

You may work with one partner on this assignment, submitting one report with both names, provided that both students contribute substantially to the work. Word-processed reports are preferred to hand-written ones.

Baseball Big Bang?

A reader wrote in to the “Ask Marilyn” column in *Parade* magazine to say that his grandfather told him that in $3/4$ of all baseball games, the winning team scores more runs in one inning than the losing team scores in the entire game. (This phenomenon is known as a “big bang.”) Marilyn responded that this proportion seemed to be too high to be believable. Let π denote the proportion of all Major League Baseball games in which a “big bang” occurs.

a) Restate the grandfather’s assertion as the null hypothesis, in symbols and in words.

b) Report Marilyn’s response as an alternative hypothesis, in symbols and in words.

To investigate this claim, I randomly selected one week of the 2006 Major League Baseball season, which turned out to be July 31 – August 6, 2006. Then I examined the 95 games played that week to determine which had a big bang and which did not. Of these 95 games in the sample, 47 contained a big bang.

c) Calculate (exactly, using the binomial distribution) the relevant p -value. Also write a sentence or two interpreting this p -value.

d) Based on this p -value, would you say that the sample data provide strong evidence to support Marilyn’s contention that the proportion cited by the grandfather is too high to be the actual value? Explain. Also indicate what test decision you would reach at the $\alpha = .01$ level.

e) Determine a 95% confidence interval (using Minitab) for the population parameter. Also write a sentence interpreting what this interval says.

f) Now determine a 99% confidence interval. Comment on how it differs from the 95% interval.

g) Are these confidence intervals consistent with your test decision concerning the grandfather’s claim? Explain briefly.