SOLUTIONS TO 2.7 and 2.11

February 17, 2012

Question 2.7: The probability of rolling a sum of 2, 3, 4, 5, or 6 is the same as the probability of rolling a 8, 9, 10, 11, or 12. Namely, both probabilities are 15/36. Further the chance of rolling a 7 is 6/36.

Therefore, for either bet E[win] $= \$2 \cdot (15/36) + \$0 \cdot (21/36) = \$(30/36)$.

Question 2.11: The constraints being that you don't tell the rumor to yourself or the person who told you, the first person has 24 options and each of the following people have 23 options of who to tell. Thus the sample space in this model consists of $24{\cdot}23^9$ elements (ordered lists of the people who hear the rumor). For no one to hear it twice, the first person can still tell 24 people, the second person 23, but now the third person only has 22 possible people to tell and so on. Thus,

P(there are no repeats)$= (24 \cdot 23 \cdot 22 \cdot 21 \cdots 15)/(24 \cdot 23^9) = \Pi_{k=1}^{8}(1-k/23)$.

If instead you just want the chance that person one never gets told the rumor: person one still has 24 options, person two has 23, and thereafter everyone who hears the rumor has 22 possibilities:

P(never gets back to originator) $= (22/23)^8$.

It seems that the numerical value given in the book is not correct.