

Errata and updates for ASM Exam STAM Study Manual (Second Edition) sorted by date

Practice Exam 11:5, correct the question as indicated below, page 1138.

- [5/27/2021] On page 970, on the third line from the bottom of the page, put a bar over X_i .
- [5/27/2021] On page 983, in exercise 53.19, on the fourth line, add “them” between “5 of” and “each”.
- [5/27/2021] On page 1049, in question 17, delete the first sentence “You are given the following experience:”.
- [5/27/2021] On page 1180, on the fourth line of the page, the answer key should be **(A)**.
- [5/19/2021] On page 774, on the 10th line, change $3\lambda e^{-3\lambda}$ to $3e^{-3\lambda}$ (delete λ). On the 11th and 17th lines, once apiece, change $e^{-x/3}$ to e^{-3x} .
- [5/19/2021] On page 822, in the solution to exercise 45.13, on the first three displayed lines, change every x to q : $f(x)$ should be $f(q)$ and dx should be dq . Four changes.
- [5/19/2021] On page 851, in the solution to exercise 47.20, on the third line, chane 370,000 to 740,000. Replace the last three sentences of the solution with
- The expected process variance is $0.2(740,000)+0.8(28,000,000) = 22,548,000$. Bühlmann’s K is $22,548,000/2,433,600 = 9.265286$. The credibility factor is

$$Z = \frac{3}{3 + 9.265286} = \boxed{0.2446} \quad (\text{D})$$

- [5/19/2021] On page 856, one line above the heading “The exposure unit”, insert “are” between “you” and “calculating”.
- [4/30/2021] On page 600, on the fourth line of the fourth paragraph under “34.2 Grouped data”, change $F_n^*(c_{j-1})$ to $F_n(c_{j-1})$.
- [4/30/2021] On page 644, in the solution to exercise 35.11, on the displayed line, change the “=” before $\frac{(4-10)^2}{10}$ to “+”.
- [4/30/2021] On page 721.19, change the solution to exercise 40.19 to

$$\lambda_F = \left(\frac{\Phi^{-1}(0.99)}{0.05} \right)^2 = \left(\frac{2.326}{0.05} \right)^2 = 2164.11$$

For severity, the credibility standard is expressed in terms of number of exposures, which is number of claims. We had 1384 claims.

$$e_X = 2164.11 \left(\frac{6,010}{55^2} \right) = 4,300$$

$$Z_X = \sqrt{\frac{1,384}{4,300}} = 0.567354$$

For pure premium, the credibility standard is expressed in terms of number of exposures, which is number of policies. We have 21,000 policies. We divide the usual formula for the credibility standard in terms of

number of expected claims by 0.085 to express it in terms of number of policies

$$e_P = \frac{2164.11}{0.085} \left(1 + \frac{6,010}{55^2} \right) = 76,044$$

$$Z_P = \sqrt{\frac{21,000}{76,044}} = 0.525506$$

The absolute difference between credibility factors is **0.0418**. (A)

[4/26/2021] On page 510, in the solution to exercise 30.10, on the last line, add a λ_2 to the exponent of the first expression so that it is $\lambda_2^4 e^{-(\sum y_i - 40)\lambda_2}$.

[4/26/2021] On page 511, in the solution to exercise 30.13, on the second line of the page, change θ^{30} in the denominator to θ_P^{30} .

[4/26/2021] On page 531, 3 lines from the bottom of the page, change $\frac{5}{\alpha} -$ to $\frac{5}{\alpha} +$.

[4/26/2021] On page 549, in exercise 31.42(iii), replace the matrix with

$$\begin{pmatrix} 0.0444 & 0 \\ 0 & 0.0222 \end{pmatrix}$$

[4/26/2021] On page 590, in the solution to exercise 33.2, on the second line, 190.84 should be 191.26, affecting all the successive calculations. Replace the entire solution with

The formula for the Weibull maximum likelihood estimate (equation (30.1)) gives

$$\hat{\theta} = \sqrt{\frac{\sum x_i^2 - 10(10^2)}{10}} = 191.26$$

Then $F^*(30)$ and $D(30)$ are

$$\hat{F}(30) = 1 - e^{-(30/191.26)^2} = 0.024303$$

$$\hat{F}(10) = 1 - e^{-(10/191.26)^2} = 0.002730$$

$$F^*(30) = \frac{0.024303 - 0.002730}{1 - 0.002730} = 0.021632$$

$$D(30) = 0.5 - 0.021632 = \mathbf{0.4784}$$

[4/22/2021] On page 1143, in question 24, on the last line, change 12/31/CY7 to 12/31/CY5.

[4/14/2021] On page 434, on the third line, change "ae" to "are".

[4/14/2021] On page 434, on the third line, change "ae" to "are".

[4/14/2021] On page 443, in the solution to exercise 27.7, on the second to last line, change "average value of S given $S > 4903.93$ " to "average value of $S - 4903.93$ given $S > 4903.93$ ".

[4/14/2021] On page 477, in the solution to exercise 29.7, on the fourth line of the page, change "question 29" to "question 29.5".

[4/13/2021] On page 1251, in the solution to question 8: The tables for the single parameter Pareto now include the formula $E[X \wedge k] = \theta \left(1 + \ln \left(\frac{k}{\theta} \right) \right)$, so the derivation of that formula on line 4-7 is unnecessary.

[3/19/2021] On page 350, in exercise 22.32, on the first line, change “number of losses, X ” to “number of losses, N ”.

[3/15/2021] On page 974, two lines from the bottom, a sum sign is missing from the numerator. The line should be

$$= \frac{\sum_{j=1}^n m_j^2(\beta + \alpha/m_j)}{m^2}$$

[3/15/2021] On page 975, two lines from the bottom of the sidebar, change $v(n - 1)$ to $v(r - 1)$.

[3/8/2021] On page 339, in the sidebar, six lines from the bottom, change $P'_N(0)$ to $P'_N(1)$.

[12/26/2020] On page 718, in exercise 40.18, on the first line, change “iimited” to “limited”.

[8/3/2020] On page 941, in the solution to exercise 50.16, on the fifth line, the line for Z , change the numerator from 90 to $200 + 250 + 225$.

[7/9/2020] On page 1295, on the first line, change the link to <https://www.casact.org/admissions/studytools/exam3/sp05-3.pdf>.

[7/9/2020] On page 1298, on the first line, change the link to <https://www.casact.org/admissions/studytools/exam3/Fall105.pdf>.

[7/9/2020] On page 1301, on the first line, change the link to <https://www.casact.org/admissions/studytools/exam3/06-3.pdf>.

[7/9/2020] On page 1304, on the first line, change the link to <https://www.casact.org/admissions/studytools/exam3/Fall106.pdf>.

[6/22/2020] On page 131, in the solution to exercise 8.11, in the table, the headings are wrong. Here is a table with the corrected headings:

Accident Year	Incremental Paid Losses in Development Year			
	2	2	3	4
AY6				10,650
AY7			13,000	11,700
AY8		35,000	14,000	12,600

[6/21/2020] On page 1195, regarding the solution to question 11, the tables now do include the formulas you need to solve this question. The revised solution is

The formula is $1082.41(1 + CV_5^2) = 1082.41 \left(\frac{E[(X \wedge 10,000)^2]}{E[X \wedge 10,000]^2} \right)$. Using the formulas in the tables,

$$E[X \wedge 10,000] = 1,000(1 + \ln(10,000/1,000)) = 3302.585$$

$$E[(X \wedge 10,000)^2] = \frac{1,000^2}{1 - 2} - \frac{2(1,000)}{(1 - 2)(10,000)^{1-2}}$$

$$= -1,000,000 + 2(1,000)(10,000) = 19,000,000$$

$$1082.41 \left(\frac{E[X^2]}{E[X]^2} \right) = 1082.41 \left(\frac{19,000,000}{3302.585^2} \right) = \boxed{1885.547} \quad \text{(B)}$$

[6/15/2020] On page 186, on the second line of the solution to Example 12K, change the left parenthesis after $E[Y^L]$ to a slash. On the third line, delete the exponent 2 after $(1 - F(500))$. The sentence should then read

$$E[Y^P] = E[Y^L]/(1 - F(500)) \text{ and } E[(Y^P)^2] = E[(Y^L)^2]/(1 - F(500)).$$

Now let's move on to Territory 2. Here, the base rate is $600(1.25) = 750$. But the average rate is 800. The average class differential is $800/750$. So we multiply the number of exposures by $800/750$ to obtain the adjusted exposures, weighted by class. This is equivalent to setting the adjusted number of exposures for each insured equal to the class differential for that insured. The number of exposures is $40,000/800 = 50$, so the adjusted number of exposures is $50(800/750) = 160/3$.

In Territory 3, the base rate is $600(1.6) = 960$ and the average rate is 1,200, making the average class differential $1200/960$. So we multiply exposures, $60,000/1,200 = 50$ by $1,200/960$, getting $50(1,200/960) = 62.5$.

Using these adjusted exposures, the loss cost is $28,000/(160/3) = 525$ in Territory 2 and $36,000/62.5 = 576$ in Territory 3. Dividing these by the 300 loss cost of Territory 1, we get $525/300 = 1.75$ for Territory 2 and $576/300 = 1.92$ for Territory 3, the same as with the loss ratio method.

[6/15/2020] On page 186, on the second line of the solution to Example 12K, change the left parenthesis after $E[Y^L]$ to a slash. On the third line, delete the exponent 2 after $(1 - F(500))$. The sentence should then read

$$E[Y^P] = E[Y^L]/(1 - F(500)) \text{ and } E[(Y^P)^2] = E[(Y^L)^2]/(1 - F(500)).$$

[5/20/2020] On page 1291, in the solution to question 24, replace the third and fourth lines with

$$\begin{aligned} l &= 4 \ln \alpha + 6\alpha \ln \theta - (\alpha + 1) \sum_{i=1}^4 \ln(\theta + x_i) - 2\alpha \ln(\theta + 200) \\ &= 4 \ln 0.6526 + 6(0.6526) \ln 38.8571 - 1.6526 \sum_{i=1}^4 \ln(38.8571 + x_i) - 2(0.6526) \ln 238.8571 \\ &= -22.8443 \end{aligned}$$

[5/5/2020] On page 1277, in the solution to question 19, on lines 3–7, change every X to $X \wedge 20$. On line 8, change “calculate above” to “calculated above”. On the third line from the end, change $10 \leq 10 < 20$ to $10 \leq X < 20$. The last line should be split into two lines; the split is between 114.6 and $\text{Var}(X \wedge 20)$.

[4/24/2020] On page 148, in the solution to Example 10D, replace the paragraph beginning “To fix the bias” with
To fix the bias of the loss cost method, we adjust the exposures. The adjustment consists of setting the number of exposures for each policyholder equal to the class differential. In this example, since we are not given the classes or their differentials, we need to know the base rate. The final indicated territory differentials will not vary as a function of the base rate, but we need it to calculate the average class differential. So let's assume that the base rate in Territory 1 is 600. Then, since the average rate equals the base rate, the average class differential is 1 and no adjustment is needed to Territory 1 exposures; they are $90,000/600 = 150$.

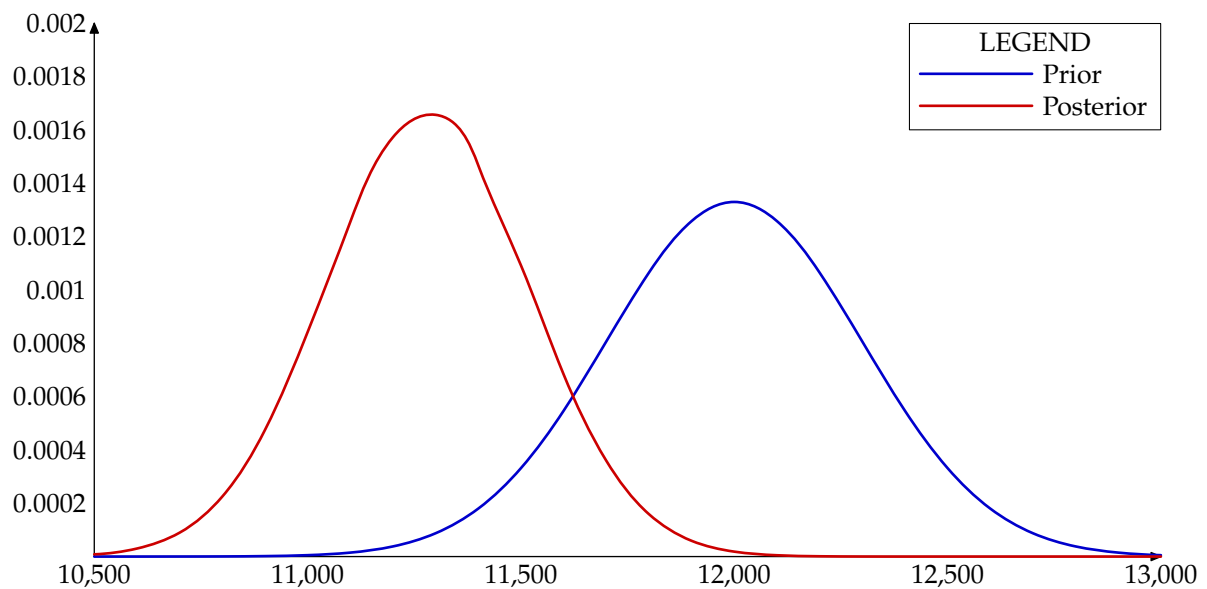
[4/24/2020] On page 1138, in question 5, after the table, add
The base rate for Territory 1 is 300.

[4/24/2020] On page 1273, replace the solution to question 5 with

The number of exposures in Territory 1 is $45,000/300 = 150$. Since the base rate in Territory 1 is 300, this implies that the average class differential in Territory 1 is 1, so that base exposures in Territory 1 equal exposures in Territory 1, or 150.

In Territory 2, the base rate is $300(1.2) = 360$ and the average rate is 400. So each exposure is given a weight of $400/360 = 10/9$. There are $40,000/400 = 100$ exposures, so there are $100(10/9) = \boxed{111\frac{1}{9}}$ base exposures. **(B)**

- [4/21/2020] On page 1137, in question 2, on the last line of the table under "Deductible 1000", change the periods to commas: 1.727 should be 1,727 and 3.558.799 should be 3,558,799.
- [4/3/2020] On page 1261, in the solution to question 3, on the second line, change "greater" to "less".
- [4/2/2020] On page 1125, in question 31, delete statement (i).
- [3/31/2020] On page 1256, in the solution to question 23, on the fourth line, delete the 2 in $2(1 - \alpha)$. The factor 2 was already multiplied by 0.1 and 0.2 in the expression, which has 0.2 and 0.4. Two lines after this line, delete the parenthesized statement "(in the following expression, 2 was canceled)".
- [3/7/2020] On page 138, in exercise 9.4, in the second table, change "Calendar Year" to "Accident Year" and change CY1, CY2, CY3, CY4 to AY1, AY2, AY3, AY4.
- [1/7/2020] On page 805, replace the graph in Figure 44.1 with



- [12/23/2019] On page 997, on the fourth line, change the denominator of the fraction from $150+272+511$ to 549.7149.