Stat 134: Section 4

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Note: You may leave your answers in terms of Φ or Φ^{-1} as necessary, where $\Phi(x) = \int_{-\infty}^{x} \frac{1}{\sqrt{2\pi}} e^{-z^2/2} dz$, and Φ^{-1} is the inverse of Φ.

Conceptual Review

a. When do we use the Normal approximation to the Binomial distribution?

b. What is the continuity correction when using this approximation? Why do we use it?

Problem 1

Let H be the number of heads in 400 tosses of a fair coin. Find normal approximations to

a. $P(190 \leq H \leq 210)$

b. $P(H \leq 220)$

c. $P(H = 205)$

Ex 2.2.1 in Pitman's Probability

Problem 2

An airline knows that over the long run, 90% of passengers who reserve flights show up for their flight. On a particular flight with 300 seats, the airline accepts 324 reservations.

a. Assuming passengers show up independently of each other, what is the chance the flight will be overbooked?

b. Suppose people always travel in pairs. Will that increase or decrease the chance above?

Ex 2.2.9 in Pitman's Probability

Problem 3

Suppose that 48% of citizens in a large state support a particular candidate for governor. That candidate is in charge of setting up the election, and wants to maximize his chances of winning the election. Suppose that n citizens at random will be allowed to vote.

a. Does the candidate want to choose a large n or a small n?

b. Find the smallest n for which there is a 95% chance that the candidate will lose the election.