812 Section # 7

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1   Review: Transforming Random Variables

Just a quick review of the question from Problem Set #4...

2   Joint, Marginal, and Conditional Distributions

Exercise 1   [Casella and Berger Ex. 4.1.2] Consider an experiment where we toss two six-sided, normal, fair, etc. dice. Define random variable X as the sum of the numbers shown on the dice in the experiment and random variable Y as the absolute value of the difference of the dice.
a. What is the joint pmf of X and Y?
b. Find the marginal pmf of X and Y.
c. What is the probability that $Y < 3$?
d. Let's say that we know the difference of the two dice was 3. What is the conditional distribution of X given that $Y = 3$?

Exercise 2   [Modified Walpole et al. Example 3.8] Two pens are going to be drawn randomly from a box that contains 3 blue pens, 2 red pens, and 3 green pens. If X is the number of blue pens drawn and Y is the number of red pens drawn, find the following:
a. The joint pmf of X and Y
b. The marginal pmf of X and Y.
c. The conditional distribution of X given that $Y = 1$
d. Find $P(X = 0)$ and $P(X = 0|Y = 1)$

Exercise 3   [Modified Walpole et al. Exercise 3.18] A coin is tossed twice. Let Z be the number of heads on the first toss and W be the total number of heads on the two tosses. Assume the coin is biased so that the probability of heads is .4. Find:
a. The joint pmf of Z and W
b. The marginal pmf of W and Z
c. What is the probability that at least 1 head occurs?

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