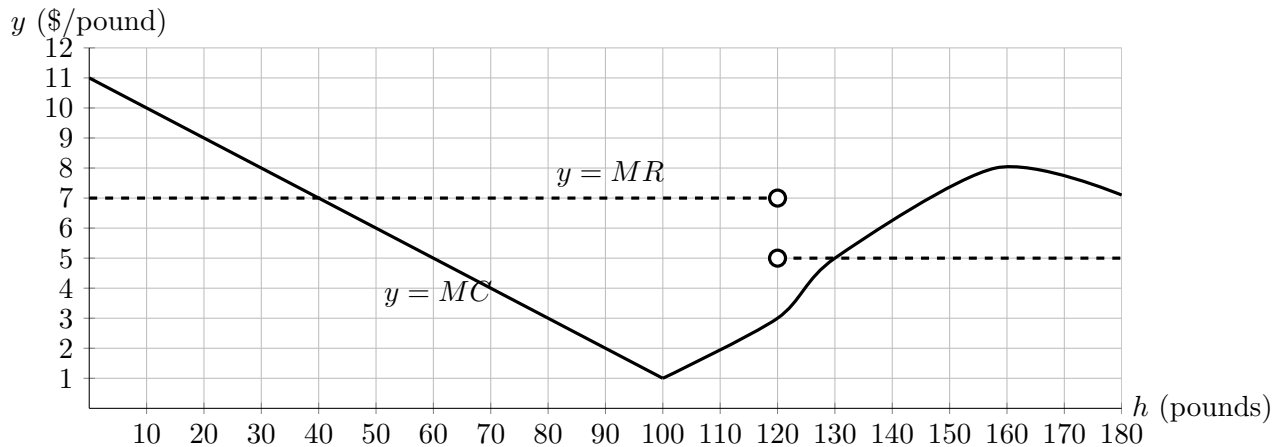


10. [10 points] The Happy Hives Bee Farm sells honey. The graph below shows marginal revenue  $MR$  (dashed) and marginal cost  $MC$  (solid), in dollars per pound, where  $h$  is the number of pounds of honey.



- a. [7 points] Use the graph to estimate the answers to the following questions. You do not need to show work. If an answer can't be found with the information given, write "NEI".
- For what value(s) of  $h$  in the interval  $[0, 180]$  is the cost function  $C$  minimized?

**Answer:**  $h = 0$ .

- For what value(s) of  $h$  in the interval  $[0, 180]$  is  $MC$  minimized?

**Answer:**  $h = 100$ .

- For what value(s) of  $h$  in the interval  $[0, 180]$  is profit maximized?

**Answer:**  $h = 130$ .

- What are the fixed costs of the farm?

**Answer:** NEI

- For what values of  $h$  in the interval  $[0, 180]$  is the profit function concave up?

**Answer:**  $(0, 100) \cup (160, 180)$

- b. [3 points] The farm currently sells 20 pounds of honey but is thinking of increasing to 80 pounds of honey.

*Solution:* The total change in profit from selling 20 to 80 pounds of honey is given by

$$\int_{20}^{80} MR(q) - MC(q) dq = \frac{1}{2}(2 + 4)(20) = 60.$$

Will this increase or decrease profit? (Circle one.)

INCREASE

DECREASE

By approximately how much will the profit change? 60 dollars.