

**Errata for the ASM Study Manual for Exam P, Thirteenth Edition**  
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**Posted January 24, 2012**

**In the solution of Problem 21 in Practice Examination 18, the expression**

$$E(X - \min(X, 100))E$$

**in the formula should be**

$$E(X - \min(X, 100))$$

**The extra  $E$  is a typo.**

**Posted September 21, 2011**

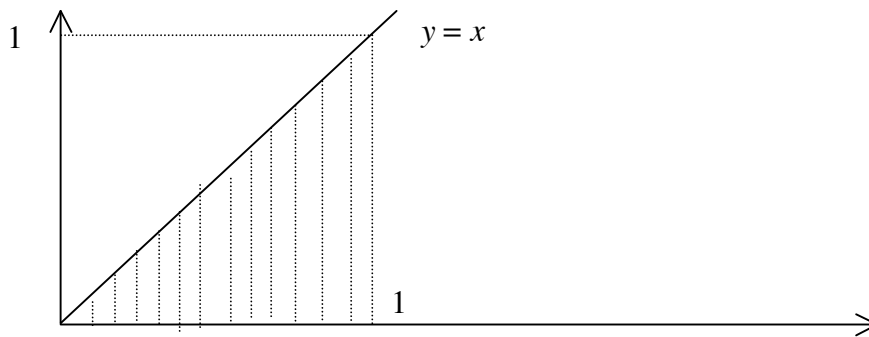
**The solution of Problem 29 in Practice Examination 19 should be:**

Solution.

The joint density, where positive, for  $0 < x < 1$  and  $0 < y < x$ , is

$$f_{X,Y}(x,y) = f_Y(y|X=x) \cdot f_X(x) = \frac{1}{x} \cdot 2x = 2.$$

The region where that joint density is positive is indicated with dotted lines in the graph below



Since the joint density is uniform, the conditional distribution of  $X$  given that  $Y = y$  is uniform on the range of values of  $x$  determined by the condition  $0 < y < x < 1$ , i.e., the interval  $(y, 1)$ , so that the variance is  $\frac{(1-y)^2}{12}$ .

Answer E.

**Posted August 31, 2011**

**The first sentence of the solution of Problem 14 in Practice Examination 18 should be:**

Chi-square distribution is obtained as a sum of squares of independent identically distributed standard normal random variables, so we need to standardize these variables, add squares of those standardized variables, and hope we get one of the answers.

**Posted August 6, 2011**

**In the third line of Problem 21 in Practice Examination 15, the words “and integer” should be “an integer”.**

**Posted August 6, 2011**

**In the solution of Problem 6 in Practice Examination 9, in the first line, the words “for and” should be “for any”.**

**Posted August 6, 2011**

**In the solution of Problem 1 in Practice Examination 9, the formula in the fifth line should be**

$$\Pr(Y_{(1)} = 3) = \Pr(E - F) = \Pr(E) - \Pr(F).$$

**instead of**

$$\Pr(Y_{(1)} = 3) = \Pr(F) - \Pr(F).$$

**Posted August 4, 2011**

**The solution of Problem 7 in Practice Examination 13 should be rephrased as follows:**

The event of at least one color not being represented is the complement of the event of all three colors being represented, and all colors being represented simply means that we pick one red ball out of 3, one green ball out of 2, and one yellow ball out of 1. Thus

$$\Pr(\text{At least one color not drawn}) =$$

$$= 1 - \Pr(\text{All colors drawn}) = 1 - \frac{\binom{3}{1} \cdot \binom{2}{1} \cdot \binom{1}{1}}{\binom{6}{3}} = 0.70.$$

You could also argue as follows. We are looking for the probability that all three balls are of the same color, or of two colors only. We have

$$\Pr(3 \text{ balls of one color}) = \Pr(3 \text{ red}) = \frac{1}{\binom{6}{3}} = \frac{3! \cdot 3!}{6!} = \frac{6}{4 \cdot 5 \cdot 6} = \frac{1}{20},$$

and

$$\begin{aligned} \Pr(3 \text{ balls of two colors only}) &= \Pr(2 \text{ red} + 1 \text{ green}) + \Pr(2 \text{ red} + 1 \text{ yellow}) + \\ &+ \Pr(2 \text{ green} + 1 \text{ red}) + \Pr(2 \text{ green} + 1 \text{ yellow}) = \\ &= \frac{\binom{3}{2} \cdot \binom{2}{1}}{\binom{6}{3}} + \frac{\binom{3}{2} \cdot \binom{1}{1}}{\binom{6}{3}} + \frac{\binom{2}{2} \cdot \binom{3}{1}}{\binom{6}{3}} + \frac{\binom{2}{2} \cdot \binom{1}{1}}{\binom{6}{3}} = \frac{13}{20}, \end{aligned}$$

so that the total probability is  $\frac{1}{20} + \frac{13}{20} = \frac{7}{10}$ .

Answer B.

**Posted August 3, 2011**

**In Practice Examination 20, Problem 6, in the solutions part of the examination, answer choices were not listed. They are listed in the questions part of the examination.**

**Posted August 3, 2011**

**The last sentence of Problem 11 in Practice Examination 16 should be:**

Calculate the variance of  $Y$  given that  $X > 3$  and  $Y > 3$ .

**instead of**

Calculate the variance of  $Y$  given that and  $X > 3$  and  $Y > 3$ .

**Posted August 3, 2011**

**In Problem 7 in Practice Examination 14, the solution should start with the words**

Because you studied this manual

**instead of**

Because you studied his manual

**Posted July 30, 2011**

**Problem 7 in Practice Examination 19 should start with**

Let  $X_1, X_2, \dots, X_{36}$  and  $Y_1, Y_2, \dots, Y_{49}$  be independent random samples from distributions ...

**instead of**

Let  $x_1, x_2, \dots, x_{36}$  and  $y_1, y_2, \dots, y_{49}$  be independent random samples from distributions ...

**Posted July 30, 2011**

**The first line of the formula in the solution of Problem 6 in Practice Examination 19 should be**

$$\Pr(2X - X^2 > 0) = \Pr(X(2 - X) > 0) = \Pr(X(X - 2) < 0) =$$

**instead of**

$$\Pr(2X - X^2 > 0) = \Pr(X(2 - X) > 0) = \Pr(X(X - 2) > 0) =$$

**Posted July 28, 2011**

**In the formula in the solution of Problem 26 in Practice Examination 17, the formula should be**

$$\begin{aligned} f_X(x) = F'_X(x) &= -\frac{d}{dx} \sum_{k=0}^3 \frac{x^k \cdot e^{-x}}{k!} = -\frac{d}{dx} \left( e^{-x} + xe^{-x} + \frac{1}{2}x^2 \cdot e^{-x} + \frac{1}{6}x^3 \cdot e^{-x} \right) = \\ &= -\left( -e^{-x} + (e^{-x} - xe^{-x}) + \left( xe^{-x} - \frac{1}{2}x^2 \cdot e^{-x} \right) + \left( \frac{1}{2}x^2 \cdot e^{-x} - \frac{1}{6}x^3 \cdot e^{-x} \right) \right) = \frac{1}{6}x^3 \cdot e^{-x}. \end{aligned}$$

**The formula was missing a minus sign in the second line just after the first parenthesis. The rest of the solution is unaffected.**

**Posted July 28, 2011**

**In the solution of Problem 16 in Practice Examination 17, the word “bad” in the first sentence should be replaced by “bag”.**

**Posted July 28, 2011**

**The second sentence of the solution of Problem 12 in Practice Examination 16 should be:**

Box 1 contains 1 blue and 4 red marbles, box 2 contains 2 blue and 3 red marbles and box 3 contains 3 blue and 2 red marbles.

**instead of**

Box 1 contains 1 blue and 4 red marbles, box 2 contains 2 blue and 3 red marbles and box 3 contains 3 red and 2 blue marbles.

**The rest of the solution is unaffected by this typo.**

**Posted July 26, 2011**

**In Problem 9 in Practice Examination 14, the third condition should be:**

(ii) The future lifetimes follow a Weibull distribution with  $\alpha = 1.5$  and  $\beta = 2.0$  for smokers, and  $\alpha = 2.0$  and  $\beta = 2.0$  for nonsmokers.

**Also, the survival function of the Weibull distribution should be given as**

$$s_T(t) = e^{-\left(\frac{t}{\alpha}\right)^\beta}.$$

**Posted June 26, 2011**

**In Problem 29 in Practice Examination 19, the last sentence should be:**

Find the variance of the conditional distribution of  $X$ , given  $Y = y$ .

**Posted March 10, 2011**

**The second sentence of the solution of Problem 10 in Practice Examination 1 should be:**

As the policy has a deductible of 1 (thousand), the claim payment is

$$Y = \begin{cases} 0, & \text{when there is no damage, with probability 0.94,} \\ \max(0, X - 1), & \text{when } 0 < X < 15, \text{ with probability 0.04,} \\ 14, & \text{in the case of total loss, with probability 0.02.} \end{cases}$$

**Posted February 18, 2011**

**The first displayed formula in the solution of Problem 17 in Practice Examination 8 should be**

$$f_P(p) = 3p^2 = \frac{3!}{2! \cdot 0!} \cdot x^2 = \frac{\Gamma(3+1)}{\Gamma(3)\Gamma(1)} \cdot x^{3-1} (1-x)^{1-1}$$

**instead of**

$$f_P(p) = 3p^2 = \frac{3!}{2! \cdot 1!} \cdot x^2 = \frac{\Gamma(3+1)}{\Gamma(3)\Gamma(1)} \cdot x^{3-1} (1-x)^{1-1}$$

**Posted January 25, 2011**

**The last two sentences of the solution of Problem 11 in Practice Examination 16 should be replaced by**

But the memoryless property of the exponential distribution tells us that  $Y$  and  $(Y - 3|Y > 3)$  have the same distribution. Note, however, that

$$(Y|Y > 3) = 3 + (Y - 3|Y > 3),$$

so that

$$\text{Var}(Y|Y > 3) = \text{Var}(Y - 3|Y > 3) = \text{Var}(Y).$$

This implies that

$$\text{Var}(Y|\{X > 3\} \cap \{Y > 3\}) = \text{Var}(Y|Y > 3) = \text{Var}(Y) = \frac{1}{2^2} = 0.25.$$

Answer A.

**Posted January 15, 2011**

**In Problem 16 in Practice Examination 6, the calculation of the second moment of  $X$  should be:**

$$E(X^2) = \frac{1}{4} \cdot 0^2 + \frac{3}{4} \cdot \underbrace{(1+1)}_{\text{Second moment of } T} = \frac{3}{2}.$$

**instead of**

$$E(X^2) = E(X) = \frac{1}{4} \cdot 0^2 + \frac{3}{4} \cdot \underbrace{(1+1)}_{\text{Second moment of } T} = \frac{3}{2}.$$

**Posted September 25, 2010**

**In Problem 22 in Practice Examination 19, answer choice C, the condition in the first line of the definition of  $F_X(x)$  should be  $x \leq 2$ , not  $x \leq 1$ .**

**Posted August 2, 2010**

**In the solution of Problem 2 in Practice Examination 20, the sentence**

Let  $X$  be the number of tails that are tossed that are tossed until the third head occurs.  
**should be**

Let  $X$  be the number of tails that are tossed until the third head occurs.

**Posted July 28, 2010**

**The first line of the first formula in the solution of Problem 13 in Practice Examination 20 has a typo in the denominator, it should say  $>$  instead of  $<$ .**

**Posted July 24, 2010**

**In the solution of Problem 21 in Practice Examination 6, the statement under the first expression on the right-hand side of the third to last formula should be:**

number of ways to  
pick ordered samples  
of size 2 from  
population of size  $n$

**instead of**

number of ways to  
pick ordered samples  
of size  $n-2$  from  
population of size  $n$

**Posted July 17, 2010**

**Practice Examinations: An Introduction on page 109, the third sentence of the last section should be:**

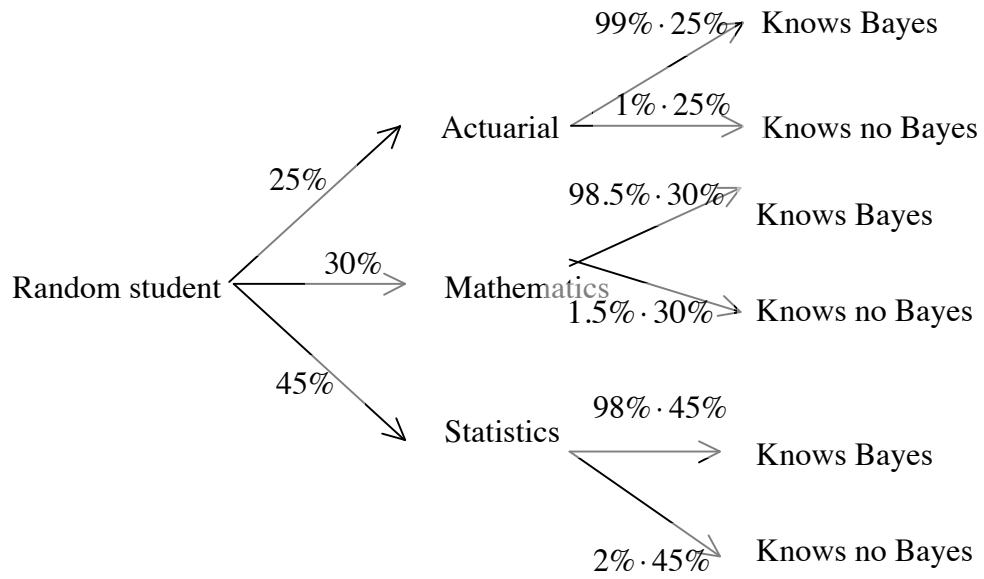
Practice examinations 6-20 are meant to be more challenging.

**Posted July 3, 2010**

**In the solution of Problem 1, Practice Examination 5, at the end of the first part of the fourth sentence of the solution,  $5/6$  is a typo, it should be  $5/36$ , as used in the formula for  $\Pr(Y = 6)$ .**

**Posted June 9, 2010**

**In the alternative solution of Problem 28, Practice Examination 11, the probability tree diagram should be:**



**Some numbers in the diagram were mistyped.**