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 1,375 dollars. Suppose $S(p)$ is a quadratic function. Find a formula for $S(p)$.

$$S(p) = \text{____________________}$$

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: \text{____________________} 

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: \text{____________________} \quad \text{Range: _____________________}