**Quiz 4, Version 1**

Q1. A researcher randomly selects 50 points along a beach to place a plastic square called a quadrat (0.5m2), and counts how many hermit crabs she finds inside each plastic square: 0 hermit crabs, 2 hermit crabs, 25 hermit crabs, etc. Which probability distribution would this random count variable be most likely to have?

1. Poisson distribution
2. Uniform distribution
3. Normal distribution
4. Binomial distribution

Q2. A researcher measures the shell diameters of the 50 hermit crabs found in one plastic square: 20.2 mm, 54.7 mm, etc. Which probability distribution would this variable be most likely to have?

1. Normal distribution
2. Uniform distribution
3. Binomial distribution
4. Poisson distribution

Q3. In a dental clinic, the tooth decay status of each patient is recorded: the patient either does have tooth decay or does not have tooth decay. Which of these statements about this tooth decay variable is **false**?

1. Like a coin flip, there is a 50/50 chance that a patient will have tooth decay.
2. Tooth decay status is a Bernoulli trial like a coin flip; there is a binary outcome for each patient (0 vs 1, yes vs. no, etc.)
3. If you added up all of the patients in the clinic who had tooth decay in the dental clinic each month out of the total number of patients per month, the monthly number of patients with tooth decay would be a binominal random variable.
4. Tooth decay is a random variable.

Q4. A researcher records the color of 1000 beetles in a museum: green, black, orange, etc. Which of these statements is **true**?

1. Color is a categorical variable.
2. Color is invariable.
3. Color is a quantitative variable.
4. Color is a random variable.

Q5. Match the names of the distributions to the corresponding histogram.

Poisson

Normal

Bernoulli







6. Which code would calculate the mean number of cavities per patient from this dataframe (named Data)?

Data<- read.csv(“~/DentalDecayData.csv")



mean(Data$NumCavities)

mean(Data)

mean(NumCavities)

mean(number of cavities)

**Quiz 4, Version 2**

Q1. A researcher randomly selects 50 points along a beach to place a plastic square (0.5m2), and counts how many hermit crabs she finds inside each plastic square: 0 hermit crabs, 2 hermit crabs, 25 hermit crabs, etc. Someone tries to tell her that this variable will be normally distributed, but she can give them three reasons why a Poisson distribution is more appropriate. Which of these reasons is **incorrect**?

1. Count data have an upper maximum number of individuals per observational unit. The Poisson distribution is more appropriate because it has an upper limit, whereas the normal distribution has no upper limit.
2. Count data are discrete. The Poisson distribution is more appropriate because it is for discrete variables, whereas the normal distribution is for continuous variables.
3. Count data cannot be less than zero. The Poisson distribution is more appropriate because it is for 0 and positive integers, whereas the normal distribution can include any value from -∞ to ∞.
4. When count data have relatively low mean counts, their distributions are asymmetrical. The Poisson distribution is more appropriate because it allows for asymmetrical distributions, whereas the normal distribution assumes that data are distributed symmetrically around the mean.

Q2. A researcher randomly selects 50 points along a beach to place a plastic square called a quadrat (0.5m2), and inspects every hermit crab that she finds per quadrat to see if they are “infected” by symbiotic organisms living on their shells: 2 hermit crabs infected out of 10 total hermit crabs, 19 hermit crabs infected out of 20 total hermit crabs, etc. Which probability distribution would this random count variable be most likely to have?

1. Binomial distribution
2. Uniform distribution
3. Normal distribution
4. Poisson distribution

Q3. A researcher records the color of 1000 beetles in a museum: green, black, orange, etc. Then she creates a histogram of the number of beetles of each color: 430 black beetles, 212 orange beetles, etc. Which of these statements is **false**?

1. The number of beetles per color is a categorical variable.
2. The number of beetles per color is a discrete variable.
3. The number of beetles per color is a quantitative variable.
4. The number of beetles per color is a random variable.

Q4. A researcher records the species of 1000 beetles in a museum: Coccinella septempunctata, Nicrophorus americanus, Coccinella septempunctata, etc. Which of these statements is **true**?

1. Species is a categorical variable.
2. Species is invariable.
3. Species is a quantitative variable.
4. Species is a random variable.

Q5. Match the names of the distributions to the corresponding histogram.

Poisson

Normal

Bernoulli







Q6. Which of these is **not** achieved by this R code?

PopMeanLength<-150

PopSDLength<-20

N<-10000

FishLength<-rnorm(n=N, mean=PopMeanLength, sd=PopSDLength)

1. The code calculates the population standard deviation.
2. The code assigns a population mean.
3. The code assigns a population size.
4. The code draws N random fish lengths from a normal distribution with a given mean and standard deviation.