Homework based on Chapter 7
Computational Probability and Statistics
CIS 2033, Section 002

Due: 9:00 AM, Friday, Feb. 27, 2015

Question 1 For random variable X follows $Bin(3, 0.5)$.

a). Calculate E[X].

b). Calculate Var[X].

Exercise 7.2 The probability distribution of a discrete random variable X is given

$$P(X = -1) = \frac{1}{5}, P(X = 0) = \frac{2}{5}, P(X = 1) = \frac{2}{5}.$$

a. Compute $E[X]$

b. Given the probability distribution of $Y = X^2$ and compute $E[Y]$ using distribution of Y.

Question 2 For random variable X follows $Unif(a, b)$.

a). Proof that $E[X] = \frac{a+b}{2}$ and $Var[X] = \frac{(b-a)^2}{12}$.

b). Based on the results from a), calculate the expectation and variance of $Unif(3, 5)$.

Exercise 7.15 Let X be a random variable and r and s any real numbers. Use the change-of-units rule $E[rX + s] = rE[X] + s$ for the expectation to obtain a and b.

a. Show that $Var(rX) = r^2 Var(X)$.

b. Show that $Var(X + s) = Var(X)$.

c. Combine parts a and b to show that $Var(rX + s) = r^2 Var(X)$.