Dr. Z.'s Intro to Probability Homework assignment 12

1. If X is uniformly distributed over $(0, 15)$, calculate the probability that (a) $X < 4$ (b) $X > 9$ (c) $5 < X < 11$.

2. Let X be uniformly distributed over $(0, A)$ Derive (*from scratch*) (i) $E[X]$ (ii) $Var(X)$.

3. Buses arrive at a specified stop at 15-minute intervals, starting at 6 AM. It a passenger arrives at a time that is uniformly distributed between 6 AM and 7 AM, what is the probability that he would have to wait

(a) Less than 3 minutes?

(b) more than 8 minutes?

(c) Between 5 and 9 minutes if it is known that he had to wait less than 12 minutes.

4. An insurance company issues policies covering damages to automobiles. The amount of damage is modeled by a uniform distribution on $[0, b]$.

The policy payout is subject to a deductible of $b/10$.

A policyholder experiences automobile damage.

Calculate the ratio of the standard deviation of the policy payout to the standard deviation of the amount of damage.

5. If X is a normal random variable with mean 4 and variance 9. find (a) $P(3 < X < 6)$; (b) $P(X > 0)$ (c) $P(|X - 4| > 3)$.

6. Approximate the probability that if you toss a loaded coin, with $Pr(Head) = 0.6$, one hundred times:

(a) you would get more than 65 Heads;

(b) You would get less than 53 Heads;

(c) You would get between 54 and 63 Heads.

7. The working lifetime, in years, of a particular model of bread maker is normally distributed with mean 4 and variance 4.

Calculate the 20-th percentile of the working lifetime, in years.