

ACTEX EXAM P STUDY MANUAL – March 2019 Edition

Errata List, by S. Broverman Updated Feb 18/20

Oct 1/19 Page 19, give more comment on improper integral from $-\infty$ to ∞

Feb 18/20 Page 210, 2 lines from bottom, probability is missing]

May 22/20 Page 494, #18, in answers B,C,D and E, y should be λ

May 22/20 Page 501, #18 solution, e^{-y} should be $e^{-\lambda}$ in every occurrence

May 22/20 Page 512, #4 solution, final line should be
Then $P(S < 4) = 1 \times 0.85 + 1 \times 0.15 + 0.88 \times 0.05 = 0.994$. Answer: D

May 22/20 Page 518, #24 solution is incorrect. The correct solution is the following.

24. Let X_A be the number of sales for manufacturer A, and X_B for B, and X_{CD} for manufacturers C and D combined. X_A, X_B and X_{CD} have a multinomial distribution with

$n = 10$ and $p_A = 0.10, p_B = 0.15, p_{CD} = 0.75$

We wish to find the probability $P[(X_A \geq 2) \cap (X_B \geq 2)] = 1 - P[(X_A \leq 1) \cup (X_B \leq 1)]$.

$P[(X_A \leq 1) \cup (X_B \leq 1)] = P(X_A \leq 1) + P(X_B \leq 1) - P[(X_A \leq 1) \cap (X_B \leq 1)]$.

$P(X_A \leq 1) = P(X_A = 0) + P(X_A = 1) = (.9)^{10} + 10(.9)^9(.1) = 0.7361$.

$P(X_B \leq 1) = P(X_B = 0) + P(X_B = 1) = (.85)^{10} + 10(.85)^9(.15) = 0.5443$.

The sales numbers that result in the event $(X_A \leq 1) \cap (X_B \leq 1)$ are as follows:

	Sales			
X_A	0	1	0	1
X_B	0	0	1	1
X_{CD}	10	9	9	8

According to the multinomial probability function,

$$P[(X_A = x_A) \cap (X_B = x_B) \cap (X_{CD} = x_{CD})] = \frac{10!}{x_A! \times x_B! \times x_{CD}!} \times p_A^{x_A} \times p_B^{x_B} \times p_{CD}^{x_{CD}}$$

The probabilities of the combinations above are

$$P[(X_A = 0) \cap (X_B = 0) \cap (X_{CD} = 10)] \\ = \frac{10!}{0! \times 0! \times 10!} \times (0.1)^0 \times (0.15)^0 \times (0.75)^{10} = 0.0563.$$

In a similar way, we get $P[(X_A = 1) \cap (X_B = 0) \cap (X_{CD} = 9)] = 0.0751$,

$P[(X_A = 0) \cap (X_B = 1) \cap (X_{CD} = 9)] = 0.1126$, and

$P[(X_A = 1) \cap (X_B = 1) \cap (X_{CD} = 8)] = 0.1352$.

Then, $P[(X_A \leq 1) \cap (X_B \leq 1)] = 0.0563 + 0.0751 + 0.1126 + 0.1352 = 0.3792$,

and $P[(X_A \leq 1) \cup (X_B \leq 1)] = 0.7361 + 0.5443 - 0.3792 = .9012$,

and the probability that no manufacturer gets dropped is $1 - 0.9012 = 0.0988$. Answer: A

May 22/20 Page 520, #29 solution is incorrect.

The value of -450 on the 6th line from the bottom should be -225. This changes the bottom line of the solution to be

The total expected insurance payment is $12,500 \times .09 - 225 + 738.99 = 1,639$ Answer : E