Practice Problems for Final Exam – Proportions Solutions

1. The National AIDS Behavioral Surveys interviewed a sample of adults in the cities where AIDS is most common. This sample included 803 heterosexuals who reported having more than one sexual partner in the past year. We can consider this a simple random sample of size 803 from the population of all heterosexuals in high-risk cities who have multiple partners. These people risk infection with the AIDS virus yet 304 of the respondents said they never use condoms.

a) **Construct** a 95% confidence interval for the percentage of heterosexuals in high risk cities who have multiple partners that do not use condoms. **Show all work and formulas**.

n = 803 heterosexuals who reported having more than one sexual partner in the past year

y = 304 respondents said they never use condoms

  

0.3786±1.96 (0.0171)

.3786± 0.0335

(0.3451 <p<.4121) where p is the proportion of respondents said they never use condoms in “it risk”situations.

b) Interpret the interval constructed in part (a).

We are 95% confident that the proportion of heterosexuals who reported having more than one sexual partner in the past year that said they never use condoms is between 34.51% to 41.21%.

c) Using your confidence interval from part (a), is there strong evidence that more than one-third of this population never use a condom? Explain

Since the entire interval is greater than 33.3% there is evidence to suggest that more than one-third of this population never use a condom.

d) If the AIDS Behavioral Surveys wanted to maintain the 95% confidence rate but now have a margin of error of 5%, what would be the minimum required size of this new sample? Show work and formulas.



n≥ (0.38)(0.62) and for initial estimate of p I used 

A minimum sample size of 363 subjects would be required.

2. There has been debate among doctors over whether surgery can prolong life among men suffering from prostate cancer, a type of cancer that typically develops and spreads very slowly. In the summer of 2003, The New England Journal of Medicine published results of some Scandinavian research. Men diagnosed with prostate cancer were randomly assigned to either undergo surgery or not. Among the 347 men who had surgery, 16 eventually died of prostate cancer compared with 31 of the 348 men who did not have surgery.

a) Create a 95% confidence interval for the difference in rates of death for the two groups of men.

Surgery Group No Surgery Group

n= 347 n=348

x=16 x=31

 



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MOE = 1.96(.0190) = .0372

95% confidence interval -0.043 ± (0.0372) = (-.0802<p1-p2<-.0058)

b) Based on your results, is there evidence that surgery may be more effective in preventing death from prostate cancer? Explain.

We are 95% confident that the percentage of deaths of men from prostate cancer that had surgery was between 0.58% to 8.02% less than the percentage of deaths of men from prostate cancer that did not have surgery.

Note: this experiment only used men in Scandinavia and did not specifically state that the men were assigned randomly to the two treatments.