3.

a) The factors that might reasonably be thought to affect fuel consumption include the weight of the car, the condition of weather, the velocity that people drive the car, the type of car, the carrying capacity of the car, the engine type of the car, the smoothness of the ground, and different drivers.

b) Based on the criteria on page 308 of the course notes, there should be more types of cars that should be tested and the way and velocity that people drive the cars should be changed for many times so that the chance that an observed association is due to a defect in one type of study or a peculiarity in one group of subjects would be reduced. Moreover, different drivers should drive the cars and the cars should be driven at sunny, rainy, snowy, or windy days. To be specific, men, women, people with 10 years or more driving experience, people with 1 year or less driving experience should drive the cars and record the data. This helps us to observe that whether the association between x and y hold when the effects of plausible confounding variates are considered. During the process, the drivers should drive the car steadily. After recording the data, we should observe that whether the fuel consumption increases as the distance driven increases. If as the distance driven increases, the fuel consumption increase. If we take other confounding variates such as the weight of the car into account, the association between the fuel consumption and distance drive is also hold. If we change the type of the cars or change the way we do the study, the association between the fuel consumption and distance drive is also hold. There exists a plausible scientific explanation for the direct influence of distance driven on fuel consumption. As these criteria met, we might can draw a conclusion that there is causal relationship between the fuel consumption and the distance driven.