1. (20 pts) A manufacturer has been selling 1000 television sets a week at $450 each. A market survey indicates that for each $10 rebate offered to the buyer, the number of sets sold will increase by 100 per week.
(a) Find the demanding function (price function).
(b) How large a rebate should the company offer to maximize its revenue?

sol: Suppose there were \( x \) units of television set were sold.
(a) \( p(x) = 450 - \frac{10}{100}(x - 1000) = 550 - \frac{1}{10}x \)
(b) The revenue is \( R(x) = xp(x) = 550x - \frac{1}{10}x^2 \) here \( x \geq 1000 \).
We find the function has maximum when \( x = 2750 \). So the rebate is \( \frac{1}{10}(2750 - 1000) = 175 \).