

6. [11 points] Ben has recently acquired a cabbage press and is opening a business selling cabbage juice. Let $R(x)$ and $C(x)$ be the revenue and cost, in dollars, of selling and producing x cups of cabbage juice. Ben only has resources to produce up to a hundred cups. After some research, Ben determines that

$$R(x) = 6x - \frac{1}{40}x^2 \quad \text{for} \quad 0 \leq x \leq 100$$

and

$$C(x) = \begin{cases} 60 + 2x & 0 \leq x \leq 20 \\ 70 + 1.5x & 20 < x \leq 100. \end{cases}$$

- a. [3 points] What is the smallest quantity of juice Ben will need to sell in order for his profit to not be negative? Round your answer to the nearest hundredth of a cup. Show your work.

Answer: _____

For the following parts, determine how many cups of cabbage juice Ben needs to sell in order to maximize the given quantity. If there is no such value, write NONE. Use calculus to find and justify your answers.

- b. [3 points] Ben's revenue.

Answer: _____

- c. [5 points] Ben's profit.

Answer: _____