

## Question 1

10 / 10 pts

A box contains seven marbles — one red, two green, and four blue. Consider an experiment that consists of taking one marble from the box, then replacing it in the box and drawing a second marble from the box. What is the probability that the first marble is red and the second marble is green?

☐ 0.16327

☐ None of all the others

☐ 0.16667

☐ 0.08163

☒ 0.04082

## Question 2

10 / 10 pts

A box contains seven marbles — one red, two green, and four blue. Consider an experiment that consists of taking one marble from the box, and then drawing a second marble from the box without replacing it in the box. What is the probability that the first marble is red and the second marble is blue?

☐ 0.19048

☒ 0.09524

☐ 0.04762

☐ None of all the others

☐ 0.05556

### Question 3

10 / 10 pts

A group of 7 boys and 13 girls is lined up in random order— assuming each permutation to be equally likely. What is the probability that the person in the 4th position is a girl?

☐ 0.6667

☒ 0.6500

☐ None of all the others

☐ 0.5000

☐ 0.6316

## Question 4

10 / 10 pts

A group of 7 boys and 10 girls is lined up in random order— assuming each permutation to be equally likely. What is the probability that the person in the 3rd position is a boy and a particular girl is in the 4th position?

☒ 0.02574

☐ None of all the others

☐ 0.02722

☐ 0.02288

☐ 0.02047

## Question 5

Original Score: 0 / 10 pts **Regraded Score: 10 / 10 pts**

⚠ This question has been regraded.

Peter is getting married tomorrow, at an outdoor ceremony in the desert. In recent years, it has rained only 7 days out of 1000 days. Unfortunately, the weatherman has predicted rain for tomorrow. When it actually rains, the weatherman correctly forecasts rain 80% of the time. When it doesn't rain, he incorrectly forecasts rain 10% of the time. What is the probability that it will not rain on the day of Peter's wedding?

☐ 0.0534

☐ 0.1242

☐ 0.4342

☐ 0.6242

☒ None of all the others

## Question 6

10 / 10 pts

John was tested positive for COVID-19. We assume that a person gets COVID-19 with 10% of the chance. When a person actually gets COVID-19, the test incorrectly predicts positive 10% of the time. When a person doesn't get COVID-19, the test incorrectly predicts positive 20% of the time. What is the probability that John gets COVID-19?

☐ 0.043478

☐ 0.633333

☒ 0.333333

☐ 0.533333

☐ None of all the others

## Question 7

10 / 10 pts

The population standard deviation of test scores on a certain achievement test is 12. If a random sample of 9 students had a sample mean score of 80 and a sample standard deviation of test scores 15, find a 90 percent confidence interval estimate for the average score of all students.

☒ 80 +/- 6.58

☐ 80 +/- 7.44

☐ None of all the others

☐ 80 +/- 9.30

☐ 80 +/- 9.17

☐ 80 +/- 8.23

## Question 8

10 / 10 pts

If a random sample of 9 students on a certain achievement test had a sample mean score of 80 and a sample standard deviation of test scores 13, find a 99 percent confidence interval estimate for the average score of all students.

- ☒ 80 +/- 14.5383
- ☐ 80 +/- 13.0883
- ☐ None of all the others
- ☐ 80 +/- 13.5383
- ☐ 80 +/- 14.0883
- ☐ 80 +/- 11.1627



A colony of laboratory mice consists of several thousand mice. The average weight of all the mice is 30 grams. A laboratory assistant was asked by a scientist to select 9 mice for an experiment. However, before performing the experiment the scientist decided to weigh the mice as an indicator of whether the assistant's selection constituted a random sample or whether it was made with some unconscious bias (perhaps the mice selected were the ones that were slowest in avoiding the assistant, which might indicate some inferiority about this group). If the sample mean of the 9 mice was 32 with a sample standard deviation of 5 grams, would this be significant evidence, at the 25 percent level of significance, against the hypothesis that the selection constituted a random sample?



Since the P-value is smaller than the significance level, we cannot reject the null hypothesis.



Since the P-value is smaller than the significance level, we reject the null hypothesis.



Since the P-value is greater than the significance level, we cannot reject the null hypothesis.



None of all the others.



Since the P-value is greater than the significance level, we reject the null hypothesis.

A producer specifies that the mean lifetime of a certain type of battery is at least 241 hours with standard deviation 12. A sample of 16 such batteries yielded the sample mean 237. Assuming that the life of the batteries is approximately normally distributed, do the data indicate that the specifications are not being met at the  $\alpha = 0.1$  level of significance?

☐

Since the P-value is greater than the significance level, we reject the null hypothesis.

☒

Since the P-value is smaller than the significance level, we reject the null hypothesis.

☐

None of all the others.

☐

Since the P-value is smaller than the significance level, we cannot reject the null hypothesis.

☐

Since the P-value is greater than the significance level, we cannot reject the null hypothesis.