1. With a perfectly balanced roulette wheel, in the long run, red numbers should turn up 18 times in 38. To test its wheel, one casino records the results of 3800 plays, finding 1890 red numbers. Is that too many reds? Orchance variation?

   (a) Formulate the null and alternative hypotheses as statements about a box model.

   (b) The null says the percentage of reds in the box is hspace2cm. The alternative says that the percentage of reds in the box is _____. Fill in the blanks.

   (c) Compute z and the probability that the number of reds is 1890 assuming the null hypothesis.

   (d) Were there too many reds?

2. One kind of plant has only blue flowers and white flowers. According to a genetic model, the offspring of a certain cross have a 75% chance to be blue-flowering, and a 25% chance to be white-flowering, independently of one another. Two hundred seeds of such a cross are raised, and 142 turn out to be blue flowereing. Are the data consistent with the model? Answer yes or no, and explain briefly.

3. One large course has 900 students, broken down into section meetings with 30 students each. The section meetings are led by teaching assistants. On the final, the class average is 63, and the standard deviation is 20. However, in one section the average is only 55. The TA argues this way:

   If you took 30 students at random from the class, there is a pretty good chance they would average below 55 on the final. That's what happened to me – chance variation.

   Is this a good defense? Answer yes or no, and explain briefly.

4. A nespaper article says that on average, college freshmen spend 7.5 hours a week going to parties. One administrator does not believe that these figures apply at her college, which has nearly 3000 freshmen. She takes a simple random sample of 100 freshmen and interviews them. On average they report 6.6 hours a week going to parties, and the standard deviation is 9 hours. Is the difference between 6.6 and 7.5 real?

   (a) Formulate the null and alternative hypotheses in terms of a box model.

   (b) Fill in the blanks. The null says that the average of the box is _____. The alternative says the average of the box is _____.

   (c) Now answer the question: is the difference real?

5. On November 9, 1965, the power went out in New York City, 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 below

shows the number of babies born every day during a 25 day period, centered nine months and ten days after the Great Blackout. These numbers average out to 436. This turns out to be not unusually high for New York. But there is an interesting twist to the data: the three Sundays only average 357. How likely is it that the average of 3 days chosen at random from the table will be 357 or less? Is chance a good explanation for the difference between Sundays and weekdays? If not, how would you explain the difference?

Date	Day	Number of births
1	Mon	451
2	Tue	468
3	Wed	429
4	Thur	448
5	Fri	466
6	Sat	377
7	Sun	344
8	Mon	448
9	Tue	438
10	Wed	455
11	Thur	468
12	Fri	462
13	Sat	405
14	Sun	377
15	Mon	451
16	Tue	497
17	Wed	458
18	Thur	429
19	Fri	434
20	Sat	410
21	Sun	351
22	Mon	467
23	Tue	508
24	Wed	432
25	Thur	426