

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

- [12/17/2011] On page 6, on the first line of Section 1.3, $\Pr(B \neq 0)$ should be $\Pr(B) \neq 0$.
- [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.
- [12/20/2011] On page 41, in the solution to exercise 3.6, the second sentence is cut off and should read
It's the usual CAS type of humor—it's not that the answer cannot be determined from the given information (almost never the right answer choice), rather there is too much information provided.
- [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 ${}_2q_0$.
- [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.
- [12/19/2011] On page 83, 4 lines above the graph, change $\dot{e}_{x:\overline{n}}$ to $\dot{e}u : \overline{n}$.
- [1/7/2012] On page 143, in exercise 8.28, on the last line, put a period after 97.5.
- [1/22/2012] On page 177, in the solution to exercise 9.18, on the first displayed line, put 1– before $\frac{900}{1000}$.
- [6/7/2011] On page 183, on the fourth line, delete “actuarial”.
- [1/23/2012] On page 207, in the solution to Quiz 10-1, on the second displayed line, replace $A_{30:\overline{10}|}$ with $A_{30:\overline{10}|}$.
- [1/30/2012] On page 216, in exercise 11.4, answer choice (B) should be 375.
- [6/3/2011] On page 249, in the solution to exercise 12.17, on the second line, remove the bar from ${}^2\bar{A}_x$.
- [6/7/2011] On page 264, on the fourth line, delete “actuarial”.
- [6/3/2011] On page 271, in the solution to exercise 13.1, on the second line, change the second v_{10} to v_t .
- [12/27/2011] On page 276, in the solution to question 13.22, on the third displayed line, remove the negative sign at the start of the line.
- [7/28/2011] On page 299, in the list of additional released exam questions, delete the “,35” in “M-S05:15,35”.
- [8/15/2011] On page 325, 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 325, on the third line of the paragraph beginning “Whole life”, replace the expression $e^{-(\delta + \mu_x(t))}$ with $e^{-\left(\delta t + \int_0^t \mu_x(u) du\right)}$.
- [6/6/2011] On page 334, in the solution to exercise 16.5, on the third line, replace μ with $k + \mu_{x+t}$.
- [8/15/2011] On page 338, revise the solution to Quiz 16-1 in line with the revised value of \bar{A}_{60} given above:
Since $\bar{A}_{50} = \bar{A}_{50:\overline{10}|}^1 + {}_{10}E_{50}\bar{A}_{60}$, 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

$$\bar{a}_{50:\overline{10}|} = \frac{1 - \bar{A}_{50:\overline{10}|}}{\delta} = \frac{1 - 0.51}{0.06} = \boxed{8\frac{1}{6}}$$

[7/27/2011] On page 349, 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 366, in the list of additional released exam questions, remove SOA M-F06:4.

[7/27/2011] On page 383, the first sentence of the fifth paragraph (starting with “If $I = 1$ ”) 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 $\text{Var}(Y | I) = v^{2n}({}^2\bar{A}_{x+n} - \bar{A}_{x+n}^2)/\delta^2$.

[6/15/2011] On page 388, in Table 18.1, formula (18.12) should have d instead of d^2 in the denominator.

[7/11/2011] On page 391, in exercise 18.10(iii), change 1250 to 125.

[7/28/2011] On page 396, add SOA M-F06:4 to the list of additional released exam questions.

[7/11/2011] On page 400, in the solution to exercise 18.10, on the 5th and 6th lines of the page, change 1250 to 125. On the 7th line, change 625 to 62.5.

[9/8/2011] On page 411, on the 4th line of the second paragraph, change 14/5 to 14/6.

[7/29/2011] On page 440, 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 460, in the solution to exercise 21.8, on the second displayed line, change ${}_5E_x$ to ${}_{10}E_x$.

[7/28/2011] On page 487, in the list of additional released exam questions, add “,35” after “M-S05:14”

[7/15/2011] On page 498, the solution to exercise 22.38 is incorrect. Replace the part starting with “The present value of the refund of premium...” to the end with the following, which also includes an easier method:

The present value of the refund of premium benefits, since the premiums are refunded with interest, is the present value of the premiums themselves. If death occurs in year k , the premiums up to that time are a k -year certain annuity-due. So the present value of the refund of premium benefits is

$$\begin{aligned} \text{PV Refund} &= 0.5\pi \sum_{k=1}^{10} {}_{k-1|}q_{20} \ddot{a}_{\overline{k}|} \\ &= 0.5\pi \sum_{k=1}^{10} 0.01(0.99^{k-1}) \left(\frac{1 - 1/1.05^k}{0.05/1.05} \right) \\ &= 0.005(21)\pi \left(\sum_{k=1}^{10} 0.99^{k-1} - \frac{1}{1.05} \sum_{k=1}^{10} \left(\frac{0.99}{1.05} \right)^{k-1} \right) \\ &= 0.105 \left(\frac{1 - 0.99^{10}}{1 - 0.99} - \frac{1}{1.05} \left(\frac{1 - (0.99/1.05)^{10}}{1 - 0.99/1.05} \right) \right) = 0.225609 \end{aligned}$$

Equating the premiums with the benefits,

$$\begin{aligned} 7.78379\pi &= 9716.212 + 0.225609\pi \\ \pi &= \frac{9716.212}{7.78379 - 0.225609} = \boxed{1285.523} \end{aligned}$$

An easier way to solve this question is to equate the accumulated premiums at time 10 to the present value of the annuity, 17,500. The nonrefundable premiums are accumulated with mortality and interest, and the refundable premiums are accumulated with interest only, so

$$\pi = \frac{17,500}{0.5(\ddot{s}_{20:\overline{10}|} + \ddot{s}_{\overline{10}|})}$$

We computed $\ddot{a}_{20:\overline{10}|}$ above, and accumulating with mortality and interest,

$$\dot{s}_{20:\overline{10}|} = 7.78379 \left(\frac{1.05^{10}}{0.99^{10}} \right) = 14.01949$$

while

$$\dot{s}_{\overline{10}|} = \frac{1.05^{10} - 1}{0.05/1.05} = 13.20679$$

so the premium is $17,500 / (0.5(14.01949 + 13.20679)) = \boxed{1285.523}$.

- [9/5/2011] On page 507, 3 lines below formula (23.2), change the expression before “is wrong” to $(b + P/\delta)^2$.
- [6/21/2011] On page 536, in the caption for Figure 25.2, change fuction to function.
- [8/15/2011] On page 581, on the third displayed line below Table 28.2, change the denominator to $_{h-k}P_{x+k:n-k}^1$ and change $h < k$ to $k < h$.
- [2/12/2012] On page 608, in question 29.8, on the second line from the end of the question, change i from 0.025 to 0.03.
- [10/5/2011] On page 632, 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.
- [10/5/2011] On page 663, in the solution to exercise 31.23, on the third line, change π_{45} to π_{19} .
- [8/14/2011] On page 672, on the four displayed lines after “The fractional premium for the endowment insurance”, there are two errors. Before the first line, add:

$$A_{45:\overline{20}|} = A_{45:\overline{20}|}^1 + A_{45:\overline{20}|}^{\frac{1}{2}} = 0.09 + 0.25 = 0.34$$

On the line for $\ddot{a}_{45:\overline{20}|}^{(4)}$, replace 0.3475558 with 0.342001. Replace the last line with

$$P_{45:\overline{20}|}^{(4)} = \frac{0.34}{11.3743} = 0.029892$$

On the last line of the answer, change 0.030324 to 0.029892.

- [11/13/2011] On page 687, on the last line of the solution to exercise 32.21, the left side should be ${}_2V(\bar{A}_{40:\overline{10}|})$.
- [10/22/2011] On page 733, in the solution to exercise 35.17, on the first line, replace $q_x q_y$ with ${}_tq_x {}_tq_y$.
- [9/27/2011] On page 783, in exercise 38.23, replace the first sentence with
For two independent lives, (30) and (50), a continuous life annuity pays 100 per year to (50) after the death of (30), but only until (50) reaches age 80.
- [7/29/2011] On page 843, delete SOA M-F06:24 from the list of additional released exam questions.
- [7/5/2011] On page 885, 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 887, in Quiz 44-1(iii), replace “if” with “is”.
- [7/29/2011] On page 901, add SOA M-F06:24 to the list of additional released exam questions.
- [7/5/2011] On page 908, in the solution to Quiz 44-1, on the left side of the first line, the superscript (1) should be (2).
- [7/19/2011] On page 1167, in question 21(iv), delete “actuarial”.

- [8/7/2011] On page 1199, 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 1203, in the solution to question 6, on the second line, change the integrand to $\mu_{x+s} ds$.
- [7/19/2011] On page 1243, in the solution to question 24, 4 lines from the bottom, change the first numerator from $\bar{a}_{\overline{10}|0.1}$ to $\bar{a}_{\overline{10}|0.1}$.
- [7/19/2011] On page 1252, 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 1253, in the solution to question 24, on the last line, change ${}_{10}L$ to ${}_{30}L$.
- [7/19/2011] On page 1258, in the solution to question 11, on the last line of the page, change 0.000890 to 0.001780.
- [7/19/2011] On page 1261, 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 $\bar{a}_{x:\overline{n}|} = (1 - \bar{A}_{x:\overline{n}|})/\delta$,

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

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

- [11/5/2011] On page 1267, 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 1269, in the solution to question 10, on the last line, change ${}_tq_0^{(2)}$ to ${}_5q_0^{(2)}$.
- [7/28/2011] On pages 1285 and 1286, in the solution to question 15, on the last line of page 1285, 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 1286, four lines from the end of the solution.
- [7/29/2011] On page 1288 in the solution to question 27, on the first line, $\mu_{50}^{(1)}$ should be $\mu_{50}^{(1)}(t)$.
- [7/29/2011] On page 1313, in the solution to question 1, on the second displayed line, q_{45} should be $q_{45}^{(s)}$.
- [7/28/2011] On page 1366, 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.