1. Suppose $X_i \overset{st}{\leq} Y_i$ for $i = 1, 2$. Assume that $X_1$ is independent of $X_2$ and $Y_1$ is independent of $Y_2$. Show that $X_1 + X_2 \overset{st}{\leq} Y_1 + Y_2$.

2. Suppose $X_i \overset{cx}{\leq} Y_i$ for $i = 1, 2$. Assume that $X_1$ is independent of $X_2$ and $Y_1$ is independent of $Y_2$. Show that $X_1 + X_2 \overset{cx}{\leq} Y_1 + Y_2$.

3. Consider two $G/M/1$ queues with service rate $\mu$ and $\rho_i < 1$, where $A_2 \overset{L}{\leq} A_1$. Show that the stationary queue lengths are ordered in standard stochastic ordering for these two systems. Note that $A_i$ denotes the distribution of interarrival times for system $i, i = 1, 2$. 