

Homework 13: Variance and Standard Deviation

1. §4.3, #3, 6, 7(a).
2. Two distinct integers are chosen at random from the first five positive integers. Compute the expected value and variance of the absolute value of the difference of the two numbers.
3. Suppose that two evenly matched teams are playing in the World Series. Find the expected value, variance, and standard deviation of the total number of games played. (The winner is the first team to get four victories.)

4. Let X have pdf

$$f_X(x) = \begin{cases} 2(1-x), & \text{if } 0 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

Find $E(X)$, $E(X^2)$, and $\text{Var}(X)$.

5. Ten husband and wife couples are randomly seated in a circle. Find the expected number of husbands who are seated next to their wives.

Hint. Use indicators.

6. Suppose a bent coin has a probability $p = 0.4$ of landing heads. If one flips the coin n times, what is the expected number of heads which are immediately followed by a tail. (For example, if $n = 8$, then for outcome 'THHTTHTH', two heads, namely the third and sixth flips, are immediately followed by a tail.)

Hint. Use indicators.