MThambeliyagodage\_Data605\_W9\_Assign9

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# Data 605 Assignment 9

## Problem 1

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The price of one share of stock in the Pilsdorff Beer Company (see Exercise 8.2.12) is given by on the day of the year. Finn observes that the differences appear to be independent random variables with a common distribution having mean and variance . If , estimate the probability that is

### $\scriptsize(a) \geqslant 100.$

.

std = sqrt(364/4)  
pnorm(100-100, mean = 0, sd = std, lower.tail = FALSE)

## [1] 0.5

### $\scriptsize(b) \geqslant 110.$

.

pnorm(110-100, mean = 0, sd = std, lower.tail = FALSE)

## [1] 0.1472537

### $\scriptsize(b) \geqslant 120.$

.

pnorm(120-100, mean = 0, sd = std, lower.tail = FALSE)

## [1] 0.01801584

## Problem 2

Calculate the expected value and variance of the binomial distribution using the moment generating function.

The probability mass function for the binomial distribution is:

Binomial Distribution function:

Substitute f(x)in g(t):

First derivative:

Find expected value E(x) by 1st derivative of MGF at t=0:

Find variance V(x) by 2nd derivative of MGF at t=0:

when t=0:

Variance:

## Problem 3

Calculate the expected value and variance of the exponential distribution using the moment generating function.

Moment generating function:

Exponential distribution function:

Substitute f(x)in g(t):

First derivative:

Find expected value E(x) by 1st derivative of MGF at t=0:

Find variance V(x) by 2nd derivative of MGF at t=0:

Variance: