

Math 55 Section Worksheet

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March 14, 2018

1 Warm-Up

Try to recall the following concepts *without* looking at your notes.

probability distribution	uniform distribution	conditional probability
independent events	Bernoulli trial	Bayes' Theorem

2 Problems

1. A pair of dice is loaded. The probability that a 4 appears on the first die is $2/7$, and the probability that a 3 appears on the second die is $2/7$. Other outcomes for each die appear with probability $1/7$. What is the probability of 7 appearing as the sum of the numbers when the two dice are rolled?
2. Let E be the event that a randomly generated bit string of length three contains an odd number of 1s, and let F be the event that the string starts with 1. Are E and F independent?
3. Find each of the following probabilities when n independent Bernoulli trials are carried out with probability of success p .
 - (a) the probability of no successes
 - (b) the probability of at least one success
 - (c) the probability of at most one success
 - (d) the probability of at least two successes
4. Suppose that E and F are events in a sample space and $p(E) = 1/3$, $p(F) = 1/2$, and $p(E|F) = 2/5$. Find $p(F | E)$.
5. Suppose that one person in 10,000 people has a rare genetic disease. There is an excellent test for the disease; 99.9% of people with the disease test positive and only 0.02% who do not have the disease test positive.
 - (a) What is the probability that someone who tests positive has the genetic disease?
 - (b) What is the probability that someone who tests negative does not have the disease?
6. A masked container contains 2 beads, each of which is either black or red. What is the probability that both beads are black, given that you select a black bead from the container?