1. (26.R10) On November 9, 1965, the power went out in NYC, and stayed out for a day - the Great Blackout. Nine months later, the newspapers suggested that New York was experiencing a baby boom. The table on page 498 of the text shows the number of babies born every day during a 25 day blackout period, centered nine months and ten days after the Great Blackout. These numbers average out to 436, which turns out not to be unusually high for New York. But there is an interesting twist to the data: the 3 Sundays only average 357. How likely is it that the average of 3 days chosen at random will be 357 or less? Is chance a good explanation for the difference between Sundays and weekdays? If not, how would you explain it?

2. (26.E11) Discount stores often introduce new merchandise at a special low price in order to induce people to try it. However, a psychologist predicted that this practice would actually reduce sales With the cooperation of a discount chain, an experiment was performed to test the prediction. Twenty-five pairs of stores were selected, matched according to such characteristics as location and sales volume. These stores did not advertise, and displayed their merchandise in similar ways.

   A new kind of cookie was introduced in all 50 stores. For each pair of stores, one was chosen at random to introduce the cookies at a special low price, the price increasing to its regular level after two weeks. The other store in the pair introduced the cookie at the regular price. Total sales of the cookies were computed for each store for six weeks from the time that they were introduced.

   In 18 of the 25 stores, the store which introduced the cookies at the regular price turned out to have sold more of them than the other store. Can this result be explained as chance variation? Or does it support the prediction that introducing merchandise at a low price reduces long-run sales? (Formulate the null hypothesis as a box model; there is no alternative hypothesis about the box.)

3. Gallup's daily tracking poll, (aggregated weekly), finds that President Obama's approval rating was 48% this week (Nov.14-15), up from 42% approval rating from about a month ago (Oct.19-20). Results are based on telephone interviews with approximately 1500 national adults. How strong is the evidence that his support has actually increased? How strong is the evidence against the *null hypothesis* of no change?

4. Data from the CDC Youth Risk Behavior Surveillance System indicates that between 2007 and 2009, there was a drop in the percent of high school students across the US who had ever used marijuana. In 2009, 8150 females were surveyed, and 34% reported using marijuana, while 39% of 7850 male students reported using marijuana.
   (a) Is there a gender difference? Were male HS students more likely to use marijuana in 2009?
   (b) The total percent (across genders) of high school students reporting marijuana usage in 2009 was about 37%. In 2007, a similar survey of 13632 high school students had 38% reporting usage of marijuana. Can we conclude that there is a real drop, or is there no difference in marijuana usage amongst high school students?

5. (Ex 4 on page 508) There are 200 subjects in a small clinical trial on vitamin C. Half of them are assigned at random to treatment (2000 mg of vit. C daily) and the other half are assigned to control (2000 mg of placebo). Over the period of the experiment, the treatment group averaged 2.3 colds and the SD was 3.1. The controls did a little bit worse: they averaged 2.6 colds and the SD was 2.9. Is the difference in averages statistically significant?

6. (27.E5) A geography test was given to an SRS of 250 high school students in a certain large school district. One question involved an outline map of Europe, with the countries identified only by number. The students were asked to pick out Great Britain and France. As it turned out, 65.6% could find France, compared to 70.4% for Great Britain. Is the difference statistically significant? Or can this be determined from the information given?

7. (27.R8) One experiment contrasted responses to "prediction-request" and to "request-only" treatments in order to answer two research questions.

   (i) Can people predict how well they will behave?

   (ii) Do their predictions influence their behavior?

   In the prediction-request group, subjects were first asked to predict whether they would agree to do some volunteer work. Then they were requested to do the work. In the request-only group, the subjects were requested to do the work, they were not asked to make predictions beforehand. In parts (a-b-c), a two-sample z-test may or may not be legitimate. If it is legitimate, make it. If not, why not?

   (a) 46 residents of Bloomington, IN, were chosen at random for the "prediction-request" treatment. They were called and asked to predict "whether they would agree to spend 3 hours collecting for the American Cancer Society if contacted over the phone with such a request". 22 out of the 46 said that they would. Another 46 residents were chosen at random for the "request-only" treatment. They were requested to spend the 3 hours collecting for the ACS. Only 2 out of 46 agreed to do it. Can this difference between 22/46 and 2/46 be due to chance? What do the data say about the research questions?

   (b) Three days later, the prediction-request group was called again, and requested to spend 3 hours collecting for the ACS. 14 out of 46 agreed. Can the difference between 14/46 and 2/46 be due to chance? What do the data say about the research questions?

   (c) Can the difference between 22/46 and 14/46 be due to chance? What do the data say about the research questions?