1. An Ivy League college is concerned that out of state students may be receiving lower grades than the state residents students. Two independent random samples have been selected: 165 observations from population 1 (Out of state students) and 177 from population 2 (State students). The sample means obtained are X1(bar)=86 and X2(bar)=87. It is known from previous studies that the population variances are 8.1 and 7.3 respectively. Using a level of significance of .01, is there evidence that the out of state students may be receiving lower grades? Fully explain your answer
2. I drive to work every weekday. I have three options to drive there. I can take the Toll Road, or I can take a main highway with some traffic lights, or I can take the back road, which has no traffic lights but is a longer distance. Is there is a difference in the time it takes to drive each route?

I randomly selected the route on 21 different days and wrote down the time it took me for the round trip, getting to work in the morning and back home in the evening.  At the .01 significance level, can I conclude that there is a difference between the driving times using the different routes?

**Time (in minutes) it took to get to work and back using:**

|  |  |  |
| --- | --- | --- |
| **Toll Road** | **Main highway** | **Back road** |
| 88 | 79 | 86 |
| 94 | 86 | 78 |
| 91 | 75 | 79 |
| 88 | 83 | 96 |
| 98 | 74 | 97 |
| 84 | 72 | 73 |
| 90 |  | 68 |
| 77 |  |  |