

Errata and Updates for ASM Exam MLC (Tenth Edition) Sorted by Page

Practice exam 10:27 is defective in that none of the 5 answer choices is correct.

- [6/8/2010] On page xi, on the first line under “Old exam question”, delete www after “questions”.
- [11/7/2010] On page 6, in Theorem 2, change $\sum_i \Pr(B_i) = 1$ to $\Pr(\cup_i B_i) = 1$.
- [9/27/2011] On page 12, in the solution to exercise 1.3, on the first displayed line, change $E[X + Y]^3$ to $E[(X + Y)^3]$.
- [5/29/2011] On page 14, in the solution to exercise 1.9, 7 lines from the end, change $\frac{3}{2}(7500)$ to $\frac{2}{3}(7500)$.
- [5/29/2011] On page 27, in the solution to exercise 2.8, at the end, delete (C), since the question is not multiple choice.
- [7/22/2010] On page 34, on the sixth line, change “on starts” to “one starts”.
- [6/9/2010] On page 34, fourth line of Section 3.3, change the three arguments x to t :
 $s_{T(x)}(t) = \Pr(T(x) > t)$. (*Models for Quantifying Risk* uses $S(t)$ instead of $s(t)$.)
- [7/22/2010] On page 34, third line from the bottom, change $X \geq 40$ to $X > 40$.
- [7/15/2010] On page 41, in the solution to exercise 3.9, on the third line, ${}_{15}p_{50}$ is 0.54, not 0.6.
- [10/3/2011] On page 43, in the solution to exercise 3.15, on the second line, in the last two symbols, q should not be in the subscript. Change them to ${}_1q_0$ and ${}_2q_0$.
- [5/28/2010] On pages 47 and 51, in formula (4.8), change the three t 's in the integrand to s 's:

$${}_tq_x = \int_0^t {}_s p_x \mu_x(s) ds$$

- [5/28/2010] Page 51: see errata for page 47.
- [11/3/2010] On page 60, on the displayed line of the solution to exercise 4.7, the right side should be 0.005 instead of $\exp(-0.005)$.
- [6/28/2010] On page 62, in the solution to exercise 4.23, 3 lines from the end, change “legs of lengths 0 and 1” to “legs of length 0.5 and 1”.
- [6/3/2011] On page 65, in the solution to exercise 4.37, on the last two displayed lines, add a right parenthesis before the last equals sign on each line.
- [11/11/2010] On page 82, 3rd line of answer to Example 6B part 2, equation (6.2) should be equation (6.6).
- [5/28/2010] On page 83, on the second to last displayed line, the first ${}_{50}p_{20}$ should be ${}_{50}q_{20}$.
- [12/6/2010] On page 88, the formula for $\text{Var}(T(x))$ of generalized deMoivre (9th formula) should have α in the numerator: $\frac{\alpha(\omega - x)^2}{(\alpha + 1)^2(\alpha + 2)}$.
- [12/6/2010] On page 100, in the solution to exercise 6.25, in the second bullet, replace $\omega - 10$ with $\theta - 10$.
- [6/9/2010] On page 102, in the solution to Quiz 6-1, a negative sign is missing on the right of the first displayed line, and the second displayed line's terms should be reversed:

$$\begin{aligned} \int_{50}^{50+t} \mu_x dx &= -\ln(10 - \sqrt{x}) \Big|_{50}^{50+t} \\ &= \ln(10 - \sqrt{50}) - \ln(10 - \sqrt{50+t}) \end{aligned}$$

- [5/28/2010] On page 107, in equation (7.5) and (7.6), change $e_{x:\overline{n-m}|}$ to $e_{x+m:\overline{n-m}|}$ (once in each equation).
- [11/1/2010] On page 108, on the fourth line, L_{x+t} should be L_{x+k} .
- [8/2/2010] On page 110, in Table 7.1, replace formula (7.6) with $= e_{x:\overline{m-1}|} + m p_x(1 + e_{x+m:\overline{n-m}|})$, $m < n$.
- [1/12/2011] On page 140, in exercise 8.14, replace the last line of the question with “Calculate $\text{Var}(\min(T(45), 2))$.”
- [5/25/2010] On page 150, in the solution to exercise 8.14, on the 6th line, change $T^2 \wedge 2$ to $(T \wedge 2)^2$.
- [6/28/2010] On page 153, in the solution to exercise 8.23, on the second line, delete the period in 7,126,036.
- [11/11/2010] On page 154, in the solution to exercise 8.27, on the first displayed line, change $e^{\mu x}$ to $e^{-\mu x}$. On the second displayed line, change $e^{\mu_{x+1}}$ to $e^{-\mu_{x+1}}$.
- [6/14/2010] On pages 163–164, in the last table on page 163 and the first table on page 164, on the line for age 42, change 9.586,465 to 9,586,464.
- [11/11/2010] On page 172, in the solution to exercise 9.2, on the 2nd line from the end, change the numerator from $l_{83} - l_{82}$ to $l_{82} - l_{83}$.
- [6/7/2011] On page 183, on the fourth line, delete “actuarial”.
- [6/14/2010] On page 188, last displayed line of page, put a bar on A_{65} .
- [2/25/2011] On page 202, in the solution to exercise 10.14, on the second displayed line, change ${}_1 2E_x$ to ${}_2 E_x$. On the third displayed line, change the denominator from $0.10 + 0.20$ to $0.10 + 0.10$.
- [2/26/2011] On page 203, in the solution to exercise 10.18, on the first line, put parentheses around $\mu + \delta$.
- [6/14/2010] On page 206, in the solution to exercise 10.31, on the first displayed line, change 0.4 to 0.04.
- [8/11/2010] On page 211, on the first line of Subsection 11.2.1, change “ a a positive real number” to “ δ a positive real number”.
- [6/14/2010] On page 212, on the first displayed line, change a in the exponent to δ .
- [12/6/2010] On page 212, on the fourth line of the answer to Example 11D, before the comma, add “divided by 0.16”.
- [2/7/2011] On page 245, in exercise 12.39, 2–3 lines under the table, replace the sentence “In this group ...” with “This group is drawn from a population in which 80% are non-smokers and 20% are smokers”.
- [6/3/2011] On page 249, in the solution to exercise 12.17, on the second line, remove the bar from ${}^2\bar{A}_x$.
- [3/3/2011] On page 249, in the solution to exercise 12.17, on the 6th line, $A_{25:\overline{5}|}$ should be $A_{25:\overline{5}|}^1$.
- [1/24/2011] On page 256, on the third to last line of the solution to Quiz 12-2, change ${}_5 E_{45}$ to ${}^2_5 E_{45}$.
- [8/12/2010] On page 256, on the second to last line of the solution to Quiz 12-2, put an equals sign between (0.09476) and 0.01634.
- [8/17/2010] On page 259, fourth line of answer to Example 13A, replace $\omega = 70$ with $\omega - x = 70$.
- [6/14/2010] On page 260, on the third line of the answer to Example 13C, replace the two subscripts 30 with 40.
- [6/7/2011] On page 262, on the sixth line, delete “actuarial”.
- [12/6/2010] On page 262, three lines above Example 13F change A_{x+t} to \bar{A}_{x+t} .
- [12/6/2010] On page 263, in the answer to Example 13H, on the first line change $x > 20$ to $t > 20$. On the last three displayed line, change each x (one on each line) to t .

- [6/3/2011] On page 269, in the solution to exercise 13.1, on the second line, change the second v_{10} to v_t .
- [9/8/2010] On page 273, in the solution to exercise 13.19, on the second displayed line, replace the integrand $e^{-0.01t} dt$ with $0.01 t dt$.
- [8/4/2010] On page 276, in the solution to Quiz 13-1, on the last line, change the two subscripts from 50 to 60: ${}_{10}P_{60} - {}_{20}P_{60}$.
- [11/11/2010] On page 280, first line, change “a a” to “as a”.
- [12/6/2010] On page 280, one line above Example 14B, delete “on”.
- [8/18/2010] On page 286, in formula (14.13), delete the 0 in the first subscript.
- [7/28/2011] On page 297, in the list of additional released exam questions, delete the “,35” in “M-S05:15,35”.
- [12/6/2010] On page 297, in the solution to exercise 14.2, on the fifth and sixth lines, change 7,533,984 to 7,533,964. On the sixth and seventh lines, change 0.962947 to 0.962945. On the eighth and ninth lines, change 0.873422 to 0.873420.
- [12/20/2010] On page 301, in the solution to exercise 14.19, on the last line, the first exponent is missing a parenthesis and should be $-(\mu + \delta)$.
- [11/11/2010] On page 305, in the solution to Quiz 14-3, on the second line, change $A_{40:\overline{5}|}$ to $A_{40:\overline{20}|}$.
- [12/6/2010] On page 309, two lines from the bottom, change $(\bar{I}\bar{a})_{\overline{1}|}$ to $(\bar{I}\bar{s})_{\overline{1}|}$.
- [8/15/2011] On page 323, in Quiz 16-1, the values given are impossible, since the resulting 10-year pure endowment of 0.6 is greater than $e^{-10\delta}$. Therefore, change \bar{A}_{60} to 0.42.
- [6/6/2011] On page 323, on the third line of the paragraph beginning “Whole life”, replace the expression $e^{-(\delta + \mu_x(t))}$ with $e^{-(\delta t + \int_0^t \mu_x(u) du)}$.
- [6/6/2011] On page 332, in the solution to exercise 16.5, on the third line, replace μ with $k + \mu_{x+t}$.
- [8/15/2011] On page 336, revise the solution to Quiz 16-1 in line with the revised value of \bar{A}_{60} given above:
 Since $\bar{A}_{50} = \bar{A}_{50:\overline{10}|} + {}_{10}E_{50} \bar{A}_{60}$, we have ${}_{10}E_{50} = (0.22 - 0.01)/0.42 = 0.5$. Then $\bar{A}_{50:\overline{10}|} = 0.01 + 0.5 = 0.51$. Also, since $\bar{A}_x = 1 - \delta \bar{a}_x$, we have $\delta = (1 - 0.22)/13 = 0.06$. Therefore
- $$\bar{a}_{50:\overline{10}|} = \frac{1 - \bar{A}_{50:\overline{10}|}}{\delta} = \frac{1 - 0.51}{0.06} = \boxed{8\frac{1}{6}}$$
- [9/4/2010] On page 339, on the second line of the answer to Example 17A, change the minus sign before 0.75 to an equals sign.
- [7/27/2011] On page 347, on the first line of the answer to Example 17H, change “second” to third. It is referring to the equation one line above Example 17H.
- [7/28/2011] On page 364, in the list of additional released exam questions, remove SOA M-F06:4.
- [9/20/2010] On page 369, in the solution to exercise 17.27, on the second line, interchange the subscripts on the A 's:
- $$= \frac{1 - A_{25:\overline{20}|}}{d} - \frac{1 - A_{20:\overline{10}|}}{d}$$

- [7/27/2011] On page 379, the first sentence of the third paragraph skips a step. Replace it with these two sentences:

If $I = 1$, $Y | I$ is v^n times a whole life annuity on $(x + n)$, and we know the expected value and variance for this annuity; the expected value is \bar{a}_{x+n} and the variance is $({}^2\bar{A}_{x+n} - \bar{A}_{x+n}^2)/\delta^2$. Therefore, $E[Y | I] = v^n \bar{a}_{x+n}$ and $\text{Var}(Y | I) = v^{2n}({}^2\bar{A}_{x+n} - \bar{A}_{x+n}^2)/\delta^2$.

- [4/17/2011] On page 379, in the second displayed formula of the page, change ${}_n|\bar{a}_{\overline{n}|i}$ to ${}_n|\bar{a}_{\overline{n}|i}$.
- [7/28/2011] On page 391, add SOA M-F06:4 to the list of additional released exam questions.
- [8/31/2010] On page 398, in the solution to exercise 18.24, on the fourth line, the lower limit of the sum should be 0 instead of 1.
- [11/11/2010] On page 401, in the solution to Quiz 18-2, on the last line, change the – before 18.67579 to =.
- [9/8/2011] On page 403, on the 4th line of the second paragraph, change 14/5 to 14/6.
- [11/11/2010] On page 429, in the solution to Quiz 19-2, on the second displayed line, change ${}_{60}E_{10}$ to ${}_{10}E_{60}$.
- [7/29/2011] On page 432, on the 6th line, change $(1+i)^{1/3} + 2(1+i)^{2/3}$ to $2(1+i)^{1/3} + (1+i)^{2/3}$.
- [7/14/2011] On page 452, in the solution to exercise 21.8, on the second displayed line, change ${}_5E_x$ to ${}_{10}E_x$.
- [7/28/2011] On page 479, in the list of additional released exam questions, add “,35” after “M-S05:14”
- [9/3/2010] On page 481, in the solution to exercise 22.7, on the third line, delete one of the “is to observe”s.
- [7/15/2011] On page 490, the previous erratum for exercise 22.39 is withdrawn. The solution is correct.
- [2/6/2011] On page 508, on the last line of the solution to exercise 23.6, in the first symbol in the numerator, the 0 should be inside the angle as follows: ${}^2\bar{A}_{x:\overline{20}|}$.
- [2/14/2011] On page 513, 3 lines above equation (24.5), change ${}^2i = i + i^2$ to ${}^2i = 2i + i^2$.
- [6/21/2011] On page 528, in the caption for Figure 25.2, change fuction to function.
- [2/9/2011] On page 533, on the last four lines of the answer to Example 25J, the exponents should be δ/μ instead of μ/δ . Make four corrections, one on each line.
- [3/9/2011] On page 545, on the second line of the third paragraph, change “a *m*thly annuity be” to “an *m*thly annuity can be”.
- [2/18/2011] On page 567, in the solution to exercise 27.11, on the second-to-last line, change $P_{45:\overline{10}|}^1$ to $P_{40:\overline{10}|}^1$.
- [2/10/2011] On page 568, in the solution to exercise 27.14, on the second to last line, change “is paid” to “are paid”.
- [11/11/2010] On page 571, in the solution to Quiz 27-2, on the second displayed line, a vertical line is missing after the 10 in the numerator. The numerator should be ${}_{10}|\bar{A}_{20}$.
- [8/15/2011] On page 575, on the third displayed line below Table 28.2, change the denominator to ${}_{h-k}P_{x+k:\overline{n-k}|}^1$ and change $h < k$ to $k < h$.
- [3/12/2011] On page 576, on the first line of Section 28.2, delete the second “the”.
- [4/3/2011] On page 589, in the solution to exercise 28.6, at the end of the second sentence of the first bullet, change “, or 1/5” to “is 1/5”.
- [8/23/2010] On page 590, in the solution to exercise 28.7, on the fourth line, put a double-dot over $a_{x:\overline{3}|}$.
- [11/11/2010] On page 595, on the second displayed line at the end, the subscript should be fixed so that the symbol is $\ddot{a}_{x+k:\overline{n-k}|}$.
- [10/5/2011] On page 624, in exercise 30.18(i), “full” should be “fully”. Also, the first column of the table represents the number of survivors on July 1, 2009.
- [2/26/2011] On page 627, in the solution to exercise 30.4, on the second and third displayed lines of the page, replace 0.379487 with 0.017446. On the third displayed line of the page, replace 0.415487 with 0.053446. On the second line from the end, replace 0.2656 with 0.0396. On the last line, replace the equation with $0.053446/0.0396 = \boxed{1.3497}$.

[9/12/2010] On page 631, in the solution to Quiz 30-1, the signs in the column “Loss” in the table are incorrect, and on the last line, 230.233 should be 230.223 and the large right parenthesis should be after the first 0.95^2 . On the line after the table, the minus signs should all be removed. The correct table and following line are

Survival time	Probability	Loss	Loss squared
1	3/98	$0.95(1000) - 230.223 = 719.777$	518,077
2	4/98	$0.95^2(1000) - 230.223(1.95) = 453.565$	205,721
3	91/98	$0.95^3(1000) - 230.223(1.95 + 0.95^2) = 200.664$	40,266

$$E[{}_1L] = \frac{3(719.777) + 4(453.565) + 91(200.664)}{98} = 226.878$$

[10/5/2011] On page 652, in the solution to exercise 31.23, on the third line, change π_{45} to π_{19} .

[2/16/2011] On page 654, in the solution to exercise 31.34, on the last line of the first paragraph, change q_{x+2} to q_{x+1} .

[7/8/2010] On page 660, the solution to Example 32D is incorrect starting with the fourth displayed line. Calculating π is unnecessary. The corrected solution is:

Let’s calculate π by setting $k = 10$ in equation (32.3), at which point the benefit reserve is 1000.

$$1000 = (\pi - 1000vq)\ddot{s}_{\overline{10}|}$$

$$\ddot{s}_{\overline{10}|} = \frac{1.2^{10} - 1}{0.2/1.2} = 31.1504$$

$$\pi - \frac{1000(0.03)}{1.2} = \frac{1000}{31.1504} = 32.1023$$

Then the benefit reserve at the end of three years, ${}_3V$, is $(\pi - 30/1.2)\ddot{s}_{\overline{3}|} = 32.1023(4.368)$, and

$$\ddot{s}_{\overline{3}|} = \frac{1.2^3 - 1}{0.2/1.2} = 4.368$$

$${}_3V = 32.1023(4.368) = \boxed{140.22}$$

[7/8/2010] On page 663, in Table 32.1,

1. On the second line, change $h < k$ to $k < h$.
2. 8 lines from the end, the subtraction sign $-$ before $\beta(m)$ should be changed to an addition sign $+$.

[4/12/2011] On page 664, in Example 32G, on the first line, change “at the moment of” to “at the end of the year of”.

[8/14/2011] On page 664, the solution to Example 32G is incorrect. The correct solution is

We will use formula (32.7), which in this case is

$${}_{10}V_{45:\overline{20}|}^{(4)} = {}_{10}V_{45:\overline{20}|} + \beta(4)P_{45:\overline{20}|}^{(4)} {}_{10}V_{45:\overline{20}|}^1$$

The benefit reserve for an annual premium endowment insurance, ${}_{10}V_{45:\overline{20}|}$, is calculated using the insurance-ratio formula.

$${}_{10}V_{45:\overline{20}|} = \frac{0.07 + 0.47 - 0.09 - 0.25}{1 - 0.09 - 0.25} = 0.303030$$

Based on the tables, $\beta(4) = 0.38424$.

The fractional premium for the endowment insurance, $P_{45:\overline{20}|}^{(4)}$, is

$$\begin{aligned} A_{45:\overline{20}|} &= A_{45:\overline{20}|}^1 + A_{45:\overline{20}|}^{\frac{1}{2}} = 0.09 + 0.25 = 0.34 \\ A_{45:\overline{20}|}^{(4)} &= \frac{i}{i^{(4)}} A_{45:\overline{20}|}^1 + A_{45:\overline{20}|}^{\frac{1}{2}} \\ &= 1.02223(0.09) + 0.25 = 0.342001 \\ \ddot{a}_{45:\overline{20}|}^{(4)} &= \frac{1 - A_{45:\overline{20}|}^{(4)}}{d^{(4)}} = \frac{1 - 0.342001}{0.05785} = 11.3742 \\ P_{45:\overline{20}|}^{(4)} &= \frac{0.34}{11.3743} = 0.029892 \end{aligned}$$

The benefit reserve for an annual premium term insurance, ${}_{10}V_{45:\overline{20}|}^1$, is

$$\begin{aligned} \ddot{a}_{55:\overline{10}|} &= \frac{1 - A_{55:\overline{10}|}}{d} = \frac{1 - 0.07 - 0.47}{0.05660} = 8.1272 \\ \ddot{a}_{45:\overline{20}|} &= \frac{1 - A_{45:\overline{20}|}}{d} = \frac{1 - 0.09 - 0.25}{0.05660} = 11.6608 \\ {}_{10}V_{45:\overline{20}|}^1 &= A_{55:\overline{10}|}^1 - P_{45:\overline{20}|}^1 \ddot{a}_{55:\overline{10}|} \\ &= 0.07 - \left(\frac{0.09}{11.6608} \right) (8.1272) = 0.007273 \end{aligned}$$

Therefore, the reserve for the fractional premium endowment insurance of this example is

$$1000 {}_{10}V_{45}^{(4)} = 303.030 + (0.38424)(0.029892)(7.273) = \boxed{303.11}$$

- [1/23/2011] On page 665, in the answer to Example 32H, on the third line, change the exponent -0.05 to -0.5 .
- [11/2/2010] On page 667, on the 7th line of the table, add a “b” to the formula: $\pi - bvq$. instead of $\pi - vq$.
- [2/17/2011] On page 678, in the solution to exercise 32.18, on the first line, change pi to π .
- [3/25/2011] On page 682, in the solution to exercise 32.30, on the second, third, fifth, and sixth lines, the 1.1 in the denominator (under $e^{-0.1}$ in lines 2 and 3 and under $e^{-0.08}$ in lines 4 and 5) should be 1.1^{10} .
- [4/8/2011] On page 682, on the second line from the end of the solution to Quiz 32-1, add “500” before “ $e^{0.6}$ ”.
- [10/21/2010] On page 686, replace the first displayed line under “**Incurred losses**” with

$$\Lambda_j = \begin{cases} -\pi_j + v_{j+1}V - {}_jV & j < K(x) \\ -\pi_j + vb_{j+1} - {}_jV & j = K(x) \\ 0 & j > K(x) \end{cases}$$

Replace the answer to Example 33B with

$$\begin{aligned} \Lambda_{36} &= -25 + 0.96(455) - 438 = \boxed{-26.2} \\ \Lambda_{37} &= -25 + 0.96(1000) - 455 = \boxed{480} \end{aligned}$$

Replace the last line of the page with

$${}_kL - {}_kV = \Lambda_k + v({}_{k+1}L - {}_{k+1}V)$$

[10/31/2010] On page 687, on the fifth line, remove the parentheses around ${}_{k+1}V - {}_kV$, so that the formula is $-\pi_k + {}_v{}_{k+1}V - {}_kV$. On the sixth line, remove the parentheses around $b_{k+1} - {}_kV$.

[10/21/2010] On page 689, in Table 33.1, the formula for Λ_j is incorrect and should be

$$\Lambda_j = \begin{cases} -\pi_j + v_{j+1}V - {}_jV & j < K(x) \\ -\pi_j + v b_{j+1} - {}_jV & j = K(x) \\ 0 & j > K(x) \end{cases}$$

[4/1/2011] On page 692, one line below the second-to-last displayed line, change $\Pr(T(xy)) > t$ to $\Pr(T(xy) > t)$.

[4/1/2011] On page 698, one line below the second-to-last displayed line, change $\Pr(T(xy)) > t$ to $\Pr(T(xy) > t)$.

[11/11/2010] On page 715, 1 line and 4 lines after Quiz 35-1 (once apiece), replace $T(\bar{(xy)})$ with $T(\bar{xy})$.

[2/22/2011] On page 717, in Table 35.1, add minus signs on the left of lines 4 and 8.

[10/22/2011] On page 725, in the solution to exercise 35.16, on the first line, replace $q_x q_y$ with ${}_tq_x {}_tq_y$.

[10/22/2010] On page 739, in the solution to exercise 36.13, on the first two displayed lines, change $\dot{e}_{0:0}$ to $\dot{e}_{0:0.5}$.

[11/11/2010] On page 785, on the second to last line, change (i) to (1).

[11/11/2010] On page 790, in Table 39.1 two lines below formula (39.8), change *omega*_x to ω_x .

[9/13/2010] On page 790, on the last line, change $\frac{1}{6} - \frac{1}{4}$ to $\frac{1}{4} - \frac{1}{6}$.

[3/9/2011] On page 814, in the solution to exercise 40.3, on the fourth displayed line, change $e^{0.01(20)}$ to $e^{-0.01(20)}$. On the fifth displayed line, change $e^{-0.01(20)}$ to $e^{0.01(20)}$.

[7/29/2011] On page 833, delete SOA M-F06:24 from the list of additional released exam questions.

[2/23/2011] On page 852, in the solution to exercise 42.13, five lines from the end, change $e^{-0.015}$ to $e^{-0.15}$.

[2/25/2011] On page 856, in the solution to Quiz 42-1, on the first displayed line, put a superscript (τ) on ${}_5p_{60}$: ${}_5p_{60}^{(\tau)}$.

[2/25/2011] On page 868, in the solution to exercise 43.13, on the 6th line, replace $0.8\mu_x^{(\tau)}$ with $0.2\mu_x^{(\tau)}$. On the 7th line, replace $0.2\mu_x^{(\tau)}$ with $0.8\mu_x^{(\tau)}$.

[3/21/2011] On page 869, in the solution to exercise 43.15, on the second line, ${}_tpp_x^{(\tau)}$ should be ${}_t p_x^{(\tau)}$.

[7/5/2011] On page 883, in the title of Section 44.1 and in the next two paragraphs, “double decrement” should be replaced by “multiple decrement” wherever it appears. It appears four times.

[7/5/2011] On page 875, in Quiz 44-1(iii), replace “if” with “is”.

[7/29/2011] On page 889, add SOA M-F06:24 to the list of additional released exam questions.

[10/27/2010] On page 894, in the solution to exercise 44.21, on the first line, change 0.1 to 1.

[7/5/2011] On page 896, in the solution to Quiz 44-1, on the left side of the first line, the superscript (1) should be (2).

[3/21/2011] On page 931, in the solution to exercise 46.9, on the last line, change $1 - 0.09\ddot{a}_{40:\overline{10}}$ to $(1 - 0.09)\ddot{a}_{40:\overline{10}}$.

[9/12/2010] On page 935, the answer to Example 47A is incorrect. The correct answer is

Annual renewal expenses are $0.05(47)+4 = 6.35$. The present value of future renewal expenses is $6.35(10) = 63.50$. The present value of future renewal expense premiums is $(47 - 40)(10) = 70$. The expense reserve at the end of the fifth year is $63.50 - 70 = \boxed{-6.50}$.

[3/21/2011] On page 935, on the first line of the footnote, change “form” to “from”.

[9/16/2010] On page 936, the last two lines of the answer to Example 47C are incorrect, and should read

$$(0.4 + 0.05(13))(40) + 45 + 5(13) + 4.25 + 0.75(13) = 166$$

The expected loss at issue is $350 + 166 - 520 = \boxed{-4}$.

[9/12/2010] On page 937, two lines above equation (47.1), change the plus sign before $(G - E)\ddot{a}_{\overline{k+1}|}$ to a minus sign.

[11/1/2010] On page 939, 5 lines from the bottom, add \ddot{a}_x to the left-hand side: $G\ddot{a}_x$.

[10/27/2010] On page 952, in the solution to exercise 47.14, on the second line, change a_{40} to a_{41} and $a_{40:\overline{19}|}$ to $a_{41:\overline{19}|}$.

[10/15/2010] On page 953, in the solution to exercise 47.16,

1. Change both 0.67's on the second line to 0.69.
2. Change 17.058 once apiece on the second and fifth line to 17.038.
3. Change the final answer to 15.85.

[10/27/2010] On page 953, in the solution to exercise 47.18, on the third line, replace $\ddot{a}_{\overline{10}|}$ with $\ddot{a}_{x:\overline{10}|}$.

[3/4/2011] On page 960, in the answer to Example 48C, on the third line, change e_5 to e_4 .

[11/11/2010] On page 981, on the 8th line, change “will not Gone” to “will not be Gone”.

[10/31/2010] On page 996, on the last line, change $t + 1$ to $k + 1$.

[11/11/2010] On page 1000, 6th line of answer to Example 50B, change “ar” to “are”.

[3/28/2011] On page 1043, in the solution to exercise 53.1, 2 lines from the end, delete the word “at” before “exactly”.

[11/2/2010] On page 1090, in question 5, on the last line, change “warrantee” to “warranty”.

[10/27/2010] On page 1116, in question 20, change “fourth” on the last line of the question to “fifth”. Also, change answer choices (C), (D), and (E) to -0.0194 , -0.0186 , and -0.0180 respectively.

[7/19/2011] On page 1155, in question 21(iv), delete “actuarial”.

[10/19/2010] On page 1169, on the second to last line of the solution to question 28, change $q_x^{(1)}q_x^{(3)}$ to $p_x^{(1)}p_x^{(3)}$.

[8/7/2011] On page 1187, in the solution to question 22, on the last line, a right parenthesis is missing from the numerator, after 0.104251.

[7/19/2011] On page 1191, in the solution to question 6, on the second line, change the integrand to $\mu_{x+s} ds$.

[11/11/2010] On page 1197, in the solution to question 24, “non-smokers” refers to the group with $\mu = 0.05$, and “smokers” refers to the group with $\mu = 0.15$.

[10/29/2010] On page 1206, replace the last two lines of the solution to question 20 with

$$\begin{aligned}\Lambda_4 &= -P_{50} + \frac{{}_5V_{50}}{1.05} - {}_4V_{50} \\ &= -0.027386 + \frac{0.047034}{1.05} - 0.037139 = \boxed{-0.01973} \quad (\mathbf{B})\end{aligned}$$

This affects the answer key on page 1200 as well.

- [4/29/2011] On page 1211, in the solution to question 5, on the fourth displayed line, change ${}_5\ddot{a}_{60}$ to ${}_5\ddot{a}_{55}$.
- [7/19/2011] On page 1230, in the solution to question 24, 4 lines from the bottom, change the first numerator from $\bar{a}_{\overline{10}|0.1}$ to $\bar{a}_{\overline{10}|0.1}$.
- [5/4/2011] On page 1239, in the solution to question 18, on the third line from the bottom, change ${}_2E_{50}$ to ${}_2E_{[50]}$.
- [7/19/2011] On page 1240, in the solution to question 20, on the second line at the end, change ${}_{10}p_x = 0.2$ to ${}_{10}p_x - 0.2$.
- [7/19/2011] On page 1241, in the solution to question 24, on the last line, change ${}_{10}L$ to ${}_{30}L$.
- [7/19/2011] On page 1246, in the solution to question 11, on the last line of the page, change 0.000890 to 0.001780.
- [7/19/2011] On page 1249, the solution to question 22 is correct, but here is a more straightforward solution, using the prospective formula for reserves.

The expected present value of the benefits at time 19 is the sum of the EPV of the death benefit and the survivorship benefit:

$$\bar{A}_{x+19:\overline{1}|} = 1000 \int_0^1 e^{-0.07t} 0.02 dt + 1000e^{-0.07} = 1000 \left(\frac{2e^{-0.07}}{7} + e^{-0.07} \right) = 951.71$$

The expected present value of the premiums at time 19 is, using $\bar{a}_{x:\overline{1}|} = (1 - \bar{A}_{x:\overline{1}|})/\delta$,

$$P\bar{a}_{x+19:\overline{1}|} = 30 \left(\frac{1 - 0.95171}{0.05} \right) = 28.97$$

So the reserve is $951.71 - 28.97 = \boxed{922.74}$. (D)

- [5/7/2011] On page 1250, in the solution to question 23, on the second line, change ${}_tq_{60}$ to ${}_tp_{60}$.
- [11/5/2011] On page 1255, in the solution to question 6, on the first displayed line, remove the bar from \bar{A}_{x+10} . On the third displayed line, change + to -.
- [7/19/2011] On page 1257, in the solution to question 10, on the last line, change ${}_tq_0^{(2)}$ to ${}_5q_0^{(2)}$.
- [10/30/2010] On page 1264, the solution to question 27 is incorrect. Replace all lines after "We can now calculate \bar{A}_{40} " with

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

- [10/23/2010] On page 1270, in the solution to question 36, replace the last line with

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

[7/28/2011] On pages 1274 and 1275, in the solution to question 15, on the last line of page 1274, remove the line from the presubscript of ${}_9p_{40}$ at the end of the line, so that it becomes ${}_9p_{40}$. Make the same correction on page 1275, four lines from the end of the solution.

[7/29/2011] On page 1277 in the solution to question 27, on the first line, $\mu_{50}^{(1)}$ should be $\mu_{50}^{(1)}(t)$.

[4/10/2011] On page 1279, in the solution to question 38, on the second line, change the second denominator to 1.06^2 .

[10/25/2010] On page 1282, in question 35, the reference should be to lesson 23 instead of lesson 10.

[7/29/2011] On page 1302, in the solution to question 1, on the second displayed line, q_{45} should be $q_{45}^{(s)}$.

[11/2/2010] On page 1320, on the second line, change $20/(\omega - 60)$ to $(\omega - 60)/20$.

[11/2/2010] On page 1320, in the solution to question 22, on the first lines of 1. and 2., change $e^{\delta t}$ to $e^{-\delta t}$.

[10/18/2010] On page 1327, 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 $1 - \Phi\left(\frac{0.5 - (-10)}{\sqrt{210}}\right) = \Phi(-0.72) = \mathbf{0.2344}$. (C)

[10/18/2010] On page 1340, in the solution to question 14, on the third line, change “moment of death” to “end of the year”.

[7/28/2011] On page 1346, the lesson number for SOA Spring 2005 question 35 should be 22 instead of 14. The lesson number for SOA Fall 2006 question 4 should be 18 instead of 17. The lesson number for Fall 2006 question 24 should be 44 instead of 41. The lesson number for SOA Spring 2007 question 29 should be 16 instead of 33.

[10/27/2010] On page 1348, in Table C.3, the columns for Practice Exams 4 and 5 are interchanged, and there are some errors. The correct table is available at errata.aceyourexams.net/MLCReplacementTableC3.pdf.