

1. **The market for lemons.** There two large groups of people: used car buyers and used car sellers. Car sellers own cars and the quality q of each car is random and distributed uniformly between 0 and 1. A seller values his car of quality q at $p_s q$ and is willing to sell his car if the price that he can receive for the car is greater than or equal to the value that he places on the car. Each buyer values a car of quality q at $p_b q$ where $p_b = \lambda p_s$ and $\lambda > 1$.

- (a) Explain in words why $\lambda > 1$ is a necessary condition for a market for used cars to exist.
- (b) In class, we noted that when buyers can't observe the quality of a seller's car, then there will only be a single price P for cars of any quality. This meant that we could define a threshold quality equal to the greatest quality car brought to market:

$$q_{\max} = \begin{cases} P/p_s & P < p_s \\ 1 & P \geq p_s \end{cases} \quad (1)$$

Assuming that $\lambda < 2$, explain why and/or show mathematically that $q_{\max} < 1$.¹