Part c)

$(x_0^A, x_S^A, x_C^A) = (10, 12, 20)$; $(x_0^B, x_S^B, x_C^B) = (10, 18, 10)$. $y^A = -y^B = -8$; $b^A = -b^B = 1$; $r = 2$; $q = \frac{1}{8}$.

Problem 5

Part a)

$(x_1^A, x_H^A, x_L^A) = (4, 4, 4)$; $(x_1^B, x_H^B, x_L^B) = (4, 4, 4)$. $r = 0$; $b^A = -b^B = 0$. No Pareto Optimal: consider $(x_1^A, x_H^A, x_L^A) = (4, 8, 0)$; $(x_1^B, x_H^B, x_L^B) = (4, 0, 8)$.

Part b)

Equilibrium Prices: $q^* = 1/2$, $r^* = 0$.
Credit and securities traded:
$b^A(q^*, r^*) = -b^B(q^*, r^*) = 4$, $z^A(q^*, r^*) = -z^B(q^*, r^*) = 8$.
Consumer A sells short (i.e., sells more units of x_H than he has.)
Equilibrium Allocation: $(x_1^A, x_H^A, x_L^A) = (4, 8, 0)$, $(x_1^B, x_H^B, x_L^B) = (4, 0, 8)$.
The equilibrium allocation is Pareto Optimal.