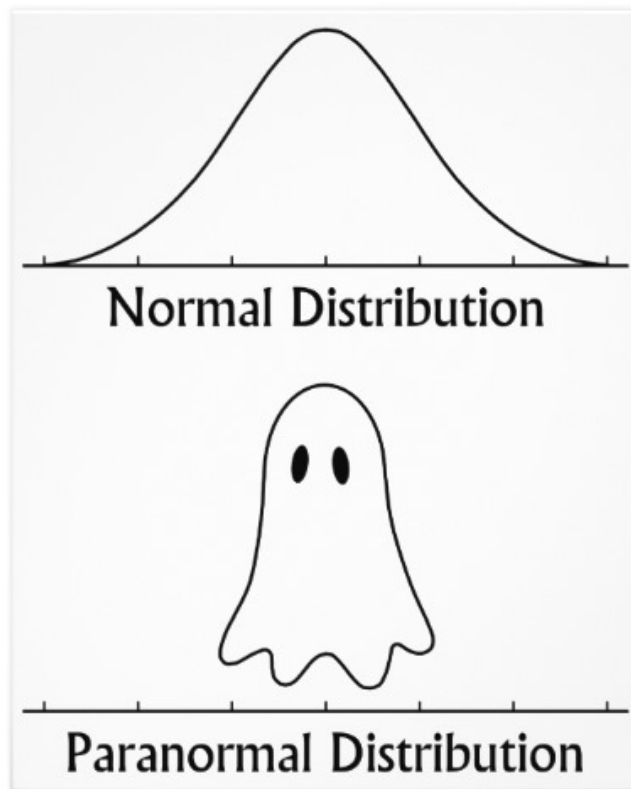


STA 100
Fall Quarter, 2018
Exam I

Name: _____

Student ID: _____



1. Round to four decimal places.
2. A correct answer with no work shown will not receive full credit.
3. An incorrect answer with no work shown (for example, via calculator) **will receive no credit**.
4. Please make sure to **write your initials on all** of the exam pages (in the upper right corner.)

Good Luck!

True/False

For each of the following questions indicate true or false, then **fully explain** your answer. You may use examples to illustrate your answer.

- (I) You can always identify range of the upper 50% of the data from a histogram.
- (II) For a continuous random variable, if the mean is larger than the median, you may conclude that the probability that a value is less than the mean is over 50%.
- (III) For two events A and B , where $Pr\{A\} > 0$ and $Pr\{B\} > 0$, $Pr\{A|B\} + Pr\{B|A\}$ must equal 1.
- (IV) For a normal random variable, the Z score of a value X that is below the mean will always be negative.

Full Detail

Work out the following problems. **Show your work.**

1. A random sample of 45 children (and their parents) asked “How many hours do you spend Trick or Treating for Halloween?”. Let Y_i = the number of hours the children (and their parents) spent Trick or Treating. The responses are below, with Y_i and the frequency of Y_i :

Value of y_i	2	4	5	6	10
Frequency of y_i	15	12	13	3	2

For example, 15 children (and their families) spend 2 hours Trick or Treating, 12 spent 4 hours, etc.

- (a) Find the average number of hours spend trick or treating.
- (b) Identify any outliers, being sure to show your work and completely justify your answer.
- (c) If the standard deviation for this data set is 1.8888, interpret the standard deviation in terms of the problem.
- (d) Estimate the probability that a childrens' family falls **within** one standard deviation from the mean.

Initial: _____

2. Suppose that 40% of students go to sleep “on time”. If a student went to sleep “on time”, the probability that they felt “well rested” was 0.80. Further, the probability that a student both did not go to sleep “on time” and felt “well rested” was 0.20.

(a) Find the probability that a student felt “well rested”.

(b) Find the probability that a student did not go to sleep “on time”, or did feel “well rested”, or both.

(c) A fellow student tells you they feel “well rested”. What is the probability the fellow student went to sleep “on time”?

(d) What is the probability a student both does not feel “well rested”, and did go to sleep “on time”?

Initial: _____

3. Suppose the length a cat takes a nap (the length of a “cat nap”) has a population mean of 3 hours, with population standard deviation 0.75 hours. Assume the length of a cat nap is normally distributed.

(a) Find the probability that a randomly selected cat takes a nap over 4 hours in length.

(b) If a cat has been napping for 2 hours, what is the probability that they nap at most an additional 1.5 hours?

(c) A cat sleeps 4.35 hours. What percentile does this value represent?

(d) Suppose we sample 1000 cats from this population. What is the expected number of cats who sleep under four hours, and the standard deviation of the number of cats who sleep under four hours (out of the 1000)? You may assume all cats are independent.

Scratch Work