Task 1

Continuous distribution

Log normal distribution: The Commonness, And Rarity, of Species

In this distribution type, the variable in question’s logarithm is normally distributed.

Normal distribution: Normal Distribution of Cell Generation Rate

Normal distribution describes how the values of a variable are distributed. It is a symmetric distribution where most of the observations cluster around the central peak and the probabilities for values further away from the mean taper off equally in both directions. Outliers in both tails of the distribution are similarly unlikely.

Uniform distribution: Uniform Distribution of Epithelial Stem Cells in the Bulbar Conjunctiva

This distribution is defined by two parameters, a minimum and maximum.

Discrete Distribution

Negative Binomial Distribution: Parasite Aggregations in host populations using a reformulated negative binomial model

A negative binomial experiment has the following properties: The experiment consists of a number of repeated trials. Each trial can result in just two possible outcomes, a success or failure. The probability of success, denoted by P, is the same on every trial. The trials are independent. The experiment continues until a predetermined number of successes are observed.

Task 2

Continuous distribution

Log normal distribution: Milk production by cows

Methods

Lactation begins before calving and this is when milking began. Healthy cows in their second calving season are milked for the first time 10 days before calving. Then, cows are milked twice a day, in the morning and the evening (14 hours between evening and morning milking and 10 hours between morning and evening). Milk is extracted throughout the calving season and after with amounts of milk produced measured in litres. We calculated the logarithm of values for height.

Results

We obtained normally distributed standardized residuals for the daily yield of milk.

Normal distribution: Height of children in a class

Methods

The heights of 20 children of the same age in a class were measured. Girls and boys were measured separately since there is variation in heights between genders that is, males are typically taller than females. These data were arranged in classes 0-5, 5-10, 10-15 and 15-20. The frequencies were graphed.

Results

The height of males and females in the class was normally distributed.

The heights of students in the class was also found to be normally distributed.

Student’s T-test Distribution: Weight of common pigeon (‎*Columba livia*) in rural and urban setting

Methods

The study looked at the weight of *Columba livia* in Cape Town CBD and a remote farm near Stellenbosch. Birds were weighed and their crops cut open and examined. Food items ingested were recorded. The data were analysed in R and their mean weights compared by means of a Student’s t-test.

Results

Birds from the Cape Town CBD were found to have a higher mean weight than those from the farm area near Stellenbosch.

Discrete Distribution

Negative binomial distribution: Flea species on dogs

Methods

The study was conducted to determine when dogs would no longer have *Ctenocephalides canis*. We looked at the presence of flea (*Ctenocephalides canis*) species on dogs (*Canis lupus familiaris*) being looked after at the SPCA in Cape Town. We examined dogs three times daily (06h00, 12h00 and 18h00) from when they entered the facility until a month after they left.

Results

Dogs were found to have no fleas within one week of leaving the facility, the presence of fleas showed a negative binomial distribution.