Stat 1350, Confidence Intervals I, Spring 2014   Name ___KEY___

Instructions, for each of the studies below, find the 95% confidence interval using the quick method, and then interpret the result in the context of the problem.

1. A recent Gallup Poll asked, "What is your favorite Summer Olympics event?" Of the people asked, 27% said "swimming."

we are 95% certain that between 23.84% and 30.16% of Americans cite swimming as their favourite Olympic sport.

$$.27 \pm \frac{1}{\sqrt{n}} \Rightarrow \left(.27 - \frac{1}{\sqrt{n}}, .27 + \frac{1}{\sqrt{n}}\right)$$

if n = 1000 then

$\frac{1}{\sqrt{n}} = .0316$

$(.2384, .3016)$

2. Do doctors in managed care plans give less charity care? Researchers chose 60 communities at random, then chose doctors at random in each community. In all, they interviewed 10,881 doctors. Overall, 77.3% of the doctors said they had given some care free or at reduced rates because of the patient's financial need in the month before the interview. Doctors who received at least 85% of their practice income from managed care plans were significantly less likely than other doctors to provide charity care.

Suppose they were evenly split   n = 5440, 5441

Then $\frac{1}{\sqrt{5440}} = .0136$

managed care doctors: (.7594, .7866) we are 95% certain that between 75.9% and 78.7% of doctors do charity care.

not managed care doctors: (.8364, .8636) we are 95% certain that between 83.6% and 86.4% of non-managed care doctors give charity care.

3. "Congress passed a ban on the sale of assault weapons. Now there is a move to repeal that ban. Do you agree that the ban on sale of assault weapons should be repealed?" You ask that question to an SRS of 1000 adults in Texas (population 18 million people) and to a separate SRS of 1000 adults in Indiana (population 5.7 million people). You make 95% confidence statements about the percents of all adults in both states who agree.

The confidence intervals will be the same width since the sample sizes are the same.

Suppose p is proportion in Texas, then CI is (p - .0316, p + .0316)

Suppose q is proportion in Indiana then CI is (q - .0316, p + .0316)

4. A Gallup Poll asked 1013 randomly chosen adults to rate the "honesty and ethical standards" of 45 occupations. Nurses were at the top, with 73% of the poll respondents rating them "very high" or "high." Car salesmen were at the bottom with just 8% "very high" or "high" ratings. Find the confidence interval for both occupations.

$$\frac{1}{\sqrt{1013}} = .0314$$

$$(.73 - .0314, .73 + .0314) = (.6986, .7614)$$

$$(.08 - .0314, .08 + .0314) = (.0486, .1114)$$

we are 95% confident that between 69.9% and 76.1% of Americans rate nurses as ethical and honest.

we are 95% confident that between 4.9% and 11.1% of Americans rate carsalesman as highly honest or ethical.

5. A local planning commission is interested in finding out what proportion of its city's residents are opposed to constructing a new baseball stadium in the downtown area. A random sample of 1870 residents is obtained, and 41.2% of them are opposed to the stadium.

$$\frac{1}{\sqrt{1870}} = .0231$$

$$(.412 - .0231, .412 + .0231) = (.3889, .4351)$$

We are 95% confident that between 38.9% and 43.5% of the city's residents are opposed to the new stadium.

6. Suppose that you are told that we are 95% sure that between 25.6% and 38.4% of Americans consider themselves to consistently identify with the Republican Party according to a recent poll. What was the statistic obtained from the study for their question about party identification, and about how many people were surveyed to obtain the resulting confidence interval? [Hint: You will need to find the mid-point of the interval: this is the statistic from the sample. The difference between the midpoint and one end of the interval is the margin of error. Set this equal to the formula for the quick method and solve for n. Round your answer to the nearest 100 people.]

$$\frac{.256 + .384}{2} = \frac{.64}{2} = .32 \quad \text{midpoint} = \text{Statistic from sample}$$

margin of error =

$$.384 - .32 = .064$$

$$.064 = \frac{1}{\sqrt{n}} \Rightarrow \sqrt{n} = \frac{1}{.064}$$

$$(\sqrt{n})^2 = (15.625)^2 \Rightarrow n = 244.14 \quad (\text{round up})$$

$$\boxed{n = 245} \text{ or } \approx 300$$