

APMA 1650 Homework 3 Common Mistakes

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1. (a) Many students forgot to normalize their probabilities to turn them into a probability distribution.
(b) Since we are proving properties of the variance in this problem, you cannot use properties of the variance. See the solution to see how to do this problem using only properties of expectations.
2. A number of students forgot to account for the order of the dice rolls.
3. (a) Y_3 should be binomial with $n = 3, p = p$, not $p = \frac{1}{2}$ since we don't know the value of p .
(b) You proved in question 1 that the variance is not linear ($\text{Var}(aX + b) = a^2\text{Var}(X)$), but many students still tried to use linearity here.
4. There was some confusion about how to interpret the question. It was meant to be that you were placing your bets before the tournament began, so the probability of getting a game right in round two depended on your bets in round one. Many students thought we were deciding each game as they were played. Although this was an incorrect interpretation, we did not take points off since this was never clarified.
5. The key to this question was to recognize that X = the number of graded projects from the second class is hypergeometric with parameters $N = 50, n = 15, r = 30$. It is not binomial or geometric.
6. A lot of students left their answers as summations, but this can be simplified using the geometric series formula $\sum_{k=0}^{\infty} r^k = \frac{1}{1-r}$ for $|r| < 1$.