

2. [10 points] Jane has a company that produces a protein powder for an energy shake. The cost, in dollars, of producing m pounds of protein powder is given by the function

$$C(m) = \begin{cases} \frac{1}{4}(m+2)^2 + 8 & 0 \leq m < 16 \\ 2m + 57 & 16 \leq m \leq 30. \end{cases}$$

The revenue, in dollars, of selling m pounds of protein powder is given by

$$R(m) = 5m.$$

- a. [1 point] What is the price, in dollars, at which Jane sells each pound of the protein powder?

Answer: _____

- b. [1 point] What is the fixed cost, in dollars, of producing Jane's protein powder?

Answer: _____

- c. [2 points] Find all values of $16 \leq m \leq 30$ for which Jane's profit is positive.

Answer: _____

- d. [2 points] Find all the values of $0 \leq m \leq 30$ where the marginal cost is equal to the marginal revenue for the protein powder. Show all your work to justify your answer.

Answer: _____

- e. [4 points] What is the maximum profit that Jane can make if she sells at most 30 pounds of protein powder? Use calculus to find and justify your answer, and make sure to provide enough evidence to fully justify your answer.

Answer: _____