Congratulations! You passed!
Next Item

Question 1

Correct

1 / 1

point

1. Question 1

Which of the following corresponds to the formula for the discrete form of Bayes' Rule?

Question 2

Correct

1 / 1

point

2. Question 2

Of women ages 40 and over, 10 out of 1000 have breast cancer. A mammography has 80% sensitivity (true positive rate) and a 90% specificity (true negative rate). A woman walks into a clinic for a routine screening (mammography). What is the probability that she has breast cancer and tests positive?

Question 3

Incorrect

0 / 1

point

3. Question 3

Of women ages 40 and over, 10 out of 1000 have breast cancer. A mammography has 80% sensitivity (true positive rate) and a 90% specificity (true negative rate). A woman walks into a clinic for a routine screening (mammography) and tests positive for breast cancer. Now, what is the probability that she has breast cancer?

Question 4

Correct

1 / 1

point

4. Question 4

True or False: As new information comes in, our posterior beliefs based on the previous information become our new prior beliefs.

Question 5

Correct

1 / 1

point

5. Question 5

Which of the following is the *best* Bayesian interpretation of the following statement: "the probability of Liverpool defeating Swansea City tomorrow is 0.9"?

Question 6

Correct

1 / 1

point

6. Question 6

Which of the following statements can be used to describe a 95 percent Frequentist confidence interval constructed based on a data from an experiment with sample of size n?

Question 7

Correct

1 / 1

point

7. Question 7

Hearing about your brilliant success in working with M&Ms, Mars Inc. transfers you over to the Skittles department. They recently have had complaints about tropical Skittles being mixed in with original Skittles. You decide to conduct a frequentist analysis. If the findings suggest than more than 1% of sampled supposedly original Skittles are actually tropical you will recommend action to be taken and the production process to be corrected. You will use a significance level of $\alpha = 0.1$. You randomly sample 300 supposedly original skittles, and you find that five of them are tropical. What should be the conclusion of your hypothesis test? Hint - $H_0: p = 0.01$ and $H_1: p > 0.01$.

Question 8

Correct

1 / 1

point

8. Question 8

You are testing dice for a casino to make sure that sixes do not come up more frequently than expected. Because you do not want to manually roll dice all day, you design a machine to roll a die repeatedly and record the number of sixes that come face up. In order to do a Bayesian analysis to test the hypothesis that $p = 1/6$ versus $p = .175$, you set the machine to roll the die 6000 times. When you come back at the end of the day, you discover to your horror that the machine was unable to count higher than 999. The machine says that 999 sixes occurred. Given a prior probability of 0.8 placed on the hypothesis $p = 1/6$, what is the posterior probability that the die is fair, given the censored data? Hint - to find the probability that at least x sixes occurred in n trials with proportion p (which is the likelihood in this problem), use the R command *1 - pbinom(x-1, n, p)*.

Question 9

Correct

1 / 1

point

9. Question 9

True or False: As long as the prior places non-zero probability on all possible values of a proportion, the posterior of the proportion is guaranteed to converge to the true proportion as the sample size approaches infinity.

Question 10

Incorrect

0 / 1

point

10. Question 10

One of the advantages of Bayesian statistics is its usefulness in making decisions. Suppose you are deciding between two actions, A, and B, and are testing between two mutually exclusive hypotheses, H_1 and H_2. If you choose action A, you receive $1 if H_1 is true and nothing if it is false. If you choose action B, you receive $2 if H_1 is true and lose $1 if it is false. Suppose H_1H_1 is true with posterior probability pp. At what value of pp are you indifferent between action AA and action BB?

Week 1 Quiz

Quiz, 10 questions

Question 1

1

point

1. Question 1

Which of the following corresponds to the formula for the discrete form of Bayes' Rule?

P(B|A) = \frac{P(A|B)P(A)}{P(B)}$P(B|A)=\frac{P(A|B)P(A)}{P(B)}$

P(A,B) = P(A)P(B)$P(A,B)=P(A)P(B)$

P(B|A) = \frac{P(A|B)P(B)}{P(A)}$P(B|A)=\frac{P(A|B)P(B)}{P(A)}$

P(B|A) = \frac{P(A|B)}{P(A)}$P(B|A)=\frac{P(A|B)}{P(A)}$

Question 2

1

point

2. Question 2

Of women ages 40 and over, 10 out of 1000 have breast cancer. A mammography has 80% sensitivity (true positive rate) and a 90% specificity (true negative rate). A woman walks into a clinic for a routine screening (mammography). What is the probability that she has breast cancer and tests positive?

0.001

0.008

0.010

0.800

Question 3

1

point

3. Question 3

Of women ages 40 and over, 10 out of 1000 have breast cancer. A mammography has 80% sensitivity (true positive rate) and a 90% specificity (true negative rate). A woman walks into a clinic for a routine screening (mammography) and tests positive for breast cancer. Now, what is the probability that she has breast cancer?

0.011

0.075

0.081

0.889

Question 4

1

point

4. Question 4

True or False: As new information comes in, our posterior beliefs based on the previous information become our new prior beliefs.

True

False

Question 5

1

point

5. Question 5

Which of the following is the *best* Bayesian interpretation of the following statement: "the probability of Liverpool defeating Swansea City tomorrow is 0.9"?

We would be indifferent between winning $1 with probability 0.9 and winning $1 if Liverpool beats Swansea City

Teams as good as Liverpool have historically beaten teams as good as Swansea City 90 percent of the time

Liverpool is a heavy favorite to beat Swansea City

Liverpool would beat Swansea City nine times out of ten.

Question 6

1

point

6. Question 6

Which of the following statements can be used to describe a 95 percent Frequentist confidence interval constructed based on a data from an experiment with sample of size n?

◉

If we ran the same experiment on new samples of size n an infinite number of times, 95 percent of our intervals generated in this way would contain the true value of μ

○

The probability that μ falls within the interval is 0.95

○

μ is in this interval 95 percent of the time.

○

All values of μ within the 95 percent confidence interval are equally likely

Question 7

1

point

7. Question 7

Hearing about your brilliant success in working with M&Ms, Mars Inc. transfers you over to the Skittles department. They recently have had complaints about tropical Skittles being mixed in with original Skittles. You decide to conduct a frequentist analysis. If the findings suggest than more than 1% of sampled supposedly original Skittles are actually tropical you will recommend action to be taken and the production process to be corrected. You will use a significance level of $\alpha = 0.1$. You randomly sample 300 supposedly original skittles, and you find that five of them are tropical. What should be the conclusion of your hypothesis test? Hint - $H_0: p = 0.01$ and $H_1: p > 0.01$.

○

Reject H_0, since the p-value is equal to 0.027, which is less than $\alpha = 0.1$

○

Fail to reject H_0, since the p-value is equal to 0.245, which is greater than $\alpha = 0.1$

◉

Fail to reject H_0, since the p-value is equal to 0.184, which is greater than $\alpha = 0.1$

Fail to reject H_0, since the p-value is equal to 0.101, which is greater than $\alpha = 0.1$

Question 8

1

point

8. Question 8

You are testing dice for a casino to make sure that sixes do not come up more frequently than expected. Because you do not want to manually roll dice all day, you design a machine to roll a die repeatedly and record the number of sixes that come face up. In order to do a Bayesian analysis to test the hypothesis that $p = 1/6$ versus $p = .175$, you set the machine to roll the die 6000 times. When you come back at the end of the day, you discover to your horror that the machine was unable to count higher than 999. The machine says that 999 sixes occurred. Given a prior probability of 0.8 placed on the hypothesis $p = 1/6$, what is the posterior probability that the die is fair, given the censored data? Hint - to find the probability that at least x sixes occurred in n trials with proportion p (which is the likelihood in this problem), use the R command *1 - pbinom(x-1, n, p)*.

0.500

0.684

0.800

0.881

Question 9

1

point

9. Question 9

True or False: As long as the prior places non-zero probability on all possible values of a proportion, the posterior of the proportion is guaranteed to converge to the true proportion as the sample size approaches infinity.

True

False

Question 10

1

point

10. Question 10

One of the advantages of Bayesian statistics is its usefulness in making decisions. Suppose you are deciding between two actions, AA, and BB, and are testing between two mutually exclusive hypotheses, H_1H_1 and H_2H_2. If you choose action AA, you receive $1 if H_1$H_1$is true and nothing if it is false. If you choose action BB, you receive $2 if H_1$H_1$ is true and lose $1 if it is false. Suppose H_1H_1 is true with posterior probability pp. At what value of pp are you indifferent between action AA and action BB?

1/3

1/2

2/3

3/4

I, **Shayan Taheri**, understand that submitting work that isn't my own may result in permanent failure of this course or deactivation of my Coursera account. Learn more about Coursera's Honor Code