04b Sample Examination Problems Chapter 4

1. X and Y are random variables with Normal distributions with mean 0, variance 1 and correlation coefficient 0.5. What is $P(X + Y > 2)$? Assume that $X + Y$ has a normal distribution.

2. X and Y are independent random variables with Normal distributions with mean 0 and variance 1. For some choice of $c > 0$ $P(X + cY > 4.2732) = 0.15$. What is c?

3. Prove that

$$\text{var}(X + Y) = \text{var}(X) + \text{var}(Y) + 2\text{cov}(X, Y).$$

4. The distribution of (X, Y) is specified in the following table:

X	Y	Probability
1	6	1/3
2	5	1/3
3	4	1/3

Find the correlation coefficient of X, Y.

5. Why is a correlation coefficient used to measure linear association rather than covariance?

6. Find the correlation coefficient of X and X^2 where X is a binomial random variable from 3 trials with probability of success 0.5.