- $p$ = price
- $q$ = actual quantity
- $\hat{q}$ = predicted quantity

**Objective function:**

$$\pi(\hat{q}) = \begin{cases} p\hat{q} & , \quad \hat{q} \leq q \\ pq - 0.6p(\hat{q}-q) & , \quad \hat{q} > q \end{cases}$$

**Roots:**

- $p(q - 0.6\hat{q} + 0.6q) = 0 \Rightarrow \hat{q}_1 = 2.67q$
- $p\hat{q} = 0 \Rightarrow \hat{q}_2 = 0$

**Example:**

$$\begin{cases} p = 100 \\ q = 10 \end{cases}$$

- $\hat{q} = 0: \quad \pi(0) = 0$
- $\hat{q} = 5: \quad \pi(5) = 500$
- $\hat{q} = 10: \quad \pi(10) = 1000$

- $\hat{q} = 15: \quad \pi(15) = 1000 - 300 = 700$
- $\hat{q} = 20: \quad \pi(20) = 1000 - 600 = 400$
- $\hat{q} = 26.66: \quad \pi(26.66) = 1000 - 1000 = 0$

**Plot:**



overpredicting
=> is less costly
than underpredicting