60080079 Introduction to Statistical Methods
Semester 2 2023-2024
Homework Assignment 7

21 CST H3Art

1 A question in a Christmas tree market survey was "Did you have a Christmas tree last year?"
Of the 500 respondents, 421 answered "Yes."

a) Find the sample proportion and its standard error.
b) Give a 90% confidence interval for the proportion of Indiana households who had a
Christmas tree this year.

1.1 The sample proportion is 0._42 and its standard error is 0._163.
1) 7; 0
2) 7; 1
3) 8; 0
4) 8; 1

1.2 The critical value is 1._45 and the confidence limits are (0._151, 0.8688).
1) 6; 7
2) 6; 8
3) 7; 7
4) 7; 8

<mark>Write your number as a two-digit number.</mark>

Answer: 32

2 In a study of unhealthy eating behaviors, the researchers surveyed 266 high school students
who were 18 years old. In this sample 58.3% reported that they had dieted sometimes in the
past year. Give a 95% confidence interval for the true proportion of 18-year-old high school
students in this population who were on a diet sometime during the past year.

2.1 The estimated proportion is 0._83 and its standard error is 0._302.
1) 5; 0
2) 5; 1
3) 6; 0
4) 6; 1

2.2 The confidence limits are 0._237 and 0._423.
1) 4; 5
2) 5; 6
3) 6; 7
4) 7; 8

<mark>Write your number as a two-digit number.</mark>

3 In the United States approximately 900 people die in bicycle accidents each year. One study examined the records of 1711 bicyclists aged 15 or older who were fatally injured in bicycle accidents between 1987 and 1991 and were tested for alcohol. Of these, 542 tested positive for alcohol (blood alcohol concentration of 0.01% or higher).

a) Summarize the data with appropriate descriptive statistics.
b) To do statistical inference for these data, we think in terms of a model where p is a parameter that represents the probability that a tested bicycle rider is positive for alcohol. Find a 99% confidence interval for p.
c) Can you conclude from your statistical analysis of this study that alcohol causes fatal bicycle accidents?

3.1 The sample proportion is 0._168 and its standard error is 0._1125.
1) 2; 0
2) 2; 1
3) 3; 0
4) 3; 1

3.2 The critical $Z^* = 2._76$ and the 99% CI is (0.2878, 0._458).
1) 4; 2
2) 4; 3
3) 5; 2
4) 5; 3

3.3 ___ - the current data give the fraction of fatally injured cyclists who tested positive for alcohol, but we do not know what fraction of cyclists who were not involved in accidents had alcohol in their systems.
1) Yes, we can conclude from this study that alcohol causes fatal bicycle accidents
2) No, we cannot conclude from this study that alcohol causes fatal bicycle accidents

Write your number as a three-digit number.

4 A matched pairs experiment compares the taste of instant versus fresh-brewed coffee. Each subject tastes two unmarked cups of coffee, one of each type, in random order and states which he or she prefers. Of the 40 subjects who participate in the study, 12 prefer the instant coffee. Let p be the probability that a randomly chosen subject prefers freshly brewed coffee to instant coffee. (In practical terms, p is the proportion of the population who prefer fresh-brewed coffee.)

a) Test the claim that a majority of people prefer the taste of fresh-brewed coffee. Report the large-sample z statistic and its p-value.

b) Draw a sketch of a standard normal curve and mark the location of your z statistic. Shade the appropriate area that corresponds to the p-value.
c) Is your result significant at the 5% level? What is your practical conclusion?
d) Find a 95% confidence interval for p using the large-sample method.

4.1 The sample proportion who preferred fresh-brewed coffee is 0.7. Under the null, the correct proportion to use in computing the standard error is ____. Therefore, the SE is 0.0791.
1) .4
2) .5
3) .6
4) .7

4.2 This will give a computed Z-statistic of 2._3 and the p-value is 0._057.
1) 4; 0
2) 4; 1
3) 5; 0
4) 5; 1

4.3 The correct sketch is plot ____.

1)	2)	3)

N(0,1)   N(0,1)   N(0,1)
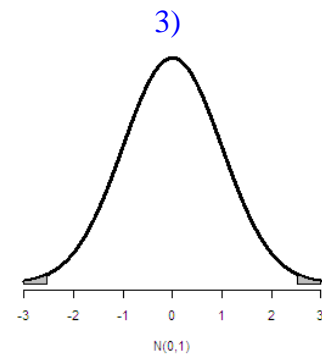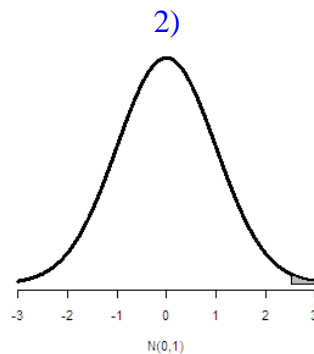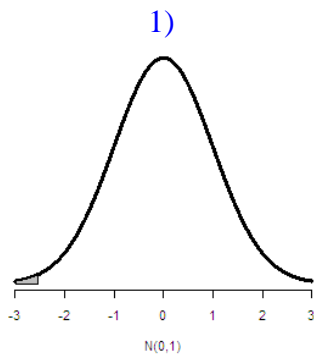
Answer: 232

4.4 ____ significant at $\alpha = .05$ so we should ____ the H_0.
1) Yes, the test statistic is
2) No, the test statistic is not
3) retain
4) reject

4.5 For the CI, the correct proportion to use in computing the SE is ____. The critical $Z^* =$ 1.96 and the confidence limits are 0._580 and 0.8420.
1) 0.5; 5
2) 0.5; 7
3) 0.7; 5
4) 0.7; 7

5   Following complaints about the working conditions in some apparel factories both in the United States and abroad, a joint government and industry commission recommended in 1998 that companies that monitor and enforce proper standards be allowed to display a "No Sweat" label on their products. Does the presence of these labels influence consumer behavior? A survey of U.S. residents aged 18 or older asked a series of questions about how likely they would be to purchase a garment under various conditions. For some conditions, it was stated that the garment had a "No Sweat" label; for others, there was no mention of such a label. On the basis of the responses, each person was classified as a "label user" or a "label nonuser." There were 296 women surveyed. Of these, 63 were label users. On the other hand, 27 of 251 men were classified as users.

a)   Give a 95% confidence interval for the difference in the proportions.
b)   You would like to compare the women with the men. Set up appropriate hypotheses, and find the test statistic and the p-value. What do you conclude?

5.1 The estimates of p_f and p_m are 0._128 and 0._076, respectively.
1)   1; 1
2)   1; 2
3)   2; 1
4)   2; 2

5.2 The standard error of the difference is $SE_D = 0._308$. The 95% CI for the difference in proportions is from 0._449 to 0.1656.
1)   0; 0
2)   0; 1
3)   1; 0
4)   1; 1

5.3 The null hypothesis is $p_f = p_m$ whereas the alternative is ___.
1) $p_f < p_m$
2) $p_f \neq p_m$
3) $p_f > p_m$

5.4 The pooled estimate of the common proportion is 0._645 and its SE is 0._318.
1)   0; 0
2)   0; 1
3)   1; 0
4)   1; 1

Answer: 23

5.5 This will give a Z-statistic of _.31 and a p-value of 0._010. Therefore, we can ____ the null.
1) 0
2) 1
3) 2
4) 3
5) retain
6) reject

Part III: Write your number as a three-digit number.

Answer: 416