

Class Exercises for 4b. Hypothesis Testing

- 1.** You are interested in researching the effect of a new drug on patients with insomnia. You predict that the drug will help people with insomnia sleep longer. You know from previous studies that the average number of hours insomnia patients sleep daily is 4, and the distance of a typical score in the dataset from that average is 1. After receiving the new drug, a patient sleeps 7 hours. Test your hypothesis with the steps outlined below, using a significance level of .05.

- 1) Restate question as a research hypothesis and a null hypothesis about populations.

Population 1: _____
(This is the population from which the research sample came.)

Population 2: : _____
(This is the comparison population.)

Research Hypothesis: The mean of population 1 is _____ the mean of population 2.

Null Hypothesis: The mean of population 1 is _____ the mean of population 2.

- 2) Determine characteristics of the comparison distribution.

The mean of the comparison distribution is _____.

The standard deviation of the comparison distribution is _____.

- 3) Determine the cutoff sample score on the comparison distribution at which the null hypothesis should be rejected.

Significance level: _____ Directionality: _____ Cutoff sample score(s): _____
Draw comparison distribution below with shading in the tail(s) beyond the cutoff sample score(s). Be sure to map raw scores onto the distribution.

- 4) Determine your sample's score on the comparison distribution.

Find Z. Mark an "X" on the comparison distribution you drew above where the sample score falls.

$$Z = \frac{X - M}{SD}$$

- 5) Decide whether to reject the null hypothesis.

Look back at your research hypothesis and null hypothesis. Which one was supported by your analysis? Which one must be rejected? Can you reject the null hypothesis?

2. You are interested in whether aqua-fit, a form of aerobic dance-exercise performed in water, is more effective at building leg muscle mass in patients with knee injuries than traditional physical therapy methods. You know from previous studies that with traditional methods, it takes 25 days on average to recover muscle mass (with a standard deviation of 9 days). After aqua-fit, a patient takes 35 days to recover. Test your hypothesis, using a significance level of .10.

- 1) Restate question as a research hypothesis and a null hypothesis about populations.

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Population 2: _____
(This is the comparison population.)

Research Hypothesis: The mean of population 1 is _____ the mean of population 2.

Null Hypothesis: The mean of population 1 is _____ the mean of population 2.

- 2) Determine characteristics of the comparison distribution. (population 2)

The mean of the comparison distribution is _____.

The standard deviation of the comparison distribution is _____.

- 3) Determine the cutoff sample score on the comparison distribution at which the null hypothesis should be rejected.

Significance level: _____ Directionality: _____ Cutoff sample score(s): _____
Draw comparison distribution below with shading in the tail(s) beyond the cutoff sample score(s). Be sure to map raw scores onto the distribution.

- 4) Determine your sample's score on the comparison distribution.

Find Z. Mark an "X" on the comparison distribution you drew above where the sample score falls.

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- 5) Decide whether to reject the null hypothesis.

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3. You wish to test the effects of chocolate on mood. You are not sure if mood will become better or worse after chocolate. You know that in the general population, people tend to score a 6 out of 10 on a measure of mood (with 10 being the best possible mood and 1 being the worst). The standard deviation in the general population is 1.5 points distance from this mean. You give chocolate to someone and administer the mood measure, with a resulting score of 4. Test your hypothesis, using a significance level of .05.

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4. You suspect that people who want to lose weight would be more successful if they ate more vegetables. You know that average participant in a diet program loses 10 pounds, with a standard deviation of 3. You ask one person from the diet plan to try eating an extra 2 servings of vegetables per day. You find that they lose 18 pounds. Test your hypothesis, using a significance level of .10.

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Research Hypothesis: The mean of population 1 is _____ the mean of population 2.

Null Hypothesis: The mean of population 1 is _____ the mean of population 2.

2) Determine characteristics of the comparison distribution.

The mean of the comparison distribution is _____.

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