The Two-Sample z-Test to Compare Two Boxes

1. Four hundred draws are made at random with replacement from box A. The average of these draws is 110 and their SD is 60. Independently, 100 draws are made at random from box B. Their average is 90 and SD is 40. Formulate the null and alternative hypotheses. Calculate the z and P values.

2. Repeat the previous exercise if the average of the draws from A was 95.

3. Repeat Exercise 1 if the number of draws from A was 100 and the number of draws from B was 36.

4. In 1970, 59% of college freshmen thought that capital punishment should be abolished; by 2005, the percentage had dropped to 35%. Is the difference real, or can it be explained by chance? You may assume that the percentages are based on two independent simple random samples, each of size 1,000.

5. A university takes a simple random sample of 132 male students and 279 females; 41% of the men and 17% of the women report working more than 10 hours during the survey week. To find out whether the difference in percentages is statistically significant, the investigator starts by computing $z = (41-17)/0.048$. Is anything wrong? If so fix it. Then do the test.

6. Five hundred draws are made at random with replacement from a box of numbered tickets; 276 are positive. Someone tells you that 50% of the tickets in the box show positive numbers. Do you believe it? Answer yes or no, and explain.