

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

Practice Exam 2:16, 2:22, and 6:25 are defective in that none of the five answer choices is correct.

[2/19/2018] On page xii, on line 14, change $x = 1 \Rightarrow x = 0$ to $x = 1 \Rightarrow y = 0$.

[1/26/2018] On page 20, 3 lines above Example 2C, remove the extra comma after “type 1”.

[1/10/2018] On page xi, on the last line, change “at 2” to “at 3”.

[12/8/2017] On page 188, in the solution to exercise 14.9, on the second line, change “if equal” to “is equal”.

[11/28/2017] On page xii, on the fifth line, change \int_0^2 to \int_0^3 .

[11/7/2017] On page 84, in the Proof of Alternative Formula for Mean, on the third line, change $c = 1$ to $c = -1$. On the last line, change $1 - F(x) = 0$ to $(1 - F(x))x = 0$.

[11/7/2017] On page 508, in the solution to question 20, on the fifth line, replace $\Pr(X > 0)$ with $\Pr(X = 0)$. On the seventh line, replace $\mathbf{E}[X^2]$ with $\mathbf{E}[X]^2$.

[10/15/2017] On page 427, in question 10, on the third line, replace $p(x)$ with $p(n)$.

[9/27/2017] On page 515, replace the solution to question 11 with

We want the 60th percentile of correct answers to be 17.5, rather than 18, to take the continuity correction into account. The number of correct answers is binomial with parameters 30 and p . The mean is $30p$ and the variance is $30p(1 - p)$. The 60th percentile of a standard normal distribution is 0.253.

$$30p + 0.253\sqrt{30p(1 - p)} = 17.5$$

$$0.253\sqrt{30p(1 - p)} = 17.5 - 30p$$

$$1.92027p - 1.92027p^2 = 900p^2 - 1050p + 306.25$$

$$901.92p^2 - 1051.92p + 306.25 = 0$$

$$p = \boxed{0.5604}, 0.6059$$

0.6055 is spurious, since it works only with the negative square root of $30p(1 - p)$. **(B)**

[9/23/2017] On page 91, in exercise 7.12, on the fourth line, change “ $a > 0$ ” to “ $a > -1$ ”.

[9/23/2017] On page 98, in the solution to exercise 7.13, on the second line from the end, insert “0.05” before “ $K(1/3 + 2/4 + 3/5)$ ”.

[9/19/2017] On page 452, in question 14, multiply the five answer choices by 0.1:

(A) 197.8

(B) 203.9

(C) 207.0

(D) 213.1

(E) 217.2

[9/19/2017] On page 505, in the solution to question 6, on the line after “Set this equal to 2000”, change $1000e^{0.25}$ to $1000^{0.25}u^{0.75}$.

[9/19/2017] On page 507, in the solution to question 14, replace the last three lines with

$$\begin{aligned} E \left[1000 \max \left(0, \frac{5-T}{5} \right) \right] &= 1000 \int_0^5 0.1 \left(\frac{5-t}{5} \right) e^{-t/10} dt \\ &= 1000 \left(\frac{5-t}{5} (-e^{-t/10}) \right) \Big|_0^5 - 0.2 \int_0^5 e^{-t/10} dt \\ &= 1000 (1 - 2(1 - e^{-0.5})) = \boxed{213.06} \quad (\text{D}) \end{aligned}$$

[9/16/2017] On page 470, in the solution to question 13, 6 lines and 4 lines from the end (once apiece), change $100\theta(2 + \theta)$ to $100(2 + \theta)$; delete θ .

[9/14/2017] On page 345, in the solution to exercise 24.8, on the second line, change $E[X | Y = 10]$ to $E[X | Y = 10]$.

[9/11/2017] On page 345, in the solution to exercise 24.5, on the fourth line, replace $\rho^2(1 - \sigma_Y^2)$ with $\sigma_Y^2(1 - \rho^2)$.

[9/4/2017] On page 97, in the solution to exercise 7.10, on the line for $F(1^-)$, remove the negative sign before $\frac{1}{8}$.

[9/4/2017] On page 239, in the solution to exercise 17.7, on the first displayed line, change $f_X(5)$ to $f_X(0.5)$.

[8/24/2017] On page 56, in the solution to exercise 4.11, on the last line, change $0.001/0.0071$ to $0.0001/0.0071$.

[8/16/2017] On page 379, in exercise 27.13, on the displayed line, put a negative sign in front of the first ∞ on the right.

[8/16/2017] On page 391, on the second line of the answer to Example 28C, change $\sqrt{\cdot}(y)$ to \sqrt{y} . On the fourth line, change $|h_i(y)|$ to $|h'_i(y)|$.

[8/15/2017] On page 357, in the solution to exercise 25.12, on the last line of the page, change 2,000,000 to 1,000,000.

[8/15/2017] On page 381, in the solution to exercise 27.1, on the second to last line of the page, delete the negative sign after the equals sign.

[8/13/2017] On page 237, in the solution to exercise 17.2, on the displayed line, replace $\Pr(A \cup B)$ with $\Pr(A \cap B)$.

[8/13/2017] On page 278, in formula (20.8), replace $i = 1$ at the bottom of the summation sign with $i = 0$.

[8/13/2017] On page 316, in the solution to exercise 22.15, on the third displayed line, replace dy with dx .

[8/6/2017] On page 162, replace the solution to exercise 12.12 with the following:

With no deductible, the expected payment for a uniform distribution is the midpoint of the interval, or 500.

With a deductible d , the expected payment is the probability that the loss is above the deductible, $1 - d/1000$, times the midpoint of the payment after the deductible, $(1000 - d)/2$. So we want

$$\begin{aligned} \left(1 - \frac{d}{1000} \right) \left(\frac{1000 - d}{2} \right) &= 0.25(500) = 125 \\ \left(\frac{1000 - d}{1000} \right) \left(\frac{1000 - d}{2} \right) &= 125 \\ (1000 - d)^2 &= 125(2)(1000) = 250,000 \\ 1000 - d &= 500 \\ d &= \boxed{500} \quad (\text{C}) \end{aligned}$$

[8/4/2017] On page 331, in the solution to exercise 23.3, on the second-to-last line, put Φ before $\left(\frac{-3}{\sqrt{4}}\right)$.

[7/24/2017] On page 289, in the solution to exercise 20.21, on the first line of the page, change “admission” to “admissions”. On the third line of the page, change (0.2^2) to (0.2) .

[7/20/2017] On page 232, replace the second line with

$$\text{Var}(Y | X = 0.2) = \frac{0.316}{0.648} - \left(\frac{0.424}{0.648}\right)^2 = \boxed{0.059518}$$

[7/20/2017] On page 253, replace the solution to exercise 18.7 with:

Use the double expectation formula. Let W be the sentence and X be the amount of time in prison. Then

$$\begin{aligned} \mathbf{E}[X] &= \Pr(\text{parole}) \mathbf{E}[X | \text{parole}] + (1 - \Pr(\text{parole})) \mathbf{E}[X | \text{no parole}] \\ &= \frac{2}{3} \mathbf{E}[X | \text{parole}] + \frac{1}{3}(4.5) \end{aligned}$$

To calculate $\mathbf{E}[X | \text{parole}]$, we use the double expectation formula again. Let $Y = X | \text{parole}$. If $W < 4$, then the criminal is expected to serve 2 years; otherwise he is expected to serve $W/2$.

$$\mathbf{E}[Y] = \Pr(W < 4) \mathbf{E}[Y | W < 4] + \Pr(W \geq 4) \mathbf{E}[Y | W \geq 4] = \frac{1}{3}(2) + \frac{2}{3}(2.5) = \frac{7}{3}$$

Putting our two calculations together,

$$\mathbf{E}[X] = \frac{2}{3} \left(\frac{7}{3}\right) + \frac{1}{3}(4.5) = 3\frac{1}{18} = \boxed{3.05556}$$

[7/20/2017] On page 478, in the solution to question 8, on the first line of the page, the first sum should be from $n = 2$, not $n = 1$.

[6/22/2017] On page 381, in exercise 27.21, on the first line, delete “independent”.

[6/16/2017] On page 376 in Table 27.1 on the last line, change the argument (0) to $(0,0)$ in both places, and change $\frac{\partial^2 M}{\partial t_i \partial t_j}$ to $\frac{\partial^2 M}{\partial t_1 \partial t_2}$.

[6/12/2017] On page 114, in the solution to exercise 8.12, on the third line, change the left side to $1 - F(2000)$.

[6/12/2017] On page 131, in the solution to exercise 10.10, on the second line, change “4 from 8, $\binom{8}{4}$ ” to “4 from 9, $\binom{9}{4}$ ”.

[6/12/2017] On page 357, in the solution to exercise 25.11, on the fifth line, change “loss size” to “payout”. On the sixth line, replace “do no” with “do not”.

[6/12/2017] On page 361, on the tenth and eleventh lines, change Y_i to Y .

[5/22/2017] On page 521, in the solution to question 25, replace the last two lines with

$$\begin{aligned} &= \frac{1000}{900} e^{-900/\mu} \Big|_{1000}^{\infty} \\ &= \frac{10}{9} (1 - e^{-0.9}) = \boxed{0.6594} \end{aligned}$$

[5/19/2017] On page 461, in question 23, on the second line, insert $1/2$ before $e^{-x/2}$.

[5/9/2017] On page 209, in the solution to exercise 15.16, on the second line on the left side, change $c_i \sum X_i$ to $\sum c_i X_i$.

[5/8/2017] On page 177, on the second line, change $E[g(x, y)]$ to $E[g(X, Y)]$.

[5/8/2017] On page 429, in question 22, on the last line of the question, replace $1/2a^3$ with $2/a^3$. None of the answer choices is correct.

[5/8/2017] On page 481, replace the last line of the solution to question 22 with

$$= \frac{3}{7} \left(-\frac{1}{2^2} + \frac{1}{(2/3)^2} + \frac{4}{3}(2) \right) = \frac{3}{7} \left(\frac{14}{3} \right) = \boxed{2}$$

[4/2/2017] On page 7, in exercise 1.10, statements (iv) and (vi) are inconsistent. Here is a revised question:

An insurance company finds that among its policyholders:

- (i) Each one has either health, dental, or life insurance.
- (ii) 81% have health insurance.
- (iii) 36% have dental insurance.
- (iv) 24% have life insurance.
- (v) 5% have all three insurance coverages.
- (vi) 14% have dental and life insurance.
- (vii) 12% have health and life insurance.

Determine the percentage of policyholders having health insurance but not dental insurance.

[4/2/2017] On page 14, here is the solution to the revised version of exercise 1.10:

Since everyone has insurance, the union of the three insurances has probability 1. If we let H , D , and L be health, dental, and life insurance respectively, then

$$\begin{aligned} 1 &= P[H \cup D \cup L] \\ &= P[H] + P[D] + P[L] - P[H \cap D] - P[H \cap L] - P[D \cap L] + P[H \cap D \cap L] \\ &= 0.81 + 0.36 + 0.24 - P[H \cap D] - 0.14 - 0.12 + 0.05 \\ &= 1.20 - P[H \cap D] \end{aligned}$$

so $P[H \cap D] = 0.20$. Since 81% have health insurance, this implies that $0.81 - 0.20 = \boxed{61\%}$ have health insurance but not dental insurance.

[3/30/2017] On page 86, on the second-to-last line of the page, change “maximum” to “minimum”.

[3/30/2017] On page 259, two lines above equation (19.1), and also in equation (19.1), replace $(1-p)^{1-k}$ with $(1-p)^{n-k}$.

[3/30/2017] On page 263, in equation (19.1), replace $(1-p)^{1-k}$ with $(1-p)^{n-k}$.

[3/30/2017] On page 278, on the ninth line, change “one more” to “one less”.

[3/30/2017] On page 375 three lines from the bottom, and also on page 376 two lines from the bottom of Table 27.1, change $\exp(t_1 X + t_2 Y)$ to $E[\exp(t_1 X + t_2 Y)]$.

[3/28/2017] On pages 401–402, there is an error in step 2 that affects all subsequent steps. Replace steps 2–6 with the following:

2. Determine the inverse transformation: express X and Y as functions of W and Z . With $Z = X/Y$ and $W = X$. The inverse transformation is $X = W$ and $Y = X/Z = W/Z$.
3. Calculate the Jacobian of the inverse transformation. The Jacobian is the determinant of the matrix of partial derivatives, or the determinant of

$$J = \begin{vmatrix} \frac{\partial x}{\partial z} & \frac{\partial x}{\partial w} \\ \frac{\partial y}{\partial z} & \frac{\partial y}{\partial w} \end{vmatrix}$$

In our example, the matrix of partial derivatives of X and Y with respect to Z and W , in that order, is

$$\begin{vmatrix} 0 & 1 \\ -\frac{w}{z^2} & \frac{1}{z} \end{vmatrix}$$

The determinant of a 2×2 matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is $ad - bc$. In our example, the Jacobian is

$$0 \cdot \frac{1}{z} - 1 \cdot \left(-\frac{w}{z^2}\right) = \frac{w}{z^2}$$

4. The joint density function of the transformed variables is

$$f_{Z,W}(z, w) = f_{X,Y}(h_1(z, w), h_2(z, w))|J| \tag{29.1}$$

where $|J|$ is the absolute value of the Jacobian. In our case, $|J| = \left|\frac{w}{z^2}\right|$.

5. The domain of the variables must be transformed as well. Since we are interested in Z , the domain would be expressed as a range of z and a range of w as a function of z .

In our example, with $Z = X/Y$, $W = X$, suppose $0 \leq x \leq y \leq 1$. Then we would replace x and y with w and w/z respectively: $0 \leq w \leq w/z \leq 1$. We see that $0 \leq z \leq \infty$. We also see that $0 \leq w \leq w/z$, implying only that $w \geq 0$, and $w/z \leq 1$, implying $w \leq z$. We conclude $0 \leq z \leq \infty$ and $0 \leq w \leq z$.

6. Integrate $f_{Z,W}(z, w)$ over w to obtain the marginal density function of Z . In our case, $f_Z(z) = \int_0^z f_{Z,W}(z, w)dw$ for $z \geq 0$.

[3/25/2017] On page 225, in the solution to exercise 16.9, on the second line, replace $f_Y(y)$ with $f_X(x)$.

[3/13/2017] On page 242, in the solution to exercise 17.15, replace all lines after the fourth with:

Thus the conditional distribution of Y given $X = 1.5$ is

$$f(y | X = 1.5) = \frac{(1.5 + y)/8}{5/8} = \frac{1.5 + y}{5} \quad \text{for } 0 < y < 2$$

The first and second moments of $Y | X = 1.5$ are

$$\int_0^2 y \left(\frac{1.5 + y}{5}\right) dy = \frac{0.75y^2 + y^3/3}{5} \Big|_0^2 = \frac{17}{15}$$

$$\int_0^2 y^2 \left(\frac{1.5 + y}{5}\right) dy = \frac{0.5y^3 + y^4/4}{5} \Big|_0^2 = \frac{8}{5}$$

The conditional variance is

$$\frac{8}{5} - \left(\frac{17}{15}\right)^2 = \frac{71}{225} = \boxed{0.315556}$$

[1/6/2017] On page 480, in the solution to question 16, change $\Phi(0.459) = \boxed{0.7057}$ to $\Phi(0.459) = \boxed{0.6768}$. None of the five answer choices is correct.

[1/4/2017] On page 95, in the solution to exercise 7.5, the second and third integrands should have multiplied $|x - \mathbf{E}[X]|$ by the density function $f(x) = x/2$ rather than by x . As a result, the correct answer is $32/81$, not $64/81$. Replace everything past the third line with:

$$\begin{aligned} \int_0^{4/3} \frac{x}{2} |x - \mathbf{E}[X]| dx &= \int_0^{4/3} \frac{1}{2} \left(\frac{4}{3}x - x^2 \right) dx \\ &= \frac{1}{2} \left(\frac{4}{3} \frac{x^2}{2} - \frac{x^3}{3} \right) \Big|_0^{4/3} \\ &= \frac{(4/3)^3}{4} - \frac{(4/3)^3}{6} = \frac{(4/3)^3}{12} = \frac{16}{81} \\ \int_{4/3}^2 \frac{x}{2} |x - \mathbf{E}[X]| dx &= \int_{4/3}^2 \frac{1}{2} \left(x^2 - \frac{4}{3}x \right) dx \\ &= \frac{1}{2} \left(\frac{x^3}{3} - \frac{4}{3} \frac{x^2}{2} \right) \Big|_{4/3}^2 \\ &= \frac{2^3}{6} - \frac{(4/3)(4)}{4} - \frac{(4/3)^3}{6} + \frac{(4/3)^3}{4} = \frac{(4/3)^3}{12} = \frac{16}{81} \end{aligned}$$

The sum of the two integrals is $\boxed{\frac{32}{81}}$. (C)