21. 0.15/0.69 points | Previous Answers MIntroStat9 7.E.508.XP.

In a study of children with a particular disorder, parents were asked to rate their child on a variety of items related to how well their child performs different tasks. One item was "Has difficulty organizing work," rated on a five-point scale of 0 to 4 with 0 corresponding to "not at all" and 4 corresponding to "very much." The mean rating for 282 boys with the disorder was reported as 2.34 with a standard deviation of 1.12. (Round your answers to four decimal places.)

Compute the 90% confidence interval.

(____ , ____)

Compute the 95% confidence interval.

(____ , ____)

Compute the 99% confidence interval.

(____ , ____)

Explain the effect of the confidence level on the width of the interval.

- ○ We see that the width of the interval does not change with confidence level.
- ○ We see that the width of the interval decreases with confidence level.
- ◉ We see that the width of the interval increases with confidence level.

✓

- (●) We reject H_0 and conclude that the intervention increased test scores.
- ( ) We do not reject H_0 and conclude that the intervention had no significant effect on test scores.

(e) Find a 95% confidence interval for the difference between the two means. Compare the information given by the interval with the information given by the significance test.

(______ , ______)

(f) The women in this study were all residents of Durham, North Carolina. To what extent do you think the results can be generalized to other populations?

- (●) The results for this sample may not generalize well to other areas of the country.
- ( ) The results for this sample will generalize well to all other areas of the country.

- ○ H_0: $\mu_{\text{Intervention}} \neq \mu_2$; H_a: $\mu_{\text{Intervention}} < \mu_{\text{Control}}$ (or $\mu_{\text{Intervention}} = \mu_{\text{Control}}$)
- ○ H_0: $\mu_{\text{Intervention}} = \mu_2$; H_a: $\mu_{\text{Intervention}} > \mu_{\text{Control}}$ (or $\mu_{\text{Intervention}} < \mu_{\text{Control}}$)
- ◉ H_0: $\mu_{\text{Intervention}} = \mu_2$; H_a: $\mu_{\text{Intervention}} > \mu_{\text{Control}}$ (or $\mu_{\text{Intervention}} = \mu_{\text{Control}}$)
- ○ H_0: $\mu_{\text{Intervention}} \neq \mu_2$; H_a: $\mu_{\text{Intervention}} > \mu_{\text{Control}}$ (or $\mu_{\text{Intervention}} = \mu_{\text{Control}}$)
- ○ H_0: $\mu_{\text{Intervention}} = \mu_2$; H_a: $\mu_{\text{Intervention}} < \mu_{\text{Control}}$ (or $\mu_{\text{Intervention}} \neq \mu_{\text{Control}}$)

✓

Some people would prefer a two-sided alternative in this situation while others would use a one-sided significanc test. Give reasons for each point of view

- ○ The two-sided alternative reflects the researchers' (presumed) belief that the intervention would increase scores on the test. The one-sided alternative allows for the possibility that the intervention might have had a negative effect.
- ○ The one-sided alternative reflects the researchers' (presumed) belief that the intervention would decrease scores on the test. The two-sided alternative allows for the possibility that the intervention might have had a negative effect.
- ◉ The one-sided alternative reflects the researchers' (presumed) belief that the intervention would increase scores on the test. The two-sided alternative allows for the possibility that the intervention might have had a negative effect.
- ○ The two-sided alternative reflects the researchers' (presumed) belief that the intervention would decrease scores on the test. The one-sided alternative allows for the possibility that the intervention might have had a positive effect.
- ○ The one-sided alternative reflects the researchers' (presumed) belief that the intervention would decrease scores on the test. The two-sided alternative allows for the possibility that the intervention might have had a positive effect.

✓

(d) Carry out the significance test using a one-sided alternative. Report the test statistic with the degees of freedom and the *P*-value. (Round your test statistic to three decimal places, your degrees of freedom to the nearest whole number, and your *P*-value to four decimal places.)

t =

df =

P-value =

Write a short summary of your conclusion.

22. 0.39/0.69 points | Previous Answers MIntroStat9 7.E.510.XP.

Self-efficacy is a geneal concept that measures how well we think we can contol different situations. A multimedia program designed to improve dietary behavior among low-income women was evaluated by comparing women who wee randomly assigned to intervention and contol groups. Participants were asked, "How sure are you that you can eat foods low in fat over the next month?" The esponse was measured on a five-point scale with 1 coresponding to "not sure at all" and 5 corresponding to "very sure." Here is a summary of the self-efficacy scores obtained about 2 months after the intervention:

Group	n	$\bar{x}$	s
Intervention	167	4.18	1.19
Control	214	3.63	1.12

(a) Do you think that these data are Normally distributed? Explain why or why not.

- ( ) The distribution is Normal because the standad deviation is smaller than the mean.
- (•) The distribution is not Normal because all scoes are integers.
- ( ) The distribution is Normal because the sample wasandomly assigned.
- ( ) The distribution is not Normal because the sample included only women.
- ( ) The distribution is Normal because the sample sizes are large.

✓

(b) Is it appropriate to use the two-sample *t* procedures that we studied in this section to analyze these data? Give reasons for your answer.

- (•) The *t* procedures should be appropriate because we have two large samples with no outliers.
- ( ) The *t* procedures should not be appropriate because the two groups are different sizes.
- ( ) The *t* procedures should be appropriate because we have Normally distributed data.
- ( ) The *t* procedures should not be appropriate because we do not have Normally distributed data.
- ( ) The *t* procedures should not be appropriate because the sample sizes are not large enough.

✓

(c) Describe appropriate null and alternative hypotheses.

23. 0.13/0.69 points | Previous Answers MIntroStat9 8.E.522.XP.

To what extent do syntax textbooks, which analyze the structure of sentences, illustrate gender bias? A study of this question sampled sentences from 10 texts. One part of the study examined the use of the words "girl," "boy," "man," and "woman." We will call the first two words *juvenile* and the last two *adult*. Is the proportion of female references that are juvenile (girl) equal to the proportion of male references that are juvenile (boy)? Here are data from one of the texts:

Gender	n	X(juvenile)
Female	59	47
Male	134	52

(a) Find the proportion of juvenile references for females and its standard error. Do the same for the males. (Round your answers to three decimal places.)

$\hat{p}_F$ = [ ]

SE_F = [ ]

$\hat{p}_M$ = [ ]

SE_M = [ ]

(b) Give a 90% confidence interval for the difference. (Do not use rounded values. Round your final answers to three decimal places.)

([ ] , [ ]).

(c) Use a test of significance to examine whether the two proportions are equal. (Use $\hat{p}_F - \hat{p}_M$. Round your value for z to two decimal places and round your P-value to four decimal places.)

z = [ ]

P-value = [ ]

State your conclusion.

- ○ There is not sufficient evidence to conclude that the two proportions are different.
- ◉ There is sufficient evidence to conclude that the two proportions are different.

✓

24. 0.29/0.69 points | Previous Answers MIntroStat9 8.E.097.

Castaneda v. Partida is an important court case in which statistical methods were used as part of a legal argument. When reviewing this case, the Supreme Court used the phrase "two or three standard deviations" as a criterion for statistical significance. This Supreme Court review has served as the basis for many subsequent applications of statistical methods in legal settings. (The two or three standard deviations referred to by the Court are values of the z statistic and correspond to P-values of approximately 0.05 and 0.0026.) In *Castaneda* the plaintiffs alleged that the method for selecting juries in a county in Texas was biased against Mexican Americans. For the period of time at issue, there were 181,775 persons eligible for jury duty, of whom 142,475 were Mexican Americans. Of the 898 people selected for jury duty, 334 were Mexican Americans.

(a) What proportion of eligible voters were Mexican Americans? Let this value be p_o. (Round your answer to four decimal places.)

[ ]

(b) Let p be the probability that a randomly selected juror is a Mexican American. The null hypothesis to be tested is H_o: $p = p_o$. Find the value of $\hat{p}$ for this problem, compute the z statistic, and find the P-value. What do you conclude? (A finding of statistical significance in this circumstance does not constitute a proof of discrimination. It can be used, however, to establish a prima facie case. The burden of proof then shifts to the defense.) (Use α = 0.01. Round your test statistic to two decimal places and your P-value to four decimal places.)

z [ ]

P-value [ ]

Conclusion

- (●) Reject the null hypothesis, there is significant evidence that Mexican Americans are underrepresented on juries.
- ( ) Reject the null hypothesis, there is not significant evidence that Mexican Americans are underrepresented on juries.
- ( ) Fail to reject the null hypothesis, there is not significant evidence that Mexican Americans are underrepresented on juries.
- ( ) Fail to reject the null hypothesis, there is significant evidence that Mexican Americans are underrepresented on juries.

✓

(c) We can reformulate this exercise as a two-sample problem. Here we wish to compare the proportion of Mexican Americans among those selected as jurors with the proportion of Mexican Americans among those not selected as jurors. Let p_1 be the probability that a randomly selected juror is a Mexican American, and let p_2 be the probability that a randomly selected nonjuror is a Mexican American. Find the z statistic and its P-value. (Use α = 0.01. Round your test statistic to two decimal places and your P-value to four decimal places.)

z [ ]

P-value [ ]

Conclusion

- (•) Reject the null hypothesis, thee is significant evidence of a difference in proportions.
- ( ) Reject the null hypothesis, thee is not significant evidence of a difference in proportions.
- ( ) Fail to reject the null hypothesis, thee is not significant evidence of a difference in proportions.
- ( ) Fail to reject the null hypothesis, thee is significant evidence of a difference in proportions.

How do your answers compare with your results in (b)?

- ( ) very different
- (•) very similar
- ( ) none of the above

25. 0.09/0.69 points | Previous Answers MIntroStat9 8.E.525.XP.

The National Student Loan Survey asked the student loan borrowers in their sample about attitudes toward debt. Below are some of the questions they asked, with the percent who responded in a particular way. Assume that the sample size is 1285 for all these questions. Compute a 95% confidence interval for each of the questions, and write a short report about what student loan borrowers think about their debt. (Round your answers to three decimal places.)

(a) "To what extent do you feel burdened by your student loan payments?" 55.8% said they felt burdened.

(____ , ____)

(b) "If you could begin again, taking into account your current experience, what would you borrow?" 55% said they would borrow less.

(____ , ____)

(c) "Since leaving school, my education loans have not caused me more financial hardship than I had anticipated at the time I took out the loans." 34.5% disagreed.

(____ , ____)

(d) "Making loan payments is unpleasant but I know that the benefits of education loans are worth it." 59.7% agreed.

(____ , ____)

(e) "I am satisfied that the education I invested in with my student loan(s) was worth the investment for career opportunities." 57.4% agreed.

(____ , ____)

(f) "I am satisfied that the education I invested in with my student loan(s) was worth the investment for personal growth." 70.8% agreed.

(____ , ____)

Conclusion

- ○ While a minority feel that loans are a burden and wish they had borrowed more, a minority are satisfied with their education.
- ○ While a minority feel that loans are a burden and wish they had borrowed more, a majority are satisfied with their education.
- ● While many feel that loans are a burden and wish they had borrowed less, a majority are satisfied with their education.
- ○ While many feel that loans are a burden and wish they had borrowed less, a minority are satisfied with their education.

✓

26. 0.43/0.69 points | Previous Answers MIntroStat9 8.E.038.

A matched pairs experiment compares the taste of instant with 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 80 subjects who participate in the study, 28 prefer the instant coffee. Let p be the probability that a randomly chosen subject prefers fresh-brewed coffee to instant coffee. (In practical terms, p is the proportion of the population who prefer fresh-brewed coffee.)

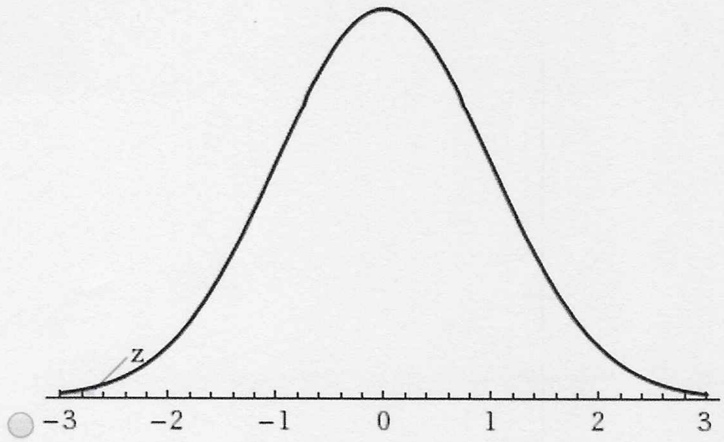
(a) Test the claim that a majority of people prefer the taste of fresh-brewed coffee. Report the large-sample z statistic. (Round your answer to two decimal places.)

[ ]

Report its P-value. (Round your answer to four decimal places.)

[ ]

(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.


z
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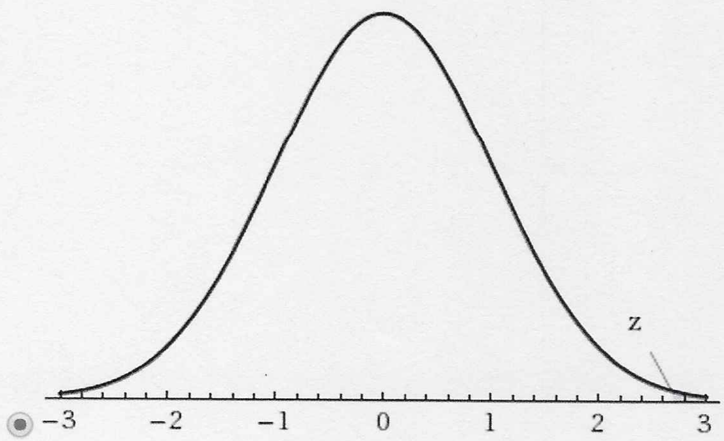
1
2
3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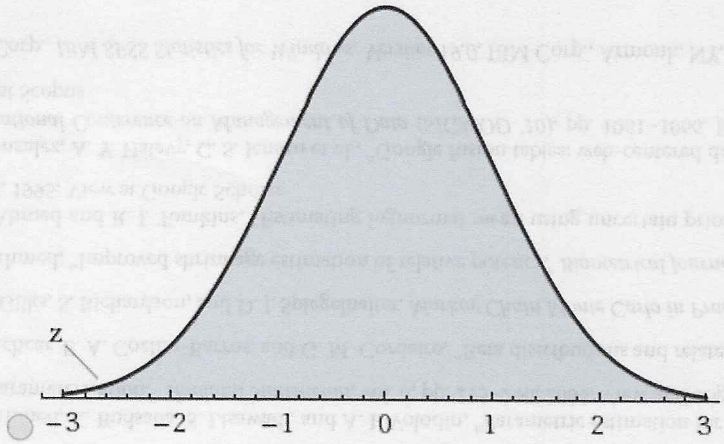

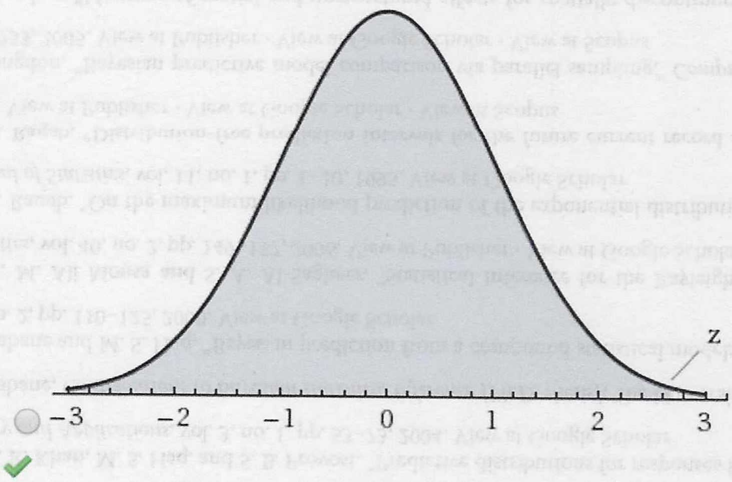

(c) Is your result significant at the 5% level?

- Yes
- No

What is your practical conclusion?

- ( ) The result is significant at the 5% level, so we reject H_0 and conclude that a majority of people prefer instant coffee.
- ( ) The result is not significant at the 5% level, so we do not reject H_0 and conclude that a majority of people prefer instant coffee.
- ( ) The result is not significant at the 5% level, so we reject H_0 and conclude that a majority of people prefer instant coffee.
- (●) The result is significant at the 5% level, so we reject H_0 and conclude that a majority of people prefer fresh-brewed coffee.
- ( ) The result is not significant at the 5% level, so we do not reject H_0 and conclude that a majority of people prefer fresh-brewed coffee.

✓

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27. –/0.69 points MIntroStat9 8.E.503.XP.

In a study of the relationship between pet ownership and physical activity in older adults,585 subjects reported that they owned a pet, while 1922 reported that they did not. Give a 98% confidence interval for the proportion of older adults in this population who are pet owners. (Round your answers to three decimal places.)

Lower limit [ ]

Upper limit [ ]

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28. –/0.69 points MIntroStat9 8.E.040.

One of your employees has suggested that your company develop a new product. You decide to take a random sample of your customers and ask whether or not there is interest in the new product. The response is on a 1 to 5 scale with 1 indicating "definitely would not purchase"; 2, "probably would not purchase"; 3, "not sure"; 4, "probably would purchase"; and 5, "definitely would purchase." For an initial analysis, you will record the responses 1, 2, and 3 as "No" and 4 and 5 as "Yes." What sample size would you use if you wanted the 95% margin of error to be 0.3 or less? (Round your answer up to the next whole number.)

[ ] participants

29. –/0.69 points MIntroStat9 8.E.044.

An automobile manufacturer would like to know what proportion of its customers are dissatisfied with the service received from their local dealer. The customer relations department will survey a random sample of customers and compute a 95% confidence interval for the proportion that are dissatisfied. From past studies, it believes that this proportion will be about 0.26. Find the sample size needed if the margin of error of the confidence interval is to be no more than 0.045. (Round your answer up to the next whole number.)

[ ] customers

30. 0.13/0.69 points | Previous Answers mintrostat9 8.e.093.def ective

In this exercise we examine the effect of the sample size on the significance test for comparing two proportions. In each case suppose that $\hat{p}_1 = 0.65$ and $\hat{p}_2 = 0.45$, and take n to be the common value of n_1 and n_2. Use the z statistic to test H_0: $p_1 = p_2$ versus the alternative H_a: $p_1 \neq p_2$. Compute the statistic and the associated P-value for the following values of n: 40, 50, 60, 80, 380, 480, and 980. Summarize the results in a table. (Test the difference $p_1 - p_2$. Round your values for z to two decimal places and round your P-values to four decimal places.)

n	z	P-value
40		
50		
60		
80		
380		
480		
980		

Explain what you observe about the effect of the sample size on statistical significance when the sample proportions $\hat{p}_1$ and $\hat{p}_2$ are unchanged.

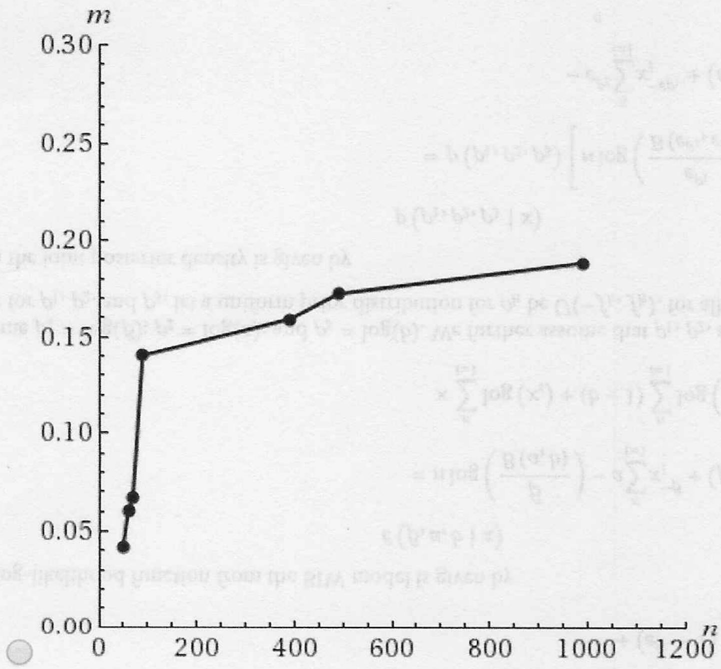
- As sample size increases, the test becomes less significant.
- As sample size increases, the test becomes moe significant.
- As sample size increases, there is no effect on significance.
- There is not enough information.

31. 0.15/0.69 points | Previous Answers MIntroStat9 8.E.094.

We have studied the effect of the sample size on the margin of error of the confidence interval for a single proportion. In this exercise we perform some calculations to observe this effect for the two-sample problem. Suppose that $\hat{p}_1 = 0.7$ and $\hat{p}_2 = 0.5$, and n represents the common value of n_1 and n_2. Compute the 95% margins of error for the difference between the two proportions for n = 50, 60, 70, 90, 390, 490, and 990. Present the results in a table. (Give the large-sample margins of error. Round your answers to three decimal places.)

n	m
50	
60	
70	
90	
390	
490	
990	

Present the results with a graph.


m
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0.25
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0.15
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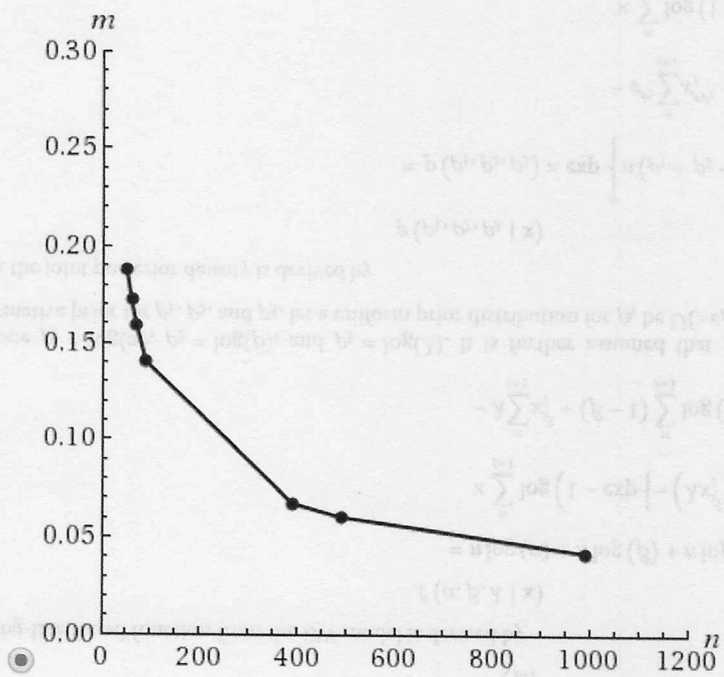
200
400
600
800
1000
1200
n


m
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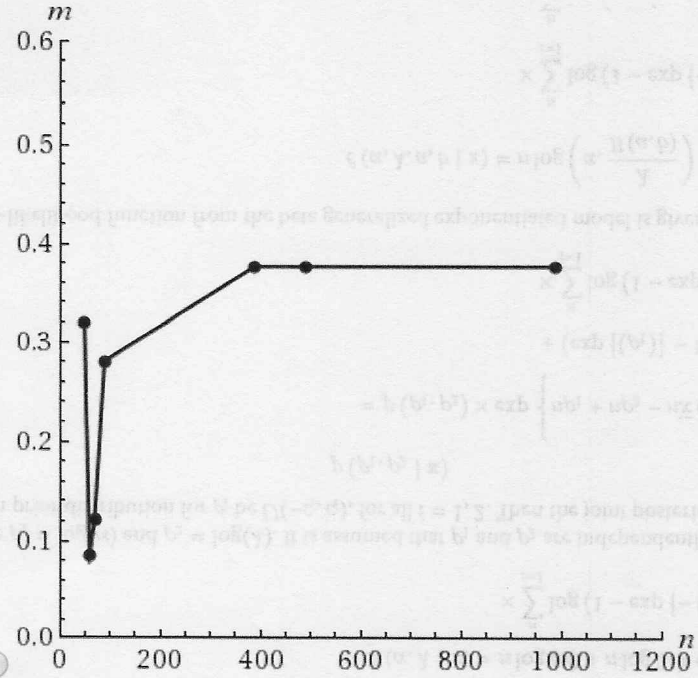
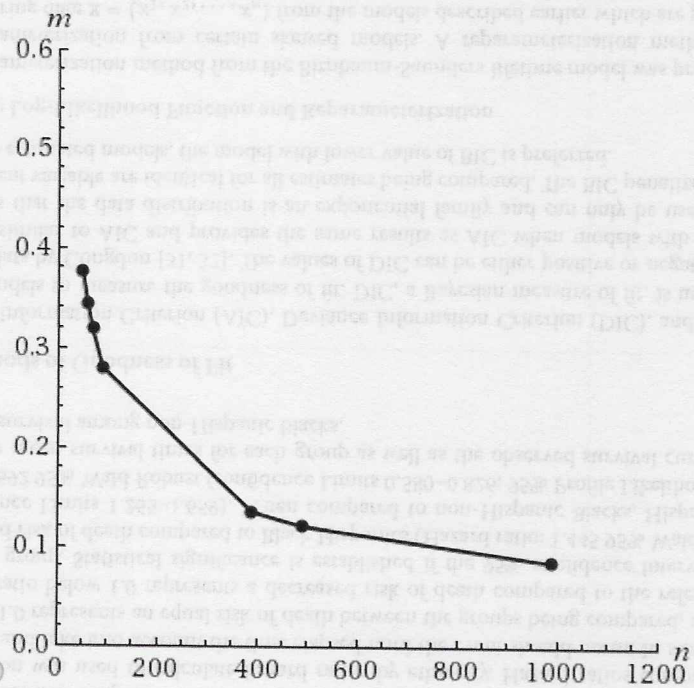
n





Write a short summary of your findings.

- ○ As sample size increases, margin of error remains constant.
- ○ As sample size increases, margin of error increases.
- ◉ As sample size increases, margin of error decreases.
- ○ There is not enough information.

---

32. –/0.69 points MIntroStat9 8.E.510.XP.

In the Health ABC Study 533 subjects owned a pet and 1963 subjects did not. Among the pet owners, there were 302 women; 975 of the non-pet owners were women. Find the proportion of pet owners who were women. Do the same for the non-pet owners. (Be sure to let Population 1 correspond to the group with the higher proportion so that the difference will be positive. Round your answers to three decimal places.)

$\hat{p}_1$ = _____

$\hat{p}_2$ = _____

Give a 95% confidence interval for the difference in the two proportions. (Do not use rounded values. Round your final answers to three decimal places.)

(_____ , _____)

33. 0.25/0.69 points | Previous Answers MIntroStat9 8.E.512.XP.

A survey of Internet users reported that 22% downloaded music onto their computers. The filing of lawsuits by the recording industry may be a reason why this percent has decreased from the estimate of 29% from a survey taken two years before. Assume that the sample sizes are both 1371. Using a significance test, evaluate whether or not there has been a change in the percent of Internet users who download music. Provide all details for the test. (Round your value for z to two decimal places. Round your P-value to four decimal places.)

z = [ ]

P-value = [ ]

Summarize your conclusion.

- ○ We conclude that the proportions are not different.
- ● We conclude that the proportions are different.
- ○ We conclude that the means are not different.
- ○ We conclude that the means are different.
- ○ We cannot draw any conclusions using a significance test for this data.

✔

Also report a 95% confidence interval for the difference in proportions. (Round your answers to four decimal places.)

([ ] , [ ])

Explain what information is provided in the interval that is not in the significance test results.

- ○ The interval does not provide any more information than the significance test would tell us
- ○ The significance test does not indicate the direction of change, but the interval shows that the music downloads decreased.
- ○ The interval shows no significant change in music downloads.
- ○ The interval tells us there was a significant change in music downloads, but the test statistic is inconclusive.
- ● The interval gives us an idea of how large the difference is between the first survey and the second survey.

✔

34. 0.15/0.69 points | Previous Answers MIntroStat9 8.E.513.XP.

A survey of Internet users reported that 15% downloaded music onto their computers. The filing of lawsuits by the recording industry may be a reason why this percent has decreased from the estimate of 27% from a survey taken two years before. Suppose we are not exactly sure about the sizes of the samples. Perform the calculations for the significance tests and 95% confidence intervals under each of the following assumptions. (Use previous − recent. Round your test statistics to two decimal places and your confidence intervals to four decimal places.)

(i) Both sample sizes are 1000.

z =

95% C.I. (,)

(ii) Both sample sizes are 1600.

z =

95% C.I. (,)

(iii) The sample size for the survey reporting 27% is 1000 and the sample size for the survey reporting 15% is 1600.

z =

95% C.I. (,)

Summarize the effects of the sample sizes on the results.

- (selected) We see in (i) and (ii) that smaller samples result in smaller z (weaker evidence) and wider intervals, while larger samples have the reverse effect. The results of (iii) show that the effect of varying unequal sample sizes is more complicated.
- We see in (i) and (ii) that smaller samples result in smaller z (weaker evidence) and narrower intervals, while larger samples have the reverse effect. The results of (iii) show that the effect of varying unequal sample sizes is more complicated.
- We see in (i) and (ii) that smaller samples result in larger z (stronger evidence) and narrower intervals, while larger samples have the reverse effect. The results of (iii) show that the effect of varying unequal sample sizes is more complicated.
- We see in (i) and (ii) that smaller samples result in larger z (weaker evidence) and smaller intervals, while larger samples have the reverse effect. The results of (iii) show that the effect of varying unequal sample sizes is more complicated.
- We see in (i) and (ii) that smaller samples result in smaller z (stronger evidence) and wider intervals, while larger samples have the reverse effect. The results of (iii) show that the effect of varying unequal sample sizes is more complicated.

35. 0.09/0.69 points | Previous Answers MIntroStat9 8.E.516.XP.

According to literature on brand loyalty, consumers who are loyal to a brand are likely to consistently select the same product. This type of consistency could come from a positive childhood association. To examine brand loyalty among fans of the Chicago Cubs, 370 Cubs fans among patrons of a restaurant located in Wrigleyville were surveyed prior to a game at Wrigley Field, the Cubs' home field. The respondents were classified as "die-hard fans" or "less loyal fans." Of the 131 die-hard fans, 94.7% reported that they had watched or listened to Cubs games when they were children. Among the 239 less loyal fans, 66.5% said that they watched or listened as children. (Let $D = p_{\text{die-hard}} - p_{\text{less loyal}}$.)

(a) Find the numbers of die-hard Cubs fans who watched or listened to games when they were children. Do the same for the less loyal fans. (Round your answers to the nearest whole number)

[ ] die-hard fans

[ ] less loyal fans

(b) Use a one sided significance test to compare the die-hard fans with the less loyal fans with respect to their childhood experiences relative to the team. (Use your rounded values from part (a). Use $\alpha = 0.01$. Round your z-value to two decimal places and your P-value to four decimal places.)

z = [ ]

P-value = [ ]

Conclusion

- (●) Reject the null hypothesis, there is significant evidence that a higher proportion of die hard Cubs fans watched or listened to Cubs games as children.
- ( ) Fail to reject the null hypothesis, there is significant evidence that a higher proportion of die hard Cubs fans watched or listened to Cubs games as children.
- ( ) Fail to reject the null hypothesis, there is not significant evidence that a higher proportion of die hard Cubs fans watched or listened to Cubs games as children.
- ( ) Reject the null hypothesis, there is not significant evidence that a higher proportion of die hard Cubs fans watched or listened to Cubs games as children.

(c) Express the results with a 95% confidence interval for the difference in proportions. (Round your answers to three decimal places.)

([ ] , [ ])

36. 0.22/1.02 points | Previous Answers mintrostat9 8.e.517.xp.def ective

According to literature on brand loyalty, consumers who are loyal to a brand are likely to consistently select the same product. This type of consistency could comefrom a positive childhood association. To examine brand loyalty among fans of the Chicago Cubs,399 Cubs fans among patrons of a restaurant located in Wrigleyville were surveyed prior to a game at Wrigley Field, the Cubs' home field. The espondents were classified as "die-hard fans" or "less loyal fans." The study found that 67.7% of the 130 die-hard fans attended Cubs games at leastonce a month, but only16.7% of the 269 less loyal fans attended this often. Analyze these data usinga significance test for the difference in proportions. (Let $D = p_{\text{die-hard}} - p_{\text{less loyal}}$. Use $\alpha = 0.05$. Round your value for z to two decimal places. Round your P-value to four decimal places.)

z = ______

P-value = ______

Analyze these data using a 95% confidence interval for the difference in proportions. (Round your answers to three decimal places.)

(______ , ______)

Write a short summary of your findings.

- (●) Reject the null hypothesis, thee is significantevidence that a higher pobortion of die hard Cubs fans attend games at least once a month.
- ( ) Fail to reject the null hypothesis, thee is significant evidence that a higher pobortion of die hard Cubs fans attend games at least once a month.
- ( ) Reject the null hypothesis, thee is not significant evidence that a higher pobortion of die hard Cubs fans attend games at least once a month.
- ( ) Fail to reject the null hypothesis, thee is not significant evidence that a higher pobortion of die hard Cubs fans attend games at least once a month.