Additional Problem for HW #4

Suppose you are building a new baseball stadium, and are deciding on the number of seats you should accommodate. You've determined that if you charge $\$A$ for an adult ticket and $\$C$ for a child ticket, then on average, N adults and M children will purchase tickets, where

$$N = 80{,}000 - 2{,}000A \qquad \text{and} \qquad M = 30{,}000 - 1{,}500C - 500A.$$

(The price of an adult ticket affects the number of children since children are typically accompanied by their parents.)

(a) Neglecting for the moment any seating constraints, calculate the prices that you should charge to maximize revenue from ticket sales. How much revenue would you generate? How many people would you have to accommodate?

(b) Now suppose you impose a seating capacity of 50,000 people (adults and children). Now what should you charge to maximize revenue from ticket sales? (You can assume that you've filled the stadium to capacity.) How much revenue would you generate in this scenario?

(c) Estimate how much additional (maximum) revenue per game you would gain by adding one more seat to the stadium. (**Hint:** This question is easy if you used a Lagrange multiplier for the previous part.)