**Exercise 6.8**

(a) Constraint (6.12) state that the sum of the lambda's equals 1, so they cannot be all equal to zero. Consequently at least one of them must be a basic variable.

(b) First subproblem: $z_1 = \min\{(c_1 - qD_1)x_1 | x_1 \in P_1\}$. Note that $(c_1 - qD_1)x_1^j - r_1$ is the reduced cost of $\lambda_1^j$. The minimum reduced cost equals $z_1 - r_1$. Since the reduced cost of the basic variables are 0, we must have $z_1 \leq r_1$.