

L10B HW

- Due Feb 19 at 11:59pm
- Points 12
- Questions 12
- Time Limit None
- Allowed Attempts 3

Instructions



You get two attempts on all homework quizzes.

In all quizzes and homeworks in this course, round your answers to **THREE DECIMAL** places unless otherwise indicated.

Take the Quiz Again

Attempt History

	Attempt	Time	Score
KEPT	Attempt 2	12 minutes	12 out of 12
LATEST	Attempt 2	12 minutes	12 out of 12
	Attempt 1	12 minutes	7 out of 12

⚠️ Answers will be shown after your last attempt

Score for this attempt: 12 out of 12

Submitted Feb 18 at 12:58pm

This attempt took 12 minutes.



Question 1

1 / 1 pts

What is α ?

- ☐ It is the probability of rejecting the null hypothesis.
- ☐ It is the probability of rejecting the null hypothesis given that the null is false.

- ☒ It is the probability of rejecting the null hypothesis given that the null is true.
- ☐ It is the probability of Type II error.
- ☐ It is the probability of failing to reject the null hypothesis when in fact it is false.



Question 2

1 / 1 pts

A factory bought a new machine and they want to test if the new machine is better (produces more items per hour than the old machine). If the old machine used to produce 15 items per hour before it broke, what would be the null and alternative hypothesis?

- ☐ $H_0 : \mu = 15$ and $H_1 : \mu < 15$
- ☐ $H_0 : \mu > 15$ and $H_1 : \mu = 15$
- ☒ $H_0 : \mu = 15$ and $H_1 : \mu > 15$
- ☐ $H_0 : \mu = 15$ and $H_1 : \mu \neq 15$



Question 3

1 / 1 pts

In the above question, if the p-value of was equal to 0.4, which of the following statements is the best conclusion at the 0.05 significance level?

- ☐ There is insufficient evidence to show that the new machine is the same as the old machine.
- ☒ There is insufficient evidence to show that the new machine is better.
- ☐ There is sufficient evidence to show that the new machine is better.
- ☐ There is sufficient evidence to show that the new machine is the same as the old machine.



Question 4

1 / 1 pts

The average number of hours that a light bulb of type A lasts before it breaks is 300 hours. If we pick 100 light bulbs of type A at random, which of the following are true. **Mark all that apply.**

- ☐ All of the 100 bulbs will last 300 hours then break.
- ☒ The average lifetime of the 100 bulbs will probably be around 300 hours.
- ☒ The population mean is 300.
- ☐ The population mean is unknown.
- ☒ The sample size is 100.
- ☐ The sample mean is 300.



A soft-drink machine is being regulated so that the amount of drink dispensed averages 240 milliliters with a standard deviation of 15 milliliters. Assume the distribution is Normal. Periodically, the machine is checked by taking a sample of 40 drinks and computing the average content. **Use this information for all that parts.**



Question 5

1 / 1 pts

Part 1: What is the distribution of the sample mean?

- ☐ $N(240, 15)$
- ☐ $N(240, 15/40)$
- ☒ $N(240, 225/40)$
- ☐ $N(240/40, 225/40)$
- ☐ $N(240, 225)$



Question 6

1 / 1 pts

Part 2: Find the probability that the sample mean is higher than 241 ml.

Note: Since σ is known, you should use the normal distribution for this question (not the T distribution).

Question 7

1 / 1 pts

Part 3: Find the probability that the sample mean is lower than 238 ml.

Note: Since σ is known, you should use the normal distribution for this question (not the T distribution).

Question 8

1 / 1 pts

A new material for manufacturing tires will be used if it can be shown that the mean lifetime of tires will be greater than 70,000 miles. (use this information for all parts)

Part 1: State the most appropriate null and alternative hypothesis.

- ☐ $H_0 : \mu = 70000$ and $H_1 : \mu \neq 70000$
- ☐ $H_0 : \mu > 70000$ and $H_1 : \mu = 70000$
- ☒ $H_0 : \mu = 70000$ and $H_1 : \mu > 70000$
- ☐ $H_0 : \mu = 70000$ and $H_1 : \mu < 70000$



Question 9

1 / 1 pts

Part 2: In the above question, what is considered a type II error?

- ☐ Saying that the mean lifetime of the tires is greater than 70,000 miles when in fact it is equal to 70,000 miles.
- ☐ Saying that the mean lifetime of the tires is equal to 70,000 miles.
- ☐ Saying that the mean lifetime of the tires is equal to 70,000 miles when in fact it is less than that.
- ☒ Saying that the mean lifetime of the tires is equal to 70,000 miles when in fact it is greater than that.



Question 10

1 / 1 pts

Part 3: If we get a p-value of 0.001, what would our conclusion be at the 0.05 significance level?

- ☐ We have insufficient evidence to conclude that the life of the tires is more than 70,000 miles.
- ☒ We have sufficient evidence to conclude that the life of the tires is more than 70,000 miles.
- ☐ We have insufficient evidence to conclude that the life of the tires is equal to 70,000 miles.
- ☐ We have sufficient evidence to conclude that the life of the tires is equal to 70,000 miles.



Question 11

1 / 1 pts

What is the p-value?

- ☐ It is the probability of failing to reject the null hypothesis when in fact it is false.
- ☐ It is the probability of getting results at least as extreme as those we got.
- ☐ It is the probability of rejecting the null hypothesis.
- ☐ It is the probability of type I error.
- ☐ It is the probability of getting results at least as extreme as those we got, given the null hypothesis is false.
- ☒ It is the probability of getting results at least as extreme as those we got, given the null hypothesis is true.



Question 12

1 / 1 pts

Suppose you suspect that workers in your factory are not putting in enough hours. You want to test if they put in more than 7 hours a day on average. What would be your **null** hypothesis?

- ☐ $\mu < 7$
- ☐ $\mu > 7$
- ☒ $\mu = 7$
- ☐ $\mu \geq 7$

Quiz Score: 12 out of 12