $\bar{a}_{50:\overline{10|}}$ to $\bar{a}_{50:\overline{7|}}$.

[8/4/2009] On page 500, in the solution to exercise 29.1, on the third displayed line, change ${}_{10}V_{50:\overset{1}{\overline{20|}}}$ to ${}_{10}V^{1}_{50:\overline{20|}}$.

[8/4/2009] On page 501, in the solution to exercise 29.6, on the displayed line, change the ${}_t\bar{V}(\bar{A}_{x+t})$ to ${}_t\bar{V}(\bar{A}_x)$

[2/10/2010] On page 502, in the solution to exercise 29.14, on the third displayed line, change B to $\dfrac{B}{1000}$.

[8/4/2009] On page 504, in the solution to exercise 29.20, on the last line, change ${}_{20}V_{35}$ to ${}_{20}V_{25}$.

[8/4/2009] On page 504, in the solution to exercise 29.21, on the second line from the end, change $1 - 0.1(0.4)$ to $1 - 0.1(4)$.

[9/23/2009] On page 506, in the solution to exercise 29.27, on the first displayed line, change P_x to P_{36}.

[8/4/2009] On page 506, in the solution to exercise 29.29, on the fifth line, "five ratios" should be two words.

[10/27/2009] On page 509, in the first displayed formula, replace $\text{Var}({}_tL \mid T(x) \geq t)$ with $\text{Var}({}_tL \mid T(x) > t)$.

[3/24/2010] On page 511, in exercise 30.5, while this question is the one that appeared on the old exam, the intended question was " Calculate $\dfrac{\text{Var}\Big({}_tL \mid T(x) > t\Big)}{\text{Var}\Big({}_{t+1}L \mid T(x) > t+1\Big)}$" instead of what is on the last line.

[4/26/2010] On page 517, in the solution to exercise 30.16, put bars on the A_{25} on the third displayed line and the A_{50} on the fourth displayed line.

[4/12/2010] On page 521, in exercise 31.3(iii), change ${}_{10}E_x$ to ${}_{10}E_{50}$.

[8/5/2009] On page 535, in the solution to exercise 31.16, 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 536, in the solution to exercise 31.18, on the first displayed line, change A_{x+20} to $1000A_{x+20}$.

[9/23/2009] On page 541, two lines from the bottom of the page, delete one of the two consecutive "the"'s

[9/23/2009] On page 543, on the second line of the answer to Example 32C, replace q_{x_t-1} with q_{x+t-1}.

[8/9/2009] On page 553, in exercise 32.24, on the last line, change "understates" to "overstates".

[2/13/2010] On page 558, in the solution to exercise 32.8, on the sixth line, change the left-hand side to $v^{t-1}\pi - v^t$.

[11/18/2009] On page 560, in the solution to exercise 32.17, on the first line, change ${}_2V\left(\bar{A}^{1}_{40:\overline{10|}}\right)$ to ${}_2V\left(\bar{A}_{40:\overline{10|}}\right)$ — the term insurance should be an endowment insurance.

[8/15/2009] On page 566, two lines below the 4th displayed equation, change $s_{T(x),T(y)}(t)$ to $s_{T(x),T(y)}(t,t)$.

[8/12/2009] On page 568, in equation (33.2), change the last ${}_tq_{xy}$ to ${}_tq_x\,{}_tq_y$.

[3/1/2010] On page 576, in the solution to exercise 33.5, on the first two displayed lines, remove the line in the presubscripts of p_{xy}.

[11/18/2009] On page 582, on the 11th line, change "to age $x + t$" to "to ages $x + t$ and $y + t$".

[11/18/2009] On page 583, in the solution to Example 34B, the values of ${}_tp_{80}$ and ${}_tp_{82}$ for $t = 2$ and $t = 3$ are interchanged on the 2nd, 3rd, 8th, and 10th lines of the answer.

[9/23/2009] On page 584, in Table 34.1, five minus signs are missing: on the first line, $\mu_s(t) = -(\mathrm{d}_t p_s/\mathrm{d}t) \div {}_tp_s$. On the second line and fourth lines, put a minus before the right hand side. On the fourth and eighth lines, put a minus sign before the left hand side. On the first, second, fourth, and eight lines, remove ln from the numerator $\mathrm{d}\ln {}_tp_{\overline{xy}}$.

[3/8/2010] On page 594, in the solution to exercise 34.19, on the second displayed line, change the upper bound of the integral from 2 to 3.

[8/12/2009] On page 595, in the solution to Quiz 34-2, the last line should be

$$\mu_{\overline{60:60}}(10) = \frac{2(1-e^{-0.1})e^{-0.1}(0.01)}{2e^{-0.1}-e^{-0.2}} = \frac{0.0017221}{0.990944} = \boxed{\mathbf{0.001738}}$$

[3/9/2010] On page 597, on the first line of the answer to Example 35A, change "joint status" to "last survivor status".

[2/17/2010] On page 598, two lines below equation (35.3), change the + to a −:

$$= \mathring{e}_x - \tfrac{2}{3}\mathring{e}_x^2\mu_y$$

[5/16/2010] On page 600, on the first line of Example 35E, change $1/(100-t)$ to $1/(60-t)$.

[11/18/2009] On page 601, in the answer to Example 35E, on the first displayed line, the integrand on the left is missing a t and should be $t\,{}_tp_{40:40}\,\mathrm{d}t$.

[9/23/2009] On page 606, in the solution to exercise 35.11, change all eleven x's to t's.

[10/22/2010] On page 607, in the solution to exercise 35.13, on the first two displayed lines, change $\mathring{e}_{0:0}$ to $\mathring{e}_{0:0:\overline{5}|}$.

[2/22/2011] On page 609, in the solution to exercise 35.21, on the sixth line, delete "integral of the". Three lines from the end, add "du" after "d$t = 5/\sqrt{u}$". Three lines from the end, change "subtituting" to "substituting".

[7/2/2009] On page 612, on the second to last line of Example 36B, delete the word "actuarial".

[3/18/2010] On page 612, change the last three lines of the solution to Example 36B to

$$\mathbf{E}[0.001Z] = 2(0.24905) - 0.34049 = 0.15761$$
$$\mathbf{E}[(0.001Z)^2] = 2(0.09476) - 0.15641 = 0.03311$$
$$\mathrm{Var}(Z) = 1000^2(0.03311 - 0.15761^2) = \boxed{\mathbf{8269.1}}$$

[10/6/2009] On page 621, in the solution to exercise 36.10, on the second line, put a bar over $A_{\overline{xy}}$.

[10/6/2009] On page 623, in the solution to exercise 36.19, on the fourth displayed line, the bar over 1 should be over P.

[3/8/2010] On page 624, in the solution to exercise 36.20, on the second displayed line, delete "1 − " on the right hand side.

[8/21/2009] On page 624, the solution to Quiz 36-1 is incorrect. The correct solution is

We calculate the two single-life endowment insurances and the joint-life endowment insurance, the latter using $\mu_{xy}(t) = 0.03$.

$$\bar{A}_{x:\overline{10|}} = \left(\frac{0.01}{0.01+0.06}\right)(1-e^{-0.7}) + e^{-0.7} = 0.568502$$
$$\bar{A}_{y:\overline{10|}} = \left(\frac{0.02}{0.02+0.06}\right)(1-e^{-0.8}) + e^{-0.8} = 0.586997$$
$$\bar{A}_{xy:\overline{10|}} = \left(\frac{0.03}{0.03+0.06}\right)(1-e^{-0.9}) + e^{-0.9} = 0.604380$$
$$\bar{A}_{\overline{xy}:\overline{10|}} = 0.568502 + 0.586997 - 0.604380 = 0.55112$$

The single benefit premium is $\boxed{\mathbf{551.12}}$.

[9/25/2009] On page 625, in the answer to Example 37A, on the 6th line, replace ${}_2q_x$ with ${}_3q_x$.

[11/18/2009] On page 626, in the answer to Example 37B, on the third line, change "an joint-life" to "a joint-life".

[3/22/2010] On page 628, Quiz 37-2 as stated is a difficult contingent survival question. Replace the first sentence with:

An annuity-due on (45) and (55) pays 100 per year until the later of the death of (55) and 30 years from the current date, but does not make any payments while (45) is alive.

[10/6/2009] On page 629, in the answer to Example 37E, on the third line from the end, replace ${}_{5|15}\bar{a}_{55}$ with ${}_{5|10}\bar{a}_{40:55}$. On the next line, replace the last ${}_{5|15}\bar{a}_{55}$ with ${}_{5|10}\bar{a}_{40:55}$.

[10/6/2009] On page 629, on the second line of Example 37F, delete the apostrophe before (65).

[11/18/2009] On page 630, 3 lines before Section 37.4, change the first minus sign to an equals sign:

$$= {}_{10}E_{55}\,(a_{65} - a_{65:65})$$

[10/6/2009] On page 645, in the solution to exercise 37.21, three lines from the end, replace the subscript $\overline{y:y}:\overline{n|}$ with $\overline{y:y}:\overline{10|}$.

[9/25/2009] On page 646, in the solution to exercise 37.23, on the second line of the page, $30E_{20}$ should be ${}_{30}E_{20}$.

[8/19/2009] On page 646, the calculation of $\text{Var}(Y_1)$ and $\text{Var}(Y_2)$ in the solution to exercise 37.25 is incorrect. The correct solution is

Let Y_1 be the present value random variable for an annuity of 1 on the joint status and Y_2 the present value random variable for an annuity of 1 on the last survivor status. Then $Y = 10(Y_2 - Y_1)$, so

$$\text{Var}(Y) = 100\,\text{Var}(Y_2) + 100\,\text{Var}(Y_1) - 200\,\text{Cov}(Y_1, Y_2)$$

Let's calculate these moments.

$$\bar{A}_x = \frac{0.005}{0.005+0.05} = 0.090909$$
$$\bar{A}_y = \frac{0.025}{0.025+0.05} = 0.333333$$
$$\bar{A}_{xy} = \frac{0.03}{0.03+0.05} = 0.375$$
$$\bar{A}_{\overline{xy}} = 0.090909 + 0.333333 - 0.375 = 0.049242$$
$${}^2\bar{A}_x = \frac{0.005}{0.005+0.1} = 0.047619$$

$$
\begin{aligned}
{}^2\bar{A}_y &= \frac{0.025}{0.025+0.1} = 0.2 \\
{}^2\bar{A}_{xy} &= \frac{0.03}{0.03+0.1} = 0.230769 \\
{}^2\bar{A}_{\overline{xy}} &= 0.047619 + 0.2 - 0.230769 = 0.016850 \\
\text{Var}(Y_1) &= \frac{0.230769 - 0.375^2}{0.05^2} = 36.05769 \\
\text{Var}(Y_2) &= \frac{0.016850 - 0.049242^2}{0.05^2} = 5.77000 \\
\text{Cov}(Y_1, Y_2) &= \frac{(0.090909 - 0.375)(0.333333 - 0.375)}{0.05^2} = 4.73489 \\
\text{Var}(Y) &= 100(36.05769) + 100(5.77000) - 200(4.73489) = \boxed{\mathbf{3235.79}}
\end{aligned}
$$

[8/18/2009] On page 647, the last 4 lines of the solution to Quiz 37-2 are incorrect. Replace them with:

$$
\begin{aligned}
\ddot{a}_{45:\overline{55:30|}} &= \ddot{a}_{45:55} + \ddot{a}_{45:\overline{30|}} - \ddot{a}_{45:55:\overline{30|}} \\
&= \ddot{a}_{45:55} + \ddot{a}_{45} - {}_{30}E_{45}\,\ddot{a}_{75} - \ddot{a}_{45:55} + {}_{30}E_{45:55}\,\ddot{a}_{75:85} \\
{}_{30}E_{45:55} &= {}_{30}E_{45}\left(\frac{l_{85}}{l_{55}}\right) = (0.10252)\left(\frac{2{,}358{,}246}{8{,}640{,}861}\right) = 0.02798 \\
\ddot{a}_{45:\overline{55:30|}} &= 14.1121 - (0.10252)(7.2170) + (0.02798)(3.9099) = 13.4816 \\
100\ddot{a}_{45|\overline{55:30|}} &= 100(14.8140 - 13.4816) = \boxed{\mathbf{133.24}}
\end{aligned}
$$

[11/18/2009] On page 651, on the last line of the page, change "probability density function of (40)" to "probability density function of (45)".

[10/6/2009] On page 656, in Table 38.1 "Relationships for Insurances", either put bars on all the A's or remove them from all the A's on these four lines.

[4/20/2010] On page 666, in the solution to exercise 38.15, on the third displayed line, change t^2 to $\frac{1}{2}t^2$.

[8/21/2009] On page 668, the solution to exercise 38.24 is incorrect. The correct solution is

The single benefit premium is obtained by integrating the density of (70)'s mortality at t, which is 1/30 for $t \le 30$, times the probability of (80) not surviving to t, discounting with interest:

$$
\begin{aligned}
\bar{A}^2_{70:80} &= \int_0^{30} \frac{1}{30}(1 - e^{-0.05t})e^{-0.03t}\,\mathrm{d}t \\
&= \frac{1}{30}\left(\int_0^{30}\left(e^{-0.03t} - e^{-0.08t}\right)\mathrm{d}t\right) \\
&= \frac{1}{30}\left(\frac{1 - e^{-0.9}}{0.03} - \frac{1 - e^{-2.4}}{0.08}\right) \\
&= \frac{19.78101 - 11.36603}{30} = 0.28050
\end{aligned}
$$

To calculate the single-life premium annuity, we calculate the insurance

$$
\bar{A}_{70} = \frac{\bar{a}_{\overline{30|}}}{30} = \frac{1 - e^{-0.9}}{0.9} = 0.659367
$$

and then calculate the annuity

$$\bar{a}_{70} = \frac{1 - \bar{A}_{70}}{\delta} = \frac{1 - 0.659367}{0.03} = 11.3544$$

The annual benefit premium is $1000(0.28050)/11.3544 = \boxed{\mathbf{24.70}}$.

[9/25/2009] On page 673, on the second displayed line of the page, $e^{-0.01t^2}$ should be $e^{-0.01t^3}$, and $e^{-0.01t}$ should be $e^{0.01t}$.

[10/6/2009] On page 684, in Section 40.2, in the third and fourth displayed equations, change the subscripts on the d's from $x + k + 1$ to $x + k$.

[10/4/2009] On page 693, in exercise 40.16(ii), replace $c = 0, 1, 2$ with $k = 0, 1, 2$.

[3/1/2010] On page 695, exercise 40.23, change (iii) to

The probability that an entering student fails in the first year is twice the probability that a student who completed the first year fails in the second year.

[10/6/2009] On page 701, in the solution to exercise 40.23, on the first line, replace "voluntarily" with "leaving voluntarily in the second year".

[11/18/2009] On page 707, in the answer to Example 41C, 3 lines from the end in the integrand, change ${}_{10}p_x^{(\tau)}$ to ${}_tp_x^{(\tau)}$

[3/8/2010] On pages 715–716, in the solution to exercise 41.3, on the first displayed line (page 715) and the first line of page 716, replace $\mu_{(}^{(2)}20)$ with $\mu_{40}^{(2)}(20)$.

[3/8/2010] On page 716, in the solution to exercise 41.4, replace $\mu_{20}^{(\tau)}$ with $\mu_{40}^{(\tau)}(20)$ and $\mu^{(2)}$ with $\mu_{40}^{(2)}(20)$.

[10/6/2009] On page 717, in the solution to exercise 41.13, eight lines from the end, put a "5" before ${}_5p_x^{(\tau)}$.

[2/23/2011] On page 717, in the solution to exercise 41.13, four lines from the end, change $e^{-0.015}$ to $e^{-0.15}$

[10/6/2009] On page 719, in the solution to exercise 41.22, two lines from the bottom of the page, change $e^{-\mu^{(\tau)}}$ to $e^{-t\mu^{(\tau)}}$.

[10/6/2009] On page 721, in the solution to exercise 41.27, three lines from the end, delete the equals sign at the beginning of the line.

[3/22/2010] On page 726, on the last line of the answer to Example 42C, change the numerator's signs so that it reads $3(50 - t)(60 - t)^2 + 60^3 - (60 - t)^3$.

[10/6/2009] On page 726, in the last displayed equation, all t's in the last integrand should be s's:

$${}_tq_x^{(j)} = \int_0^t {}_sp_x^{(\tau)}\,\mu_x^{(j)}(s)\,\mathrm{d}s = \int_0^t {}_sp_x^{\prime(-j)}\,{}_sp_x^{\prime(j)}\,\mu_x^{(j)}(s)\,\mathrm{d}s$$

On the following line, the expression after "then" should be ${}_sp_x^{\prime(j)}\,\mu_x^{(j)}(s)$.

[10/6/2009] On page 727, in Table 42.1, in step 3 of going from probabilities to rates, ${}_tp_x^{(j)}$ should be ${}_tp_x^{\prime(j)}$.

[10/6/2009] On page 733, in the solution to exercise 42.8, 4 lines from the bottom, change -0.780556 to $= 0.780556$.

[10/6/2009] On page 735, in the solution to exercise 42.13, on the fifth and sixth lines of the page, the integrals should have bounds of 0 and 2.

[8/25/2009] On page 736, in the solution to exercise 42.15, make the following corrections:

- On the 3rd and 4th displayed lines on the page, change $20 - t$ to $20 + t$.
- Change the 7th line to

  Then ${}_6p_x^{\prime(1)} = (4^{1/3})(26^{-1/3})/(10^{1/3})(20^{-1/3}) = \boxed{\mathbf{0.675106}}$.

- On the last two displayed lines, change $20 - t$ to $20 + t$.

[10/6/2009] In the solution to exercise 42.16, on the last line of the page, $\mu_{64}(t)$ should be $\mu_{64}^{(1)}(t)$.

[8/3/2009] On page 741, in the solution to Example 43B, on the 6th line from the end, change $p_{35}^{(3)}$ to $p_{35}'^{(3)}$. On the last 4 lines, change 0.2676 to 0.2476 in three places. Change the final answer to 0.194210.

[10/6/2009] On page 742, four lines from the bottom of the page, ${}_tq_x'^{(2)}$ should be $q_x'^{(2)}$.

[11/18/2009] On page 744, on the fourth line of Section 43.3, change "illustrate" to "illustrates".

[11/18/2009] On page 745, 3 lines above the table, change "live remaining" to "lives remaining".

[10/6/2009] On page 756, in the solution to exercise 43.4, on the third line from the end, the numerator of the middle fraction should be ${}_{0.3}q_x^{(1)}$; delete $+0.1$ in the subscript.

[10/6/2009] On page 757, in the solution to exercise 43.9, on the second to last line, the numerator should be $q_{60}'^{(1)}$.

[10/6/2009] On page 759, in the solution to exercise 43.16, on the second line, $q'^{(1)}$ should be $q_{20}'^{(1)}$.

[10/27/2010] On page 760, in the solution to exercise 43.21, on the first line, change 0.1 to 1.

[11/18/2009] On page 763, on the third line of the second paragraph, delete the first word of the line, "the".

[11/18/2009] On page 764, on the sixth displayed line of the page, change the exponent from $-0.02t$ to $-0.14t$ so that it reads

$$= 19{,}000 \int_0^{20} e^{-0.14t}\,dt$$

[9/25/2009] On page 764, on the last line of the page, the parentheses should only be around $b_t^{(j)}$:

$$\mathbf{E}[Z^2] = \int_0^{\infty} v^{2t}\,{}_tp_x^{(\tau)} \sum_{j=1}^{m} \mu_x^{(j)}(t)\left(b_t^{(j)}\right)^2\,dt$$

[10/6/2009] On page 765, on the fourth line of the answer to Example 44B, in the last integral, ${}_tp_x$ should be ${}_tp_{45}^{(\tau)}$.

[9/25/2009] On page 766, in Table 44.1, formula (44.2) should have a parentheses only around $b_t^{(j)}$, as indicated in the erratum for page 764.

[10/6/2009] On page 775, in the solution to exercise 44.5, on the first line, $v^t\,{}_tp_x$ should be $v^{2t}\,{}_tp_x^{(\tau)}$.

[9/25/2009] On page 775, in the solution to exercise 44.5, the left hand sides of the first three displayed lines should have parentheses only around $B^{(}i)_{x+t}$:

$$\mu_x^{(1)}(t)\left(B_{x+t}^{(1)}\right)^2 = \begin{cases} 0.045, & t \le 10 \\ 0, & t > 10 \end{cases}$$

$$\mu_x^{(2)}(t)\left(B_{x+t}^{(2)}\right)^2 = \begin{cases} 0.04, & t \le 20 \\ 0, & t > 20 \end{cases}$$

$$\mu_x^{(3)}(t)\left(B_{x+t}^{(3)}\right)^2 = 0.020$$

[4/27/2010] On page 777, in the solution to exercise 44.17, on the third line, change "10-year annuity" to "life annuity".

[8/11/2009] On pages 800–801, in the solution to exercise 45.13, on the 9th displayed line, replace $\dfrac{11.24}{0.897}$ with $\dfrac{11.24}{(11.925)(0.9897)}$. On the second line from the end of the page, replace 0.103 with 0.0103. On the last line of page 800 and the first line of page 801, replace 0.749330 with 0.749333 ad 0.21189 with 0.213189.

[10/27/2010] On page 810, in the solution to exercise 46.1, on the second line, change a_{40} to a_{41} and $a_{40:\overline{19|}}$ to $a_{41:\overline{19|}}$.

[5/16/2010] On page 949, 3 lines from the end of the answer to Example 47B, change "asset share" to "premium".

[10/6/2009] On page 831, on the second line from the end of the first paragraph, change ${}_kQ^{(i,i)}$ to ${}_kQ^{(i,j)}$.

[8/14/2009] On pages 857–858, in the solution to exercise 49.9, change 0.04608 to 0.4608 on the line "No payment" and on the first white line of the table on page 858.

[11/18/2009] On page 861, 9 lines from the bottom of the page, change "variables" to "variable".

[11/18/2009] On page 862, on the fourth line of the answer to Example 50B, change "number" to "numbers".

[4/21/2010] On page 864, on the first line of Example 50H, add after "answering center": "in a nonhomogeneous Poisson process".

[11/18/2009] On page 865, the caption of Figure 50.1 should refer to Example 50H instead of 50G.

[8/16/2009] On page 873, in the first sentence, change the phrase between dashes to "the time from when $N(t) = 0$ until $N(t) = n$".

[10/12/2009] On page 873, on the first line of the answer to Example 51A, change $t \geq 4$ to $T \geq 4$.

[11/18/2009] On page 873, on the second line from the bottom of the page, add "du" at the end.

[5/4/2010] On page 878, in the solution to Quiz 51-2, on the first line, change the exponent on e from $e^{-0.06}$ to $e^{-0.06t}$. On the first displayed line, change 0.0108 to $\dfrac{1}{0.0108}$.

[8/16/2009] On page 879, in the solution to Example 52A, change the final answer from 0.04656 to 0.04653.

[4/3/2010] On page 881, on the last line of the page, add a set of parentheses around the second case: $\left(5/(20-t)\right)^2$.

[8/16/2009] On page 889, in the solution to exercise 52.23, on the first displayed line, change 30 to 3.

[4/6/2010] On page 891, in the second sentence of the paragraph before Example 53B, change "If X if" to "If X is". Also, change $X - Y$ to $\mathbf{E}[X] - \mathbf{E}[Y]$ and change $X + Y$ to $\text{Var}(X) + \text{Var}(Y)$.

[11/18/2009] On page 894, in the answer to Example 53E part 2, in the second sentence of the first bullet, change r to θ.

[9/29/2009] On page 898, in the solution to exercise 53.4, on the fourth line, delete the word "twice".

[8/17/2009] On page 900, in the solution to exercise 53.14, on the third line, change 0.7λ to 0.7 (delete λ).

[10/12/2009] On page 907, in question 54.12, on the first line, change X_n to X_N.

[10/12/2009] On page 913, in the solution to question 54.8, on the displayed line, change $\mathbf{E}[X \mid I]$ to $\mathbf{E}[S \mid I]$.

[8/17/2009] On page 913, in the solution to exercise 54.10, on the last line, change 07422 to 0.7422.

[5/16/2010] On page 914, in the solution to exercise 54.15, on the displayed line, add $1 -$ at the beginning.

[11/2/2010] On page 928, in question 5, on the last line of the question, delete "actuarial", and change "warrantee" to "warranty".

[10/27/2010] On page 947, in question 20, change answer choices (D), and (E) to −0.0194, and −0.0191 respectively.

[11/18/2009] On page 986, in the solution to question 5, on the first displayed line, A_{x+10} should be $\bar{A}_{x+10}$. Six lines further down, on the third displayed line, $e^{-10(\delta-\delta')}$ should be $e^{-10(\mu+\delta-\delta')}$.

[11/5/2009] On page 990, in the solution to question 18, on the line with (**), the left hand side should be $a_{x:\overline{10-x|}} + A_{x:\overline{10-x|}}$. On the second line from the end, the left hand side should be $a_{x:\overline{10-x|}}$.

[4/26/2010] On page 990, in the solution to question 18, replace $\overline{10-x|}$ with $\overline{40-x|}$ in all the displayed equations (twice in the first, once in the third, once apiece in the fourth and fifth—the left side should be $a_{x:\overline{40-x|}}$) and

$\overline{9-x|}$ with $\overline{39-x|}$ in the 3rd (twice), 4th (once), and 5th (once) displayed equations. The third displayed equation's left side is wrong and should be $a_{x:\overline{40-x|}} + A_{x:\overline{40-x|}}$

[11/5/2009] On page 991, in the solution to question 21, on the fifth displayed line, $(\bar{I}\bar{A})_x + 5A_x$ should be $(\bar{I}\bar{A})_{x+5} + 5A_{x+5}$.

[10/19/2010] On page 993, on the second to last line of the solution to question 28, change $q_x'^{(1)} q_x'^{(3)}$ to $p_x'^{(1)} p_x'^{(3)}$.

[11/5/2009] On page 994, in the answer key, 23 should be B.

[11/5/2009] On page 999, in the solution to question 18, on the first line of the table, q_{x+t} should be q_{x+t-1}.

[4/26/2010] On page 1001, in the solution to question 23, on the third displayed line, change $e^{-0.5}$ to $1 - e^{-0.5}$. On the fourth displayed line, change $e^{-0.8}$ to $1 - e^{-0.8}$. On the last line, replace 0.137668 with 0.157388.

[11/5/2009] On page 1001, in the solution to question 25, on the last line of the page, change the = in the exponent to a $-$.

[11/18/2009] On page 1010, in the solution to question 21, on the third line, change "Waiting time for 4 services" to "Waiting time for 5 services".

[11/5/2009] On page 1018, in the solution to question 14, on the sixth displayed line, add dy at the end.

[5/9/2010] On page 1020, in the solution to question 20, the last two lines should read

$$\begin{aligned}\Lambda_4 &= -P_{50} + \frac{{}_5V_{50} - {}_4V_{50}}{1.05} \\ &= -0.027386 + \frac{0.047034 - 0.037139}{1.05} = \boxed{\mathbf{-0.01796}}\end{aligned}$$

[11/5/2009] On page 1030, in the solution to question 21, on the first line, change μ_{x+t} to μ_t.

[9/7/2009] On page 1035, in the solution to question 1, on the fifth line, delete the presubscript t from ${}_tp_{64}$.

[9/7/2009] On page 1036, in the solution to question 4, on the first line, add "is" after $f(x)$.

[9/7/2009] On page 1038, in the solution to question 10, on the second displayed line, the first exponent should be $-(0.01 + 0.03)t$; change the second minus to plus.

[4/29/2010] On page 1049, in the solution to question 8, change the second and third lines to

$$\begin{aligned}\pi_h &= vq_{45+h} + v\,{}_{h+1}V - {}_hV \\ (h+1)\pi_0 &= 0.01v + v\,{}_{h+1}V - {}_hV\end{aligned}$$

On the fourth line, change v^{h-1} to v^h.

[9/7/2009] On page 1050, in the solution to question 10, on the last line, put a bar on P.

[9/7/2009] On page 1058, in the solution to question 6, on the second line from the end, there should be a double-dot on $s_{\overline{5|}}$.

[11/5/2009] On page 1060, in the solution to question 11, on the third displayed line, change the 1 after the left parenthesis to t.

[11/5/2009] On page 1062, in the solution to question 17, on the first displayed line, change m_{85+t} to m_{85}.

[11/5/2009] On page 1066, in the solution to question 25, $a_{\overline{10|}}$ (5th line of page) should be $\ddot{a}_{\overline{10|}}$ and $a_{\overline{60|}}$ (6th line of page) should be $\ddot{a}_{\overline{60|}}$.

[11/5/2009] On page 1066, in the solution to question 27, on the last line of the page, change $t < 60$ and $t > 60$ to $t < 20$ and $t > 20$.

[10/30/2010] On page 1067, the solution to question 27 is incorrect. Replace all lines after "We can now calculate $\bar{A}_{40}$" with

$$\begin{aligned}
\bar{A}_{40} &= \bar{A}^{1}_{40:\overline{20}|} + {}_{20|}\bar{A}_{40} \\
&= \frac{1}{260}\int_0^{20} e^{-0.02t}\mathrm{d}t + \frac{4}{260}\int_{20}^{80} e^{-0.02t}\mathrm{d}t \\
&= \left(\frac{1}{260(0.02)}\right)\left(1 - e^{-0.4}\right) + \frac{4}{260(0.02)}(e^{-0.4} - e^{-1.6}) \\
&= 0.063400 + 0.360326 = 0.423726 \\
\bar{P}(\bar{A}_{40}) &= \frac{\delta\bar{A}_{40}}{1 - \bar{A}_{40}} \\
&= \frac{0.02(0.423726)}{1 - 0.423726} = \boxed{\mathbf{0.014706}}
\end{aligned}$$

[8/19/2009] On page 1069, in the solution to question 1, in the table, interchange the column headings ${}_tp_x$ and q_{x+t}.

[8/19/2009] On page 1070, the solutions to questions 13 and 14 are misnumbered 12 and 13 respectively.

[8/19/2009] On page 1071, 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.

[10/23/2010] On page 1072, in the solution to question 36, replace the last line with

We see that in the second year, the probability of accident-free is $\boxed{\mathbf{0.74}}$. **(E)**

[8/19/2009] On page 1072, 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.

[8/18/2009] On page 1077, in the solution to question 23, on the first line, change ${}_kp_{xy}$ to ${}_kp_{\overline{xy}}$.

[10/25/2010] On page 1084, in question 35, the reference should be to lesson 10 instead of lesson 22.

[8/18/2009] On page 1089, in the solution to question 15, delete A_x on the first displayed line.

[8/18/2009] On page 1105, in the solution to question 2, on the 4th displayed line, there should be a dt before the equal sign.

[2/21/2010] On page 1110, in the solution to question 24, on the first displayed line change $p^{(\tau)}_{61}$ to $p^{(\tau)}_{60}$. On the second displayed line, change $p^{(\tau)}_{62}$ to $p^{(\tau)}_{61}$.

[8/18/2009] On page 1111, in the solution to question 35, on the first displayed line, the 1000 should be outside the parentheses, so that the right hand side is

$$1000v\,(q_{80} + p_{80}\,A_{81})$$

[8/18/2009] On page 1112, in the solution to question 36, on the second line, change the denominator 796 to 776.

[8/20/2009] On page 1113, 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 1115, in the solution to question 27, the heading of the fifth column of the table should be ${}_tp_{65}^{(\tau)} = {}_{t-1}p_{65}^{(\tau)}(1 - q_{65+t-1}^{(\tau)})$.

[8/19/2009] On page 1118, 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 1119, 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 1120, in footnote 1, delete one of the double vertical lines after 893.

[8/19/2009] On page 1120, in the solution to question 13, delete one of the double vertical lines in $\text{Var}({}_1L \mid |K(x) \geq 1)$.

[11/2/2010] On page 1123, on the second line, change $\frac{20}{omega-60}$ to $\frac{\omega-60}{20}$.

[11/2/2010] On page 1123, in the solution to question 22, on the first lines of 1. and 2., change $e^{\delta t}$ to $e^{-\delta t}$.

[8/20/2009] On page 1129, in the solution to question 40, on the third line, "change" should be "chance".

[10/18/2010] On page 1130, in the solution to question 11, a continuity correction should be made; we should calculate the probability that the difference exceeds 0.5 (instead of the probability that it exceeds 0). Replace the last line with

Using the normal approximation, the probability of the difference exceeding 0.5 is $1 - \Phi\Big((0.5 - (-10))/\sqrt{210}\Big) = \Phi(-0.72) = \boxed{\mathbf{0.2344}}$. **(C)**

[8/20/2009] On page 1130, in the solution to question 12, on the second line, change $2(10^7)$ to $2(10^{14})$ in two places.

[8/9/2009] On page 1142, in Table C.1, the entry for Spring 2007:29 should be 17 instead of 32.