9. [12 points] A store sells socks. Let $S(p)$ be the profit (in dollars) the store earns from selling socks at a price of p dollars.

a. [5 points] The store manager notices that if they sell socks at 4 dollars, they get the highest profit of $2,500$ dollars. If they sell socks at 2.50 dollars the profit is 1375 dollars. Suppose $S(p)$ is a quadratic function. Find a formula for $S(p)$.

$S(p) =$ _____

b. [7 points] The winter season is here and the store is now selling mittens. Let M be the profit (in dollars) the store earns from selling mittens at a price of p dollars, where

$$M = f(p) = -96(p - 3.5)^2 + 600.$$

i) At what price(s) will the store not have any profit from selling mittens? You must find your answer algebraically.

Answer: _____

ii) Suppose that the store refuses to sell any mittens at any price at which no profit will be obtained. What is the practical domain and range of the function $f(p)$? Use interval notation or inequalities to answer this question. Your answer needs to be in *exact form* or be accurate up to two decimals.

Domain: _____ Range: _____