

May 2012

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## WEEK 6: HOMEWORK

Started: Jun 20 at 3:31pm

### QUIZ INSTRUCTIONS

Click the button to start the homework set. You can re-do this assignment as often as you need. Be sure to have the Week 6 spreadsheet available to help with the calculations. It is provided in [Week 6 Resources](#).

### QUESTIONS

- Question 1
- Question 2
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Time Elapsed: [Hide](#)  
Attempt due: Jun 17 at 12:59am  
0 Minutes, 25 Seconds

**Question 1** 2 pts

A consumer analyst reports that the mean life of a certain type of alkaline battery is more than 36 months. Write the null and alternative hypotheses and note which is the claim.

Homework Help:  
[6DA\\_Theory and basics of writing hypotheses](#) (DOCX)

- $H_0: \mu = 36$  (claim),  $H_a: \mu \geq 36$
- $H_0: \mu > 36$  (claim),  $H_a: \mu \leq 36$
- $H_0: \mu \leq 36$ ,  $H_a: \mu > 36$  (claim)
- $H_0: \mu \leq 36$ ,  $H_a: \mu < 36$  (claim)

**Question 2** 2 pts

A business claims that the mean time that customers wait for service is at most 3.5 minutes. Write the null and alternative hypotheses and note which is the claim.

Homework Help:  
[6DA\\_Theory and basics of writing hypotheses](#) (DOCX)

- $H_0: \mu > 3.5$  (claim),  $H_a: \mu > 3.5$
- $H_0: \mu > 3.5$ ,  $H_a: \mu \leq 3.5$  (claim)
- $H_0: \mu \leq 3.5$  (claim),  $H_a: \mu > 3.5$
- $H_0: \mu \geq 3.5$ ,  $H_a: \mu \leq 3.5$  (claim)

**Question 3** 2 pts

An amusement park claims that the average daily attendance is at least 12,000. Write the null and alternative hypotheses and note which is the claim.

Homework Help:  
[6DA\\_Theory and basics of writing hypotheses](#) (DOCX)

- $H_0: \mu > 12000$  (claim),  $H_a: \mu = 12000$
- $H_0: \mu \leq 12000$ ,  $H_a: \mu > 12000$  (claim)
- $H_0: \mu = 12000$ ,  $H_a: \mu \leq 12000$  (claim)
- $H_0: \mu \geq 12000$  (claim),  $H_a: \mu < 12000$

**Question 4** 2 pts

A transportation organization claims that the mean travel time between two destinations is about 17 minutes. Write the null and alternative hypotheses and note which is the claim.

Homework Help:  
[6DA\\_Theory and basics of writing hypotheses](#) (DOCX)

- $H_0: \mu = 17$  (claim),  $H_a: \mu \leq 17$
- $H_0: \mu \neq 17$ ,  $H_a: \mu = 17$  (claim)
- $H_0: \mu > 17$ ,  $H_a: \mu \leq 17$  (claim)
- $H_0: \mu = 17$  (claim),  $H_a: \mu \neq 17$

**Question 5** 2 pts

If the null hypothesis is not rejected when it is false, this is called \_\_\_\_\_.

Homework Help:  
[6DB\\_Type I and type II errors](#) (DOCX)

- a type I error
- the Empirical Rule
- a type II error
- an alternative hypothesis

**Question 6** 2 pts

A scientist claims that the mean gestation period for a fox is less than 50.3 weeks. If a hypothesis test is performed that rejects the null hypothesis, how would this decision be interpreted?

Homework Help:  
[6VA\\_Overview of hypothesis testing, hypotheses, conclusions, implications for claim](#) (4:32)  
[6DC\\_Connecting reject/fail to reject decision and implication for claim](#) (DOCX)

- There is not enough evidence to support the scientist's claim that the gestation period is more than 50.3 weeks
- There is not enough evidence to support the scientist's claim that the gestation period is 50.3 weeks
- The evidence indicates that the gestation period is more than 50.3 weeks

- There is enough evidence to support the scientist's claim that the gestation period is less than 50.3 weeks

**Question 7** 2 pts

A marketing organization claims that none of its employees are paid minimum wage. If a hypothesis test is performed that fails to reject the null hypothesis, how would this decision be interpreted?

Homework Help:

- [6VA. Overview of hypothesis testing, hypotheses, conclusions, implications for claim](#) (4.32)  
[6DC. Connecting reject/fail to reject decision and implication for claim](#) (DOCX)

- There is not sufficient evidence to support the claim that none of the employees are paid minimum wage
- There is sufficient evidence to support the claim that none of the employees are paid minimum wage
- There is not sufficient evidence to support the claim that some of the employees are paid minimum wage
- There is sufficient evidence to support the claim that some of the employees are paid minimum wage

**Question 8** 2 pts

A sprinkler manufacturer claims that the average activating temperatures is at least 131 degrees. To test this claim, you randomly select a sample of 32 systems and find the mean activation temperature to be 133 degrees. Assume the population standard deviation is 3.3 degrees. Find the standardized test statistic and the corresponding p-value.

Homework Help:

- [6VB. Hypothesis testing with spreadsheet to find test statistic and p-value](#) (2.58)

- z-test statistic = 3.43, p-value = 0.0006
- z-test statistic = -3.43, p-value = 0.0006
- z-test statistic = -3.43, p-value = 0.0003
- z-test statistic = 3.43, p-value = 0.0003

**Question 9** 2 pts

A consumer group claims that the mean acceleration time from 0 to 60 miles per hour for a sedan is 7.9 seconds. A random sample of 33 sedans has a mean acceleration time from 0 to 60 miles per hour of 7.6 seconds. Assume the population standard deviation is 2.3 seconds. Find the standardized test statistic and the corresponding p-value.

Homework Help:

- [6VB. Hypothesis testing with spreadsheet to find test statistic and p-value](#) (2.58)

- z-test statistic = -0.749, p-value = 0.227
- z-test statistic = -0.749, p-value = 0.227
- z-test statistic = 0.749, p-value = 0.454
- z-test statistic = -0.749, p-value = 0.454

**Question 10** 2 pts

A consumer research organization states that the mean caffeine content per 12-ounce bottle of a population of caffeinated soft drinks is 37.8 milligrams. You find a random sample of 48 12-ounce bottles of caffeinated soft drinks that has a mean caffeine content of 34.8 milligrams. Assume the population standard deviation is 12.5 milligrams. At  $\alpha=0.05$ , do you support or reject the organization's claim using the test statistic?

Homework Help:

- [6VC. Determining when to reject or fail to reject, both methods](#) (4.00)  
[6VE. Second sample hypothesis testing from word problem to implications for claim, with test statistic](#) (3.26)  
[6DD. Determining when to reject or fail to reject, both methods](#) (DOCX)

- Claim is alternative, fail to reject the null and support claim as test statistic (-1.66) is not in the rejection region defined by the critical value (-1.64)
- Claim is null, fail to reject the null and reject claim as test statistic (-1.66) is not in the rejection region defined by the critical value (-1.96)
- Claim is null, reject the null and support claim as test statistic (-1.66) is in the rejection region defined by the critical value (-1.96)
- Claim is alternative, reject the null and reject claim as test statistic (-1.66) is in the rejection region defined by the critical value (-1.64)

**Question 11** 2 pts

A computer manufacturer estimates that its cheapest screens will last less than 2.8 years. A random sample of 61 of these screens has a mean life of 2.7 years. The population is normally distributed with a population standard deviation of 0.88 years. At  $\alpha=0.02$ , what type of test is this and can you support the organization's claim using the test statistic?

Homework Help:

- [6VC. Determining when to reject or fail to reject, both methods](#) (4.00)  
[6VE. Second sample hypothesis testing from word problem to implications for claim, with test statistic](#) (3.26)  
[6DD. Determining when to reject or fail to reject, both methods](#) (DOCX)

- Claim is null, reject the null and support claim as test statistic (-0.89) is not in the rejection region defined by the critical value (-2.05)
- Claim is null, fail to reject the null and cannot support claim as test statistic (-0.89) is not in the rejection region defined by the critical value (-2.33)
- Claim is alternative, reject the null and support claim as test statistic (-0.89) is not in the rejection region defined by the critical value (-2.33)

- Claim is alternative, fail to reject the null and cannot support claim as test statistic (-0.89) is not in the rejection region defined by the critical value (-2.05)

**Question 12** 2 pts

A pharmaceutical company claims that the average cold lasts an average of 8.4 days. They are using this as a basis to test new medicines designed to shorten the length of colds. A random sample of 106 people with colds, finds that on average their colds last 8.7 days. The population is normally distributed with a population standard deviation of 0.9 days. At  $\alpha=0.02$ , what type of test is this and can you support the company's claim using the p-value?

Homework Help:

- [6VC\\_Determining when to reject or fail to reject\\_both methods](#) (4.00)
- [6VE\\_Second sample hypothesis testing from word problem to implications for claim\\_with test statistic](#) (3.26)
- [6DD\\_Determining when to reject or fail to reject\\_both methods](#) (DOCX)

- Claim is null, reject the null and cannot support claim as the p-value (0.001) is less than alpha (0.02)
- Claim is alternative, reject the null and support claim as the p-value (0.000) is greater than alpha (0.02)
- Claim is alternative, fail to reject the null and cannot support claim as the p-value (0.000) is less than alpha (0.02)
- Claim is null, fail to reject the null and support claim as the p-value (0.001) is greater than alpha (0.02)

**Question 13** 2 pts

A business receives supplies of copper tubing where the supplier has said that the average length is 26.70 inches so that they will fit into the business' machines. A random sample of 48 copper tubes finds they have an average length of 26.77 inches. The population standard deviation is assumed to be 0.20 inches. At  $\alpha=0.05$ , should the business reject the supplier's claim?

Homework Help:

- [6VD\\_Sample hypothesis testing from word problem to implications for claim\\_with p-values](#) (3.15)

- Yes, since  $p > \alpha$ , we fail to reject the null and the null is the claim
- No, since  $p < \alpha$ , we fail to reject the null and the null is the claim
- No, since  $p > \alpha$ , we reject the null and the null is the claim
- Yes, since  $p < \alpha$ , we reject the null and the null is the claim

**Question 14** 2 pts

The company's cleaning service states that they spend more than 46 minutes each time the cleaning service is there. The company times the length of 37 randomly selected cleaning visits and finds the average is 47.6 minutes. Assuming a population standard deviation of 5.2 minutes, can the company support the cleaning service's claim at  $\alpha=0.10$ ?

Homework Help:

- [6VD\\_Sample hypothesis testing from word problem to implications for claim\\_with p-values](#) (3.15)

- Yes, since  $p < \alpha$ , we reject the null. The claim is the alternative, so the claim is supported
- No, since  $p < \alpha$ , we reject the null. The claim is the alternative, so the claim is not supported
- No, since  $p > \alpha$ , we fail to reject the null. The claim is the alternative, so the claim is not supported
- Yes, since  $p > \alpha$ , we fail to reject the null. The claim is the null, so the claim is supported

**Question 15** 2 pts

A customer service phone line claims that the wait times before a call is answered by a service representative is less than 3.3 minutes. In a random sample of 62 calls, the average wait time before a representative answers is 3.24 minutes. The population standard deviation is assumed to be 0.29 minutes. Can the claim be supported at  $\alpha=0.08$ ?

Homework Help:

- [6VE\\_Second sample hypothesis testing from word problem to implications for claim\\_with test statistic](#) (3.26)

- No, since test statistic is in the rejection region defined by the critical value, reject the null. The claim is the alternative, so the claim is not supported
- Yes, since test statistic is in the rejection region defined by the critical value, reject the null. The claim is the alternative, so the claim is supported
- No, since test statistic is in the rejection region defined by the critical value, fail to reject the null. The claim is the alternative, so the claim is not supported
- Yes, since test statistic is not in the rejection region defined by the critical value, reject the null. The claim is the alternative, so the claim is supported

**Question 16** 2 pts

In a hypothesis test, the claim is  $\mu \leq 40$  while the sample of 40 has a mean of 41 and a population standard deviation of 5.9 from a normally distributed data set. In this hypothesis test, would a z test statistic be used or a t test statistic and why?

Homework Help:

- [6DE\\_When to use z and when to use t distribution](#) (DOCX)

- t test statistic would be used as the data are normally distributed with an unknown population standard deviation
- t test statistic would be used as the population standard deviation is known
- z test statistic would be used as the mean and sample size are the same
- z test statistic would be used as the population standard deviation is known

**Question 17** 2 pts

A university claims that the mean time professors are in their offices for students is at least 6.5 hours each week. A random sample of nine professors finds that the mean time in their offices is 6.2 hours each week. With a sample standard deviation of 0.49 hours from a normally distributed data set, can the university's claim be supported at  $\alpha=0.05$ ?

Homework Help:  
[6VE. Second sample hypothesis testing from word problem to implications for claim .with test statistic](#) (3.26)  
[6VF. Third sample hypothesis testing from word problem to implications for claim .with t distribution .test statistic and p-value](#) (4.03)  
[6DE. When to use z and when to use t distribution](#) (DOCX)

Yes, since the test statistic is not in the rejection region defined by the critical value, the null is not rejected. The claim is the null, so is supported  
 Yes, since the test statistic is in the rejection region defined by the critical value, the null is not rejected. The claim is the null, so is supported  
 No, since the test statistic is not in the rejection region defined by the critical value, the null is rejected. The claim is the null, so is not supported  
 No, since the test statistic is in the rejection region defined by the critical value, the null is rejected. The claim is the null, so is not supported

**Question 18** 2 pts

A credit reporting agency claims that the mean credit card debt in a town is greater than \$3500. A random sample of the credit card debt of 20 residents in that town has a mean credit card debt of \$3547 and a standard deviation of \$391. At  $\alpha=0.10$ , can the credit agency's claim be supported, assuming this is a normally distributed data set?

Homework Help:  
[6VD. Sample hypothesis testing from word problem to implications for claim .with t-values](#) (3.15)  
[6VF. Third sample hypothesis testing from word problem to implications for claim .with t distribution .test statistic and p-value](#) (4.03)  
[6DE. When to use z and when to use t distribution](#) (DOCX)

Yes, since p-value of 0.30 is greater than 0.10, fail to reject the null. Claim is null, so is supported  
 No, since p-value of 0.30 is greater than 0.10, fail to reject the null. Claim is alternative, so is not supported  
 No, since p-value of 0.30 is greater than 0.10, reject the null. Claim is null, so is not supported  
 Yes, since p-value of 0.30 is less than 0.54, reject the null. Claim is alternative, so is supported

**Question 19** 2 pts

A car company claims that its cars achieve an average gas mileage of at least 26 miles per gallon. A random sample of five cars from this company have an average gas mileage of 25.2 miles per gallon and a standard deviation of 1 mile per gallon. At  $\alpha=0.06$ , can the company's claim be supported, assuming this is a normally distributed data set?

Homework Help:  
[6VE. Second sample hypothesis testing from word problem to implications for claim .with test statistic](#) (3.26)  
[6VF. Third sample hypothesis testing from word problem to implications for claim .with t distribution .test statistic and p-value](#) (4.03)  
[6DE. When to use z and when to use t distribution](#) (DOCX)

Yes, since the test statistic of -1.79 is not in the rejection region defined by the critical value of -2.60, the null is rejected. The claim is the null, so is supported  
 No, since the test statistic of -1.79 is in the rejection region defined by the critical value of -1.97, the null is rejected. The claim is the null, so is not supported  
 Yes, since the test statistic of -1.79 is not in the rejection region defined by the critical value of -1.97, the null is not rejected. The claim is the null, so is supported  
 No, since the test statistic of -1.79 is close to the critical value of -2.60, the null is not rejected. The claim is the null, so is supported

**Question 20** 2 pts

A researcher wants to determine if zinc levels are different between the top of a glass of water and the bottom of a glass of water. Many samples of water are taken. From half, the zinc level at the top is measured and from half, the zinc level at the bottom is measured. Would this be a valid matched pair test?

Homework Help:  
[6DF. Paired sample experiment structure requirements and assumptions](#) (DOCX)

No, as the measurements of top and bottom should be from the same glass  
 Yes, as long as they are all from the same faucet  
 Yes, as long as there are an equal number of glasses in each group  
 No, as the zinc levels cannot be accurately measured

