

9. [10 points] Kiki and her mother, Fifi, are restarting their failed business selling half-sized eggs that weigh half as much as regular-sized eggs. Each regular-sized egg they buy is changed into a half-sized egg via size-change technology. Customers pay six times as much per pound for the small eggs as they do for regular-sized eggs. The regular-sized eggs cost \$1 per pound (for regular customers and for Kiki and Fifi). Suppose Kiki's shrinking machine costs \$500 to build, and each shrinking machine will shrink 300 pounds of regular-sized eggs to half-sized eggs before it breaks and Kiki needs to build a new one.

a. [2 points] If  $N$  is the number of pounds of half-sized eggs they sell, how much money will they receive from the sales (in terms of  $N$ )?

They will receive \_\_\_\_\_ dollars from sales.

b. [3 points] Suppose the function  $P = G(N)$  gives the profit, total dollars from sales minus total expenses (including all regular-sized eggs purchased, and any machines built), from selling  $N$  pounds of half-sized eggs. Find  $G(5)$ ,  $G(150)$  and  $G(151)$ .

$$G(5) = \underline{\hspace{2cm}}.$$

$$G(150) = \underline{\hspace{2cm}}.$$

$$G(151) = \underline{\hspace{2cm}}.$$

c. [5 points] Write a piecewise-defined formula for  $G(N)$  for  $0 < N \leq 400$ .

$$G(N) = \left\{ \begin{array}{l} \\ \\ \\ \\ \\ \end{array} \right.$$