

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

Practice Exam 10:17 is defective in that none of the five answer choices is correct.

- [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”.
- [9/20/2018] On page 103, 6 lines above Table 7.2, delete “use” before “average”.
- [7/4/2018] On page 103, 3 lines above Table 7.2, change AY3 to AY4.
- [9/20/2018] On page 104, in the second-to-last table on the page, change “Accident year” to “Calendar year”.
- [10/23/2018] On page 105, three lines below formula (7.1), change  $f$  to  $f_{ult}$ .
- [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”.
- [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.
- [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.
- [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.
- [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”.
- [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.

[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,  $(994.6/989.65)(605.76) = \boxed{608.79}$ .

[10/28/2018] On page 142, in exercise 9.4, on the last line, change "Calculated" to "Calculate".

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

[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".

[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

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

[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

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

[10/19/2018] On pages 186–187, 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).

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

Therefore, the variance of payment per payment is

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

[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)**.

[12/1/2018] On page 244, in exercise 15.6, on the second line, change "primary reinsurer's" to "primary insurer's".

[12/10/2018] On page 343, in the solution to exercise 21.16, on the last line, put primes on the  $\beta$ s;

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

[12/10/2018] On page 350, in Example 22D(iv), add "given  $\theta$ " after "independent" and before the period.

[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".

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

[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  $v_B$ .

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

[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.