

Key!

AP Statistics Section 8.2 Class Notes

Problem 1

Mr. Bautista's class took an SRS of Reese's Pieces from a candy machine and got 107 orange and 144 pieces of other colors.

- (a) Check conditions.
- (b) Calculate a 90% confidence interval for p .
- (c) Mr. Deggeller claims that half the Reeses Pieces in the machine are orange. Comment on this claim.

- (a) B-orange/not, I-each candy, T- 251, S - constant (unknown)
SRS-given, $n\hat{p} = 251\left(\frac{107}{251}\right) = 107 \geq 10$ $n(1-\hat{p}) = 251\left(\frac{144}{251}\right) = 144 \geq 10$, $N \geq 2510$ Reeses Pieces
- (b) 90% CL. 1-Prop z-Int. $[0.37, 0.48]$. I am 90% confident that the true proportion of orange Reeses pieces was captured within 0.37 and 0.48.
- (c) This claim is unlikely because 0.50 is not within the 90% CI of 0.37 to 0.48.

Problem 2

It has been claimed that 70% of Earth is covered in water. To investigate, Ms. Congress tossed an inflatable globe to Mr. Bautista 50 times. When he caught the globe, Mr. Bautista recorded where his right index finger was pointing. In 50 tosses, his finger was pointing at water 33 times. Construct and interpret a 95% confidence interval for the proportion of Earth's surface that's covered in water.

I. 95% CL

SRS - assume
B - water/land
I - each toss
T - 50

S - constant

$$n\hat{p} = 50\left(\frac{33}{50}\right) = 33 \geq 10$$

$$n(1-\hat{p}) = 50\left(\frac{17}{50}\right) = 17 \geq 10$$

$$N \geq 500 \text{ tosses}$$

II. 1-Prop z-Int
 $[0.53, 0.79]$

III. I am 95% confident that the true proportion of Earth that is covered in water was captured within 0.53 and 0.79.

Problem 3

A company has received complaints about its customer service. The managers intend to hire a consultant to carry out a survey of customers. Before contacting the consultant, the company president wants some idea of the sample size that she will be required to pay for. One critical question is the degree of satisfaction with the company's customer service, measured on a five-point scale. The president wants to estimate the proportion p of customers who are satisfied (that is, who choose either "satisfied" or "very satisfied," the two highest levels on the five-point scale). She decides that she wants the estimate to be within 3% (0.03) at a 95% confidence level. How large a sample is needed?

$$0.03 = 1.96 \sqrt{\frac{(\frac{2}{5})(\frac{3}{5})}{n}}$$
$$\left(\frac{0.03}{1.96}\right)^2 = \frac{0.24}{n}$$

$$n = \frac{0.24}{\left(\frac{0.03}{1.96}\right)^2}$$

$$n = 1024.42$$

\therefore

at least
1,025 customers
are needed

Problem 4

A college student wants to estimate the proportion of students who eat broccoli. The student finds that 11 out of 43 students sampled eat broccoli. Calculate a 90% confidence interval for the true proportion of students who eat broccoli.

I. 90% CL

SRS - assume

B - eat/don't

I - each student

T - 43

S - constant

$$n\hat{p} = 43\left(\frac{11}{43}\right) = 11 \geq 10$$

$$n(1-\hat{p}) = 43\left(\frac{32}{43}\right) = 32 \geq 10$$

$$N \geq 430 \text{ students}$$

II. 1-Prop z-Int
[0.15, 0.37]

III. I am 90% confident that the true proportion of students who eat broccoli was captured within 0.15 and 0.37.