EXAMPLE

- The demand and supply of sweets are given by

$P = -2q_d^2 - 2q_d + 35$ and $P = 0.5q_s^2 + q_s + 3.5$

- Equilibrium: $q_d = q_s = q$ and since *P* = *P* →
- $-2q^2 - 2q + 35 = 0.5q^2 + q + 3.5$
- Collect like terms to have $-2.5q^2 - 3q + 31.5$=0
- This can easily be solved using the formula to get q=3 or q=-4.2.
- What can you say about these quantities? No economic meaning for a negative quantity,
- Hence, we only have one solution q=3 and at this quantity $p = -2(9) - 2(3) + 35$= 11
- Therefore: q=3 and p=11.

COST, REVENUE AND PROFIT

- Another quadratic economic relationship is between a firm's output and its total costs.
- Note $\mathrm{TC}\ -\mathrm{Total\ Cost}, \mathrm{TFC}\ -\mathrm{Total\ Fixed\ Cost}, \mathrm{TVC}\ -\mathrm{Total\ Variable\ Cost}\ ,\ \ TR-\mathrm{Total\ Revenue}\ ,\ \ \mathrm{q}-$ $\mathrm{Quantity\ produced\ or\ sold}$
- $TC\ =\ TFC\ +\ TVC$; where $TVC = aq^2 + bq, TFC = c$. Therefore
  - Quadratic cost function: $TC\ = aq^2 + bq + c$
- Recall that $TR\ =\ p\ \times q$ (thus: multiply demand function with *p* or multiply inverse demand function with *q* to find *TR*)
  - Quadratic total revenue function: $TR\ = dq^2 + eq$
- Profit function: $\pi = TR - TC$:

$$\pi = dq^2 + eq - (aq^2 + bq + c\ ) = (d-a)q^2 + (e-b)q - c$$

- See p. 148-50