

Please write your student number here: _____

Ground rules:

- Do not write your name on the exam. If you're worried about losing the first page, write your student number on each page of the exam.
- If you use pages other than this exam to do your work, STAPLE them to the exam, clearly identify each question with a number, write your student number on those pages and hand them in.
- You can use your notes or books, but you may not communicate with other people about this exam or the material covered by it.
- In order to receive as much credit as possible, please show all of your work. Showing that you understand the question and know how to set up the solution correctly is more important than arriving at the exact answer.
- Feel free to use Excel or another program for your calculations, if necessary.
- Please be neat -- you can't get credit if I can't read your answers.
- I'll be in my office Friday morning-- just bring the exam by my office. If you would like to drop off the exam prior to Friday morning, you can leave it in my box at Parrington or slip it under my door. Send me an email so that I know that you have done this.
- Good luck!

(30 points)

1. Initiative 695 not only reduced car tabs in the State of Washington to \$30 a car, but also it reduced the amount of money available for public transportation across the state. The potential impacts on public transit were much discussed throughout the election season. When votes for the initiative were tallied in the November 1999 election, King County was the only county throughout the state in which a majority did not vote for the initiative. Let's take a look at people's travel habits in 1998 to begin to understand why that might be. The following table contains the results of a question asked of a random sample of the population of the State of Washington about their most common method to travel to work.

	Drive a Car, Truck or Van	No Driving: Public Transit, Bike or Walk	Other	Total
Puget Sound (Not King County)	915	118	50	1083
King County	616	189	34	839
Olympic Peninsula	882	77	37	996
Eastern Washington	1379	178	58	1615
Total	3792	562	179	4533

Source: 1998 Washington State Population Survey

- 1a. Across the state, what is the rate of the use of alternatives to driving to work?
- 1b. What is the probability that someone would both live in King County and not drive?
- 1c. What is the probability that someone who lived in Eastern Washington would use public transportation?
- 1d. Given that a person drives, what is the probability that he or she would live in Eastern Washington? What is the probability that he or she would live in King County?

1e. Is one's likelihood of driving associated with where one lives? What evidence supports your answer?

1f. Write a paragraph discussing your findings for the nontechnical reader and suggesting some reasons for the November 1999 election results.

(40 points)

3. The voting habits of U.S. citizens have been cause for concern for quite some time. Only approximately 50% of the voting age population actually voted in the U.S. elections in 1996. Of the inhabitants of inner cities, only about 20% voted.¹

3a. In a group of 10 people randomly selected from inner city populations of the U.S., what is the probability that five or more voted in the 1996 elections?

3b. In a group of 10 people randomly selected from the entire U.S. population, what is the probability that five or more of them voted in the 1996 elections?

3c. What is the expected number of voters in a random sample of 10 people in the entire U.S. population?

¹ Adapted from the *New York Times*, Jan. 30, 1997 "Many Black Men Barred from Voting, Study Shows."

One possible explanation for some of the non-voters is that those who have been convicted of a felony are disqualified from voting in most states in the U.S. The following data pertain to those people who are ineligible to vote by reason of felony conviction:

- The probability of a male of voting age being ineligible due to a felony conviction, given that he is black, is 14%
- The probability of a male of voting age being ineligible due to a felony conviction, given that he is non-black, is 4%
- Blacks make up 12 percent of the voting-age male population

3d. Given that a male is ineligible to vote due to a felony conviction, what is the probability that he is black?

3e. If there are 10.5 million black males of voting age, how many are barred from voting due to a felony conviction?

3f. Experts in voting behavior has said that only 20 percent of convicted felons would have voted (even if they were not barred) because of low voter turnout in their demographic group.

Write 2 paragraphs of the back of this page presenting both the information you are given throughout this question and your findings for the nontechnical reader. Explore the policy implications and offer suggestions for improving representation of the U.S. population in elections.