Errata and Updates for the 2nd Edition of the ACTEX Manual for Exam FAM-L

(Last updated 04/10/2025)

Page 76 **Solution of Question 29.**

Change (c) to:

$\mathrm{E}(T_{40}^2) = 2\int_0^{60} t\left(1 - \frac{t}{60}\right)^{0.5} \, \mathrm{d}t.$

Let $y = 1 - t/60$. We have

$$\begin{aligned}\mathrm{E}(T_{40}^2) &= 2\int_1^0 60(1-y)y^{0.5}(-60)\mathrm{d}y \\ &= 7200\int_0^1 \left(y^{1/2} - y^{3/2}\right)\mathrm{d}y \\ &= 7200\left[\frac{2}{3}y^{3/2} - \frac{2}{5}y^{5/2}\right]_0^1 = 1920\end{aligned}$$

Hence, $\mathrm{Var}(T_{40}) = 1920 - 40^2 = 320$.

Page 77 **Solution of Question 32.**

Change (b) and (c) to:

(b) We first calculate the survival probabilities:

x	$p_{[x]}$	$p_{[x]+1}$	$p_{[x]+2}$	$p_{[x]+3}$	p_{x+4}	$x+4$
40	0.99899	0.99825	0.99795	0.99767	0.99743	44
41	0.99887	0.99812	0.9978	0.99748	0.99707	45
42	0.99873	0.99796	0.9976	0.9972	0.99663	46

Starting from $l_{[40]} = 10000$ and using the probabilities in the first row, we get:

$l_{[40]+1} = 9989.9$, $l_{[40]+2} = 9989.9 \times 0.99825 = 9972.418$, $\ldots$, $l_{44} = 9928.786119$.

Then we make a turn:

$$l_{45} = 9928.786119 \times 0.99707 = 9903.269139,$$

and

$$l_{46} = 9903.269139 \times 0.99663 = 9874.25256.$$

Based on $l_{45} = l_{[41]+4}$, we can go backwards using the probabilities in the second row:

$$l_{[41]+3} = \frac{9903.269139}{0.99748} = 9928.288425, \ \ldots, \ l_{[41]} = 9980.198013.$$

Based on $l_{46} = l_{[42]+4}$, we can go backwards using the probabilities in the third row:

$$l_{[42]+3} = \frac{9874.25256}{0.9972} = 9901.978099, \ \ldots, \ l_{[42]} = 9958.737639.$$

The final result, rounded to 3 decimal places, is calculated as follows:

x	$l_{[x]}$	$l_{[x]+1}$	$l_{[x]+2}$	$l_{[x]+3}$	l_{x+4}	$x+4$
40	10000	9989.900	9972.418	9951.974	9928.786	44
41	9980.198	9968.920	9950.179	9928.288	9903.269	45
42	9958.738	9946.090	9925.800	9901.978	9874.253	46

(c) (a) ${}_2p_{[42]} = l_{[42]+2}/l_{[42]} = 0.99669$

(b) ${}_3q_{[41]+1} = (l_{[41]+1} - l_{[41]+4})/l_{[41]+1} = 0.00659$

(c) ${}_{3|2}q_{[41]} = (l_{[41]+3} - l_{[41]+5)})/l_{[41]} = 0.005414.$

Page 77 **Solution of Question 33.**

Change (d) to:

$$\begin{aligned} {}_{4.3}p_{50.4} &= {}_{0.6}p_{50.4} \times {}_{3.7}p_{51} = {}_{0.6}p_{50.4} \times {}_3p_{51} \times {}_{0.7}p_{54} \\ &= (p_{50})^{0.6}\, {}_3p_{51}\, (p_{54})^{0.7} \\ &= \left(\frac{99900}{100000}\right)^{0.6} \left(\frac{99100}{99900}\right) \left(\frac{98500}{99100}\right)^{0.7} = 0.987191 \end{aligned}$$

Page 132 **Solution of Question 13. Second line.**

Change A_x to $\bar{A}_x$.

Page 155 **Fourth line from the bottom.**

Change the formula to:

$$\mathrm{E}(Y) = \int_0^n \bar{a}_{\overline{t}|}\, {}_tp_x \mu_{x+t} \mathrm{d}t + \int_n^\infty \bar{a}_{\overline{n}|}\, {}_tp_x \mu_{x+t} \mathrm{d}t = \int_0^n \bar{a}_{\overline{t}|}\, {}_tp_x \mu_{x+t} \mathrm{d}t + \bar{a}_{\overline{n}|}\, {}_np_x$$

Page 251 **Question 33. 3rd line.**

Change "a 20-year whole life insurance of 500" to "a whole life insurance of 500".

Page 252 **11th line.**

Change $l_x = 100x$ to $l_x = 100 - x$.

Page 260 **Solution of Question 1.**

Change the solution to:

$\bar{A}^{1}_{x:\overline{n}|} = 0.804 - 0.6 = 0.204$. Under UDD, $A^{1}_{x:\overline{n}|} = \frac{\ln 1.04}{0.04} \times 0.204 = 0.2$.

$A_{x:\overline{n}|} = 0.2 + 0.6 = 0.8$, $\ddot{a}_{x:\overline{n}|} = \frac{1-0.8}{0.04/1.04} = 5.2$.

So, $1000P(\bar{A}_{x:\overline{n}|}) = 1000 \times \frac{0.804}{5.2} = 154.62$, and the correct answer is (B).

Page 261 **Solution of Question 5. 3rd line.**

Change $a_{30:\overline{15}|}$ to $\ddot{a}_{30:\overline{15}|}$.

Page 262 **Solution of Question 12**.

Change the solution to:

The APV of death benefit is $1000A^{1}_{30:\overline{10}|} + 2000{}_{10}E_{30}A^{1}_{40:\overline{10}|} = 16.66 + 65.22{}_{10}E_{30}$.
The APV of premiums is $2\pi\ddot{a}_{30:\overline{20}|} - \pi\ddot{a}_{30:\overline{10}|} = 21.3527\pi$.
We still need to solve for ${}_{10}E_{30}$. To this end, we note that

$$\ddot{a}_{30:\overline{20}|} = \ddot{a}_{30:\overline{10}|} + {}_{10}E_{30}\ddot{a}_{40:\overline{10}|}$$
$$15.0364 = 8.7201 + 8.6602{}_{10}E_{30}$$

so that ${}_{10}E_{30} = 0.729348$. By the equivalence principle,

$$16.66 + 65.22 \times 0.729348 = 21.3527\pi$$

and hence $\pi = 3.01$. The correct answer is (B).

Page 276 **Solution of Question 47 (d)**.

Change 22,515,631.69 to 25,515,631.69.