

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

Practice Exams 5:2 and 10:17 are defective in that none of the five answer choices is correct. For Practice Exam 7:24, correct the question as indicated below, page 1125.

- [3/7/2020] On page 142, 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. On the last line, change “Calculated” to “Calculate”.
- [10/13/2019] On page 1214, in the solution to question 28, three lines from the end, replace 104.43575 with 14.43575.
- [10/6/2019] On page 1314, in the solution to question 8, 3 lines above the table at the end, change “50(0.8) + 19 = 43” to “30(0.8) + 19 = 43”.
- [9/14/2019] On page 1307, in the solution to question 26, on the first line, change $\frac{2}{\beta^2}$ to $\frac{2}{\beta^3}$.
- [9/4/2019] On page 1295, in the solution to question 23, on the first displayed line, division signs (/) are missing from two exponents. The line should read

$$L(\mu) = \left(\frac{e^{-(1+2+4+7)/\mu}}{\mu^4} \right) \left(e^{-20/\mu} \right) \left(\frac{\mu^4}{(\mu+1)^5} \right) = \frac{e^{-34/\mu}}{(\mu+1)^5}$$

- [7/24/2019] On page 97, on the last line, change “insurane” to “insurance”.
- [6/7/2019] On page 1095, in question 32, add the following sentence to (i):
The deductible is subtracted from the payment after coinsurance is applied.
- [6/7/2019] On page 1227, in the solution to question 2, change the last line to

$$0.9 \left(\frac{21,000(0.1953125)}{0.7} \right) = \span style="border: 1px solid black; padding: 2px;">5,273.438$$

None of the answer choices is correct.

- [5/9/2019] On page 495, in the solution to exercise 29.28, on the fourth line, the last right parenthesis in the denominator should be before the exponent $\alpha + 1$:

$$\frac{\alpha^3(1000^{3\alpha})}{((1200)(1700)(4000))^{\alpha+1}}$$

- [3/17/2019] On page 1319, in the solution to question 21, on the ninth line, change $r = 1$ to $r = 3$. On the second to last line of the solution, change $1 - 2P_X(0)$ to $3 - 2P_X(0)$.
- [2/21/2019] On page 133, in the solution to exercise 8.9, in the table, the Development Years should be 1, 2, 3, and 4 instead of 2, 3, 4, and 5.
- [2/13/2019] On page 302, right after formula (19.3), replace the next 4 lines with
These formulas are provided in the distribution tables you get at the exam at the beginning of Section B.2. Formula (19.2) is the more important one, in that it may save a little work in a question like the following.
- [2/13/2019] On page 1007, in the solution to exercise 53.3, on the third displayed line, replace $v_Z -$ with $v_X =$.
- [2/13/2019] On page 1125, in question 24(i), change 6% to 6.5%.
- [2/10/2019] On page 226, in the solution to exercise 13.27, on the third line, change $\alpha - 1$ to $\alpha - 1 = 1$.

- [1/30/2019] On page 633, delete the first word on the page, “squared”.
- [1/22/2019] On page 1295, in the solution to question 22, on the lsat line of the page, change 2000^2 to 2000^4 .
- [1/20/2019] On page 470, change the sentence on lines 5–6 beginning with “Expect” to
Expect lots of exam questions on maximum likelihood estimation.
- [1/20/2019] On page 477, in exercise 29.1, in answer choice C, change theta to θ .
- [1/20/2019] On page 497, on the second line of item 3 in the enumerated list, change $|\sigma^2$ to σ^2 .
- [1/13/2019] On page 865, in exercise 47.24, on the line below the table, change “than” to “that”.
- [1/10/2019] On page 781, replace the paragraph before Example 42B with the following paragraph:
Special care is needed when the region on which the model distribution has support (in other words, nonzero density) has bounds that depend on a prior parameter. For example, if the model distribution is uniform on $[a, \theta]$ and there is a claim for 5, you immediately know that θ must be at least 5. A similar statement holds for a single parameter Pareto model with prior parameter θ , as the next example illustrates.
- [1/3/2019] On page 1198, in the solution to question 12, in the table, change the entry for AY1 development year 3 from 100.0% to 10.0%.
- [1/2/2019] On page 1270, in the solution to question 25, change the last term in the formula from $\frac{\sum(\theta/x_i)^\tau}{\ln(\theta/x_i)}$ to
 $\sum(\theta/x_i)^\tau \ln(\theta/x_i)$.
- [12/25/2018] On page 1215, in the solution to question 32, on the third line from the end, change “greater than or equal to 2” to “less than 2”.
- [12/24/2018] On page 132, in the solution to exercise 8.7, on the line below the table, change AY3 to AY4.
- [12/23/2018] On page 120, in Table 8.3, change 12.1609 (for AY3) to 12.0426.
- [12/19/2018] On page 265, in the solution to exercise 16.6, on the ninth line, change equation (16.1) to equation (16.2).
- [12/16/2018] On page 436, in exercise 26.25, change answer choice B to 18.8.
- [12/10/2018] On page 343, in the solution to exercise 21.16, on the last line, put primes on the β s;

$$r\beta'(1 + \beta')$$

- [12/10/2018] On page 350, in Example 22D(iv), add “given θ ” after “independent” and before the period.
- [12/1/2018] On page 244, in exercise 15.6, on the second line, change “primary reinsurer’s” to “primary insurer’s”.
- [11/24/2018] On page 228, the first full paragraph is confusing. It says that each ILF calculation should only use data from policies at that limit or higher, yet Example 14B violates this. It instead should say that each LAS calculation should only use data from policies at that limit or higher. Replace the paragraph with the following paragraph:

In the previous example the sizes of all losses were known, but in practice the company would not know the sizes of losses above the limit. Therefore, you should compute the *limited average severity* (LAS) for the basic policy limit and the policy limit of interest. The limited average severity for a limit is the sum of limited losses, the minimums of loss sizes and policy limit, divided by the number of losses. For each LAS calculation, you should use data only from policies with the policy limit of interest or a higher policy limit; for policies with lower limits, you do not know the limited loss for policies at the policy limit. Since there will be different numbers of policies used in the calculation of limited losses, the number of losses used to calculate each LAS will not be the same.

[11/24/2018] On page 236, change the answer key for exercise 14.5 to **(E)**.

[11/18/2018] On page 164, in the solution to exercise 10.14, on the second line, in the denominator, remove the parenthesis after 5000 and add a parenthesis after 1.5). The line should read

$$\frac{2,000,000 + 500,000}{500(5000(1) + (1000)(1.5))} = 0.769231$$

[11/3/2018] On page 675, on the last line before the exercises, change “Exam C” to “Exam STAM”.

[10/30/2018] On page 122, on the line above the last table, change “We are using Table 8.3” to “We are using the table at the top of page 120”.

[10/23/2018] On page 105, three lines below formula (7.1), change f to f_{ult} .

[10/23/2018] On page 711, in the solution to exercise 38.14, on the last line, insert “=” between k and $\frac{1.96}{\sqrt{683}}$.

[10/23/2018] On page 908, in the solution to exercise 48.24, on the ninth line, change v_2 to v_B .

[10/19/2018] On pages 191, the answer to Example 12K is incorrect. Replace it with the following:

The payment per payment random variable Y^P has density $f_{Y^P}(x) = f_{Y^L}(x)/(1 - F(500))$, where Y^L is the payment per loss random variable, for $x > 500$. Therefore, $E[Y^P] = E[Y^L]/(1 - F(500))$ and $E[(Y^P)^2] = E[(Y^L)^2]/(1 - F(500))^2$. We'll calculate variance as second moment minus first moment squared.

Split the first interval (0, 1000) into two subintervals, (0, 500] and (500, 1000). The average payment in the first interval is 0 and in the second interval the average payment is 250. The probability that a loss will be in the second interval is $0.5(23)/50 = 0.23$. Similarly, the probabilities of the other three intervals are $16/50 = 0.32$, $6/50 = 0.12$, and $5/50 = 0.1$. The average payment per loss in those intervals is the midpoint, minus 500. So the overall average payment per loss is

$$E[(X - 500)_+] = 0.23(250) + 0.32(1000) + 0.12(3000) + 0.1(7000) = 1437.5$$

Also, $\Pr(X \leq 500) = 0.5(23)/50 = 0.23$, so the average payment per payment is $1437.5/(1 - 0.23) = \boxed{1866.88}$.

We'll calculate the second moment of payment per loss using equation (2.4) in each interval starting with the interval (500, 1000).

$$E[(X - 500)_+^2] = \frac{0.23(500^2) + 0.32(500^2 + (500)(1500) + 1500^2) + 0.12(1500^2 + (1500)(4500) + 4500^2) + 0.10(4500^2 + (4500)(9500) + 9500^2)}{3} = 6,644,166\frac{2}{3}$$

Therefore, the variance of payment per payment is

$$\frac{6,644,166}{0.77} - 1866.88^2 = \boxed{5,143,535}$$

[10/4/2018] On page 109, in exercise 7.13, on the second-to-last line, change “Earned premium for AY2” to “Earned premium for CY2”.

[10/4/2018] On page 1293, replace the last two sentences with

The effective loss ratio is $21/15.5 = 1.354839$. The indicated rate change is $1.354839/0.7 - 1 = \boxed{0.9354}$, which is not one of the 5 answer choices.

- [9/20/2018] On page 103, 6 lines above Table 7.2, delete “use” before “average”.
- [9/20/2018] On page 104, in the second-to-last table on the page, change “Accident year” to “Calendar year”.
- [9/7/2018] On page 134, in the solution to exercise 8.12, on the fourth line, change $4/3$ to $3/2$. 7 lines from the end, change 4397.83 to 3763.65. This affects the rest of the solution; starting with that line, the rest of the solution is

$$924(1.1) + 1050(1.112195)(1.1) + 800(1.494444)(1.112195)(1.1) = 3763.65$$

and subtracting paid to date from the cumulative payments triangle, future payments are

$$3763.65 = 989.65$$

We therefore multiply next year’s payments by $994.6/989.65$ to adapt them to the reserve. Next year’s payments based on the paid loss triangle and paid loss link ratios are

$$800(0.494444) + 1050(0.112195) + 924(0.1) = 605.76$$

and adapting them, $(994.6/989.65)(605.76) = \boxed{608.79}$.

- [9/4/2018] On page 114, in the solution to exercise 7.12, on the fourth line, change $\frac{800}{725}$ to $\frac{800}{700}$. On the fifth line, change 1.120833 to 1.208333.
- [9/4/2018] On page 154, in the answer to Example 10G, on the fourth line, change the second $\sqrt{60/1082}$ (but not the first) to $\sqrt{30/1062}$. On the second-to-last line, change “Territory 1” to “Class B”.
- [8/31/2018] On page 123, three lines under the Incremental Closed Claims table, change 153 to 115. The calculations use internal precision for ultimate claim counts greater than the one decimal place that is shown. To use one decimal place for ultimate claim counts, replace the Incremental Closed Claims table through the end of the page with the following:

Incremental Closed Claims				
Accident Year	Development Years			
	1	2	3	4
AY1	10	5	3	2
AY2	12	6	5	2.100
AY3	12	3	4.043	2.157
AY4	5	4.666	4.066	2.169
AY5	9.897	4.881	4.253	2.269

For example, for AY3,

$$0.653(136.2 - 115 - 12 - 3) = 4.043$$

$$136.2 - 115 - 12 - 3 - 4.043 = 2.157$$

We multiply incremental frequency by incremental severity to obtain loss payments in the year, then add up projected loss payments to obtain the total reserve.

$$\text{AY2: } (2.100)(18.3750) = 38.59$$

$$\text{AY3: } (4.043)(33.075) + (2.157)(19.2938) = 175.34$$

$$\text{AY4: } (4.666)(23.2342) + (4.066)(34.7288) + (2.169)(20.2584) = 293.53$$

$$\text{AY5: } (9.897)(34.5063) + (4.881)(24.3959) + (4.253)(36.4652) + (2.269)(21.2714) = 663.94$$

The reserves sum up to 1171.40.

[8/31/2018] On page 165, in the solution to Quiz 10-3, change the denominator on the second line so that the second line is

$$\frac{5000(1) + 2500(1.7) + 1500(2.5) + 2000(1.7)(2.5)}{5000(1) + 2500(1.6) + 1500(2.8) + 2000(1.6)(2.8)} = \boxed{0.970217}$$

[8/28/2018] On page 147, in the solution to exercise 9.11, on the lsat line, change 3000(1.0918/1.065171) to 3000(1.065171).

[8/20/2018] On page 117, in the solution to exercise 7.19, 4 lines from the end, change 1.670(1.336) to 1.670(1.500).

[7/25/2018] On page 122, on the line right after the third table, change 34.4652 to 36.4652.

[7/19/2018] On page 112, in the solution to exercise 7.2, on the last line, change 5,500 to 5,000 and change the final answer to 7,270.83.

[7/4/2018] On page 100, on the third line of the paragraph beginning with "CY and AY", change "wit" to "with". In the paragraph beginning with "Loss ratio", add "is used" between "concept" and "in".

[7/4/2018] On page 102, at the end of the second paragraph of the page, delete "4" before "age".

[7/4/2018] On page 103, 3 lines above Table 7.2, change AY3 to AY4.

[6/22/2018] On page 402, in the solution to exercise 24.2, on the last two lines, replace "unmodified frequency of 20" with "the reduced unmodified frequency of 16".

[6/13/2018] On page 1217, in the solution to question 6, on the seventh line, change $F(x_i)$ to $S(x_i)$.