

## Errata and updates for ASM Exam C/Exam 4 Manual (Seventeenth Edition Fourth Printing) sorted by page

[8/28/2016] On page 30,  $F_X(x)$  is not a legitimate distribution function. Replace the example with Claim sizes  $X$  initially follow a distribution with distribution function:

$$F_X(x) = 1 - \frac{1}{e^{0.01x}(1 + 0.01x)} \quad x > 0$$

Claim sizes are inflated by 50% uniformly.

Calculate the probability that a claim will be for 60 or less after inflation.

Replace the answer with

Let  $Y$  be the increased claim size. Then  $Y = 1.5X$ , so  $\Pr(Y \leq 60) = \Pr(X \leq 60/1.5) = F_X(40)$ .

$$F_X(40) = 1 - \frac{1}{1.4e^{0.4}} = \boxed{0.5212}$$

[12/8/2016] On page 63, on the second line of the answer to Example 4E, replace  $1dx$  with  $1 dt$ .

[9/30/2016] On page 94, in the solution to exercise 5.14, on the second line, change “between 21 and 25” to “between 20 and 25”.

[10/30/2016] On page 114, in the solution to exercise 6.23, on the second line, replace disribution with distribution. On the last line, remove the extra equals sign before the final answer.

[5/25/2017] On page 143, on the second and third lines of the answer to Example 8G, change 1.174 to 1.1774.

[1/5/2017] On page 149, in the heading of Table 82., change Meaaures to Measures.

[8/28/2016] On page 158, on the last line, replace 21.2847 with 21.2848.

[7/24/2017] On page 315, in exercise 18.22, on the second-to-last line of the question, replace “expected claim amounts” with “expected aggregate claim amounts”.

[6/15/2016] On page 410, in the solution to exercise 24.10, on the fourth line, change 48 to 49.

[11/13/2016] On page 445, in the solution to exercise 26.3, on the last line, change  $\sqrt{0.1699}$  to  $\sqrt{0.001699}$ .

[6/19/2017] On page 477, in exercise 27.23(A), on the second line, change “as high than” to “as high as”.

[11/21/2016] On page 484, in the solution to exercise 27.17, on the second line, replace theta in the exponent with  $\theta$ .

[11/21/2016] On page 484, in the solution to exercise 27.18, replace the third, fourth, and fifth lines with

$$\begin{aligned} 1 - 0.5(y^2 + y) &= 0.5 \\ y^2 + y &= 1 \\ y^2 + y - 1 &= 0 \end{aligned}$$

[5/18/2017] On page 507, in exercise 28.25, the question in the SOA sample is now question 74 instead of 73A.

[6/29/2016] On page 510, in the solution to exercise 28.9, two lines from the end, delete the extra right parenthesis from the numerator  $e^{-3/12}$ .

[11/24/2016] On pages 681–682, replace the solution to exercise 34.32 beginning with the third paragraph with the following:

If you aren't comfortable calculating the Erlang distribution function, an alternative method for calculating  $\Pr(Z > 20)$ , is to calculate it directly. Once again,  $Z = X_1 + X_2$ , where  $X_1$  and  $X_2$  are the two exponential observations. We want  $\Pr(Z > 20)$ . By the Law of Total Probability, conditioning on  $X_1$ ,

$$\Pr(Z > 20) = \int_0^{\infty} \Pr(Z > 20 \mid X_1 = x_1) f_{X_1}(x_1) dx_1 \quad (*)$$

The integral's lower bound is 0 since  $Z$  cannot be less than 0.  $X_1$  is exponential with mean 6, so

$$f_{X_1}(x_1) = \frac{e^{-x_1/6}}{6} \quad x_1 \geq 0$$

$\Pr(Z > 20 \mid X_1 = x_1)$  is equal to 1 if  $X_1 \geq 20$ , since  $X_2 \geq 0$  and  $Z = X_1 + X_2$ . If  $X_1 < 20$ , then  $Z > 20$  only if  $X_2 \geq 20 - X_1$ . Since  $X_2$  is exponential with mean 6,

$$\Pr(X_2 \geq 20 - x_1) = e^{-(20-x_1)/6}$$

We can now rewrite equation (\*) as follows:

$$\begin{aligned} \Pr(Z > 20) &= \int_0^{20} \Pr(Z > 20 \mid X_1 = x_1) f_{X_1}(x_1) dx_1 + \int_{20}^{\infty} \Pr(Z > 20 \mid X_1 = x_1) f_{X_1}(x_1) dx_1 \\ &= \int_0^{20} e^{-(20-x_1)/6} \left( \frac{e^{-x_1/6}}{6} \right) dx_1 + \int_{20}^{\infty} \frac{e^{-x_1/6}}{6} dx_1 \end{aligned}$$

Let's evaluate these two integrals.

$$\begin{aligned} \Pr(Z > 20) &= \int_0^{20} \frac{e^{-20/6}}{6} dx_1 + e^{-20/6} \\ &= \frac{20}{6} e^{-20/6} + e^{-20/6} \\ &= \left( 1 + \frac{20}{6} \right) e^{-20/6} \\ &= \frac{13}{3} e^{-10/3} = \boxed{0.154587} \end{aligned}$$

[6/12/2017] On page 720, in the solution to exercise 36.1, on the first line, change "to heavy" to "too heavy".

[5/8/2017] On page 751, on the fourth line, change "mean squared" to "mean" (delete the word "squared").

[12/14/2016] On page 759, on the third line of Section 38.5, replace "Section 38.5" with "Section 35.5".

[7/7/2017] On page 902, two lines below the fifth displayed line, change  $\mathbf{E}[X_{n_1} \mid \theta]$  to  $\mathbf{E}[X_{n+1} \mid \theta]$ .

[5/16/2017] On page 1063, on the fourth line of the fourth paragraph, delete the words "observations a weight of 3/12."

[1/13/2017] On page 1112, in exercise 56.15, on the last line of the table, delete "Claims".

[6/15/2016] On page 1149, in exercise 58.16, ignore the answer choices. The correct answer is not one of the choices.

[6/15/2016] On page 1155, in the solution to exercise 58.16, on the second displayed line, change  $6.52686 \times 10^9$  to  $3.95616 \times 10^9$ . On the next line, change 6.52686 to 3.95616. Change the last 4 lines of the solution to

$$\begin{aligned}\text{Var}(X_3) &= \mathbf{E}[\text{Var}(X_3 | I)] + \text{Var}(\mathbf{E}[X_3 | I]) \\ &= 0.637070(15,187,500) + 0.362930(18,750,000) + (0.637070)(0.362930)(2500 - 2250)^2 \\ &= 16,494,889\end{aligned}$$

The standard deviation is 4061.

None of the answer choices is correct.

[5/1/2016] On page 1159, on the third line of the third paragraph, replace “add  $\frac{1}{2}$ ” with “subtract  $\frac{1}{2}$ ”.

[6/2/2017] On page 1234, in the solution to exercise 62.16, on the first line, add “be” between “not” and “a”.

[11/15/2016] On page 1430, in the solution to question 30, replace  $\mathbf{E}[(X - 10,000)_+] - \mathbf{E}[(X - 500)_+]$  with  $\mathbf{E}[(X - 500)_+] - \mathbf{E}[(X - 10,000)_+]$ .

[10/15/2017] On page 1440, in the solution to question 24, on the last line of the page, delete the 0 after the equals sign.

[10/29/2017] On page 1455, in the solution to question 30, on the third line, add a right parenthesis “after  $x = 3$ ”.

[10/29/2017] On page 1460, on the fourth line, change “fourth power” to “fourth root”.

[9/6/2017] On page 1461, in the solution to question 15, on the first line, change “age-0” to “age-30”.

[5/29/2015] On page 1552, in the solution to question 19, on the fifth line, change  $e^{-\ln 4}$  to  $e^{\ln 4}$ .

[6/23/2017] On page 1597, in the solution to question 22, on the first displayed line, add a sum sign after the big bracket:  $\sum m_i(x_i - \bar{x})^2$ .