Question 1

2 pts

(1) Assume the outcomes from an experiment with a trials conform to a Poisson distribution with lambda equal to 1. Determine the probability of obtaining an outcome greater than 3. (Round to four decimal places.)

- ○ 0.015
- ○ 0.019
- ○ 0.012
- ○ 0.08

Question 2

3 pts

(2) Use Bayes' theorem to find the indicated probability.

5.8% of a population is infected with a certain disease. There is a test for the disease, however the test is not completely accurate. 93.9% of those who have the disease test positive. However 4.1% of those who do not have the disease also test positive (false positives). A person is randomly selected and tested for the disease.

What is the probability that the person has the disease given that the test result is positive?

- ○ 0.905
- ○ 0.585
- ○ 0.038
- ○ 0.475

Question 3   2 pts

(3) Given the following probability distribution for the variable x, compute the expected value and variance of x using the distribution below. Round to two decimal places.

x	0	1	2	3
probability	0.779	0.195	0.024	0.002

- ◯ mean = 0.25 variance = 0.5
- ◯ mean = 0.5 variance = 0.25
- ◯ mean = 0.25 variance = 0.25
- ◯ mean = 0.5 variance = 0.5

Question 4   2 pts

(4) Solve the problem.

Given the following sample data: 1.3, 2.2, 2.7, 3.1, 3.3, 3.7, use quantile() in R with type = 7 to find the estimated 33rd percentile. Round to 2 decimal places. Pick the correct answer.

- ◯ 2.53
- ◯ 2.20
- ◯ 2.33
- ◯ 2.90

Question 5

3 pts

(5) Solve the problem.

A study of the amount of time it takes a mechanic to rebuild the transmission for a 2005 Chevrolet Cavalier shows that the mean is 8.4 hours and the standard deviation is 1.8 hours. If a random sample of 36 mechanics is selected, find the probability that their mean rebuild time exceeds 8.7 hours. Assume the mean rebuild time has a normal distribution. (Hint, interpolate in the tables or use pnorm().)

○ 0.129

○ 0.135

○ 0.195

○ 0.159

Question 6

2 pts

(6) Use the normal distribution to estimate the probability of 50 successes for a binomial distribution with n = 67 and the probability of success p = 0.7. Round to four decimal places.

○ 0.0783

○ 0.0755

○ 0.0756

○ 0.0754

Question 7   2 pts

(7) The given values are discrete (binomial outcomes). Use the continuity correction and describe the region of the normal distribution that corresponds to the indicated probability.

The probability of less than 44 correct answers.

- ○ The area to the left of 44.5

- ○ The area to the right of 44

- ○ The area to the left of 44

- ○ The area to the left of 43.5

Question 8   3 pts

(8) Solve the problem. Round to the nearest tenth unless indicated otherwise.

In one region, the September energy consumption levels for single-family homes are found to be normally distributed with a mean of 1050 kWh and a standard deviation of 218 kWh. Find P_{45} (45th percentile).

- ○ 1148.1

- ○ 1087.8

- ○ 1022.6

- ○ 1078.3

(9) Find the indicated probability.

In a taste test, five different customers are each presented with 3 different soft drinks. The same soft drinks are used with each customer, but presented in random order. If the selections were made by random guesses, find the probability that all five customers witnesses would pick the same soft drink as their favorite. (There is more than one way the customers can agree.)

○ 0.00412

○ 0.01235

○ 0.00617

○ none of the above

(10) Find the indicated probability.

As a prize for winning a contest, the contestant is blindfolded and allowed to draw 3 dollar bills one at a time out of an urn. The urn contains forty $1 bills and ten $100 bills. The urn is churned before each selection so that the selection would be at random. What is the probability that none of the $100 bills are selected? (Round to four decimal places.)

○ 0.6097

○ 0.5041

○ 0.0035

○ 0.6231