Errata and Updates for ASM Exam LTAM (Second Edition Second Printing) Sorted by Date

[1/4/2021] On page 178, in the solution to Quiz 10-1, on the last line, change $2020+28=$ **2048** to $2020+29=$ **2049**.

[1/4/2021] On page 181, on the second line of the solution to Example 11B, change K_t to K_{t+1}.

[1/4/2021] On page 184, in Example 11E, question 3, change "$q(50,1)$ is greater than 0.007" to "$q(50,1)$ is less than 0.007".

[12/27/2020] On page 872, make the following corrections to the Woolhouse formulas:

- In formula (47.7), change $\bar{a}_x^{ij}$ to $\bar{a}_x^{ii}$.
- In formula (47.9), change $\bar{a}_x^{ij}$ to $\bar{a}_x^{ii}$.
- In formula (47.11), delete the plus sign after the minus sign.

[12/27/2020] On page 873, fix equations (47.7), (47.9), and (47.11) as indicated in the errata for page 872. Also, delete the second line under Two-term Woolhouse formulas, and on the first line, change the equation number (47.12) to (47.6).

[12/16/2020] On page 1890, the solution to 1(a)(ii) is incorrect. The correct solution is

By equation (25.7), Woolhouse's formula (first two terms only)

$$\ddot{a}_{45}^{(12)}=\ddot{a}_{45}-\frac{11}{24}=14.4893-\frac{11}{24}=14.03097$$

Multiplying this by the annual amount of 48,000, we find that the APV of the monthly annuity-due is **673,486**.

[12/16/2020] On page 1893, 3 lines from the end of the page, 0.38424 should be 0.34824. As a result, the solutions to 4(c), 4(d), and 4(e) are incorrect. The correct solutions are

(c) [**Lesson 60**] The EPV of benefits is

$$100{,}000(2A_{50}-A_{50:50})=100{,}000\big(2(0.18931)-0.24669\big)=13{,}193$$

The EPV of 1 unit of premium per year is $\ddot{a}_{\overline{50:50}}$ minus $\ddot{a}_{\overline{50:50:\overline{20}|}}-\ddot{a}^{(2)}_{\overline{50:50:\overline{20}|}}$.

$$\ddot{a}_{\overline{50:50}}=2\ddot{a}_{50}-\ddot{a}_{50:50}=2(17.0245)-15.8195=18.2295$$

From part (b), the item to subtract is $2(0.25)(1-{}_{20}E_{50})-0.25(1-{}_{20}E_{50:50})$:

$$2(0.25)(1-0.34824)-0.25(1-0.32177)=0.1563$$

So the EPV of 1 unit of premium per year is $18.2295-0.1563=18.0732$. The gross premium is

$$G=\frac{13{,}193}{0.9(18.07321)-0.7}=\boxed{\textbf{847.56}}$$

(d) [**Lesson 60**]

(i)

$$
\begin{aligned}
{}_{20}V &= 100{,}000A_{\overline{70:70}} - 0.9G\ddot{a}_{\overline{70:70}} \\
A_{\overline{70:70}} &= 2(0.42818) - 0.52488 = 0.33148 \\
\ddot{a}_{\overline{70:70}} &= 2(12.0083) - 9.9774 = 14.0392
\end{aligned}
$$

$\ddot{a}_{\overline{70:70}}$ may also be computed using $\ddot{a}_{\overline{70:70}} = \frac{1-A_{\overline{70:70}}}{d}$

$$
{}_{20}V = 33{,}148 - 0.9(847.56)(14.0392) = \boxed{\textbf{22,439}}
$$

(ii)

$$
\begin{aligned}
{}_{20}V &= 100{,}000A_{70} - 0.9G\ddot{a}_{70} \\
&= 42{,}818 - 0.9(847.56)(12.0083) = \boxed{\textbf{33,658}}
\end{aligned}
$$

(e) [**Section 47.4 and Lesson 60**] We will use multistate recursion from time 20.

$$
\begin{aligned}
({}_{19.5}V + 0.9(0.5G))(1+i)^{0.5} &= ({}_{0.5}p_{69.5})^2\ {}_{20}V^{\text{(both alive)}} + 2\,{}_{0.5}p_{69.5}\ {}_{0.5}q_{69.5}\ {}_{20}V^{\text{(one alive)}} \\
&\quad + ({}_{0.5}q_{69.5})^2(100{,}000) \\
{}_{0.5}p_{69.5} &= p_{69}^{0.5} = (1-0.009294)^{0.5} = 0.9953422 \\
\left({}_{19.5}V + 0.9\big(0.5(847.56)\big)\right)(1.05)^{0.5} &= 0.990706(22{,}439) + 2(0.9953422)(1-0.9953422)(33{,}658) \\
&\quad + (1-0.9953422)^2(100{,}000) = 22{,}545 \\
{}_{19.5}V &= \frac{22{,}545}{1.05^{0.5}} - 0.9\big(0.5(847.56)\big) = \boxed{\textbf{21,620}}
\end{aligned}
$$