

**ERRATA and CLARIFICATIONS FOR 2009 EXAM MLC/3L
STUDY MANUAL
*Dated 4/6/2009***

Module 2

Page 40, second to last paragraph, last sentence

minor typo: reference to “page 42” should be to “page 35”.

Page 41, Exercise 11, lower branch of tree

“ $E(N|G)$ ” and “ $V(N|G)$ ” should be “ $E(N|B)$ ” and “ $V(N|B)$ ”.

Page 49 in Example 2.108

In the second equation displayed, the $f_y(y)$ under the double integral should be $f_y(s-x)$.

Page 55, last paragraph before Exercise 16

“iid” should be “independent” (distributions are not identical).

Page 56

Notation Issues: Ignore this paragraph; distributions other than Normal not included in Exam MLC tables.

Page 59, Example (2.130), solution

Reference to “(2.142)” should be “(2.125)”.

Module 3

Page 13, Example (3.18)

Delete reference to Exam M tables; distributions other than Normal not included in Exam MLC tables.

Module 4

Page 14

Remove the bolded CAS note at the bottom of the page, under the header “The Gompertz and Makeham Distributions”.

Page 15

Delete line 5 beginning “The Exam M tables...” distributions other than Normal not included in Exam MLC tables.

Module 5

Page 22

Remove the note in bold type immediately under the Section title “Interpolation Between Integral Ages.”

Page 26

Delete line 2 “CAS students...”

Module 6

Pages 5, 31, reference to Course 3

Course 3 was the predecessor to Exam M.

Page 5

Clarification re use of ω in “T is uniform on $[0, \omega]$ ”: This ω is not the limiting age of the mortality assumption/table (which is the common usage for ω); it is the ending “time of death” for a person age x.

Page 15, Example (6.18), Solution

First line, additional detail, given RV X is uniform on $[0,100]$: ${}_np_x =$

$$\frac{S(x+n)}{S(x)} = \frac{1-F(x+n)}{1-F(x)} = \frac{1-\frac{x+n}{100}}{1-\frac{x}{100}} = \frac{\frac{100-(x+n)}{100}}{\frac{100-x}{100}} = \frac{100-(x+n)}{100-x};$$

for $x = 30$, ${}_np_{30} = \frac{70-n}{70}$. (This additional detail is also appropriate for first equation in Solution to Example (6.24) on page 20.)

Page 17, (6.22)

More detail re “ $2\text{Cov}(Z_T, Z_P)$ ” term: $Z_T = v^T \mathbb{1}_{T \leq n}$ and $Z_P = 0 \mathbb{1}_{T \leq n} + v^n \mathbb{1}_{T > n}$

$$\begin{aligned} \text{Thus, } \text{Cov}(Z_T, Z_P) &= E[Z_T Z_P] - E[Z_T] E[Z_P] = 0 - \bar{A}_{x:\overline{n}|}^{\downarrow} A_{x:\overline{n}|}^{\uparrow} \\ &= -\bar{A}_{x:\overline{n}|}^{\downarrow} A_{x:\overline{n}|}^{\uparrow}. \end{aligned}$$

Page 22

$\bar{A}_x = \bar{A}_{x:\overline{m}|}^{\downarrow} + {}_m\bar{A}_x$ (6.26) = $\bar{A}_{x:\overline{m}|}^{\downarrow} + v^m {}_m p_x \bar{A}_{x+m}$, notational issue: ${}_m\bar{A}_x$ violates the general principle that “|” followed by a blank means the period of evaluation is 1

period immediately after the m periods of deferral (e.g. ${}_m|q_x$); in the case of ${}_m\bar{A}_x$, the period of evaluation is the time until death after age $x + m$. To avoid this inconsistency, use $v^m {}_m p_x \bar{A}_{x+m}$ instead of ${}_m\bar{A}_x$; $v^m {}_m p_x \bar{A}_{x+m}$ is also more helpful for understanding the valuation of deferred insurance.

Page 42, lines 2 and 3

Replace second sentence of “CAS Note” with: “That section is not on the CAS Exam 3L syllabus.”

Page 50, Example (6.62)

Immediately above the sentence beginning “The reasoning ...”: ${}_{t-x} p_{10+x}$ should be ${}_{t-10} p_{x+10}$.

Page 73

Delete “ $= \bar{A}_x$ ” after “ \bar{A}_{x+10} ” because that \bar{A}_x is not the same as the \bar{A}_x in $1000 \bar{A}_x$, which is based on different assumptions.

Module 7

Page 29, lines 2 and 3

Replace second sentence of “CAS Note” with: “That section is not on the CAS Exam 3L syllabus.”

Module 8

Page 5, after equation (8.5)

The statement says “You can derive...value of (8.5) equal to 0:”. The reference should be (8.4) instead.

Page 24, lines 2 and 3

Replace second sentence of “CAS Note” with: “That section is not on the CAS Exam 3L syllabus.”

Module 9

Page 22, lines 4 and 5

Replace second sentence of “CAS Note” with: “Those sections are not on the CAS Exam 3L syllabus.”

Page 24, lines 3 and 4

Replace second sentence of “CAS Note” with: “That chapter is not on the CAS Exam 3L syllabus.”

Module 10

Page 13, lines 2 and 3

Replace second sentence of “CAS Note” with: “That section is not on the CAS Exam 3L syllabus.”

Page 33, solution to Exam Problem #2

Second to the last line: the intermediate values listed are not correct, but the final answer on the last is. The intermediate values to three decimal places are 0.0581 and 0.0823.

Module 11

Page 3

Replace bolded CAS note immediately after the first paragraph to “CAS Note: Associated single decrement is covered in Section 10.5 of Actuarial Mathematics, which is not on the CAS Exam 3L syllabus.”

Page 35, solution to Exam Problem #5

Last equation in “Find multiple decrement probabilities” section: second “0” subscript should be “1”.

Module 12

Page 1, lines 2 and 3

Replace second sentence of “CAS Note” with: “That chapter is not on the CAS Exam 3L syllabus.”

Page 23, Asset Share Calculation

Add “ b_{h+1} ” after “ ${}_{h+1}CV$ ”.

Module 13

Page 28, solution to #3

States should be 2 at times 1, 2, and 3

SOA Practice Exam

Solutions, page 28, solution to #28

If values are not rounded until the last step, $V(Y) = 2589$ instead of 2591.

Solutions, page 29, solution to #29, equation for $m(3)$

The exponents in the $(t+1)$ terms are both negative, although the negative signs may be hard to see.

Solutions, page 31, solution to #31

If values are not rounded until the last step, the answer is 74.41 instead of 74.36.