

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

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

[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  $\boxed{673,486}$ .

[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

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

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

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

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

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

(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  $\ddot{a}_{\overline{70:70}} = \frac{1-A_{\overline{70:70}}}{d}$

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

(ii)

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

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

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