

10. [8 points] Gen is setting up a business selling hot chocolate in Srebmun Foyoj and, due to local restrictions, she will be able to produce and sell no more than 200 gallons. She has determined that the total cost, in dollars, for her to produce  $g$  gallons of hot chocolate can be modeled by

$$C(g) = \begin{cases} 100 + 90\sqrt{g} & \text{if } 0 \leq g \leq 100 \\ 400 - 10e^5 + 6g + 10e^{0.05g} & \text{if } 100 < g \leq 200 \end{cases}$$

and that for  $0 \leq g \leq 200$ , the revenue, in dollars, that she will bring in from selling  $g$  gallons of hot chocolate is given by

$$R(g) = 15g.$$

- a. [4 points] For what quantities of hot chocolate sold would Gen's marginal revenue equal her marginal cost?

**Answer:** \_\_\_\_\_

- b. [4 points] Assuming Gen can sell up to 200 gallons of hot chocolate, how much hot chocolate should she produce in order to maximize her profit, and what would that maximum profit be? *You must use calculus to find and justify your answer. Be sure to provide enough evidence to justify your answer fully.*

**Answer:** gallons of hot chocolate: \_\_\_\_\_ and max profit: \_\_\_\_\_