

Exercises 2 (GT Models of Economic Competition)

① Consider the Cournot duopoly model:

- two firms choose their outputs q_1 and q_2 ;
- market demand function: $q(p) = \max\{36 - \frac{1}{2}p, 0\}$;
- marginal costs $c_1 = 24$, $c_2 = 40$; assume zero fixed costs.

Find:

- the firms' reaction functions;
- Cournot (Nash) equilibrium;
- Stackelberg equilibrium (firm 1 - leader);
- Stackelberg equilibrium (firm 2 - leader).

② Assume that in linear city model the constraint $c < v < c+t$ holds. Find the sales of each firm when both firms use the Nash equilibrium prices.

③ Assume that in linear city model the constraint $v > c+3t$ holds.

Find the 1-st firm reaction function $p_1 = R_1(p_2)$, $p_2 \geq c$.
Verify that for each $p_2 \geq c$ the price vector $(R_1(p_2), p_2)$ implies that all the consumers will purchase a good.

④ Consider the vertical differentiation model (monopoly settings, case of imperfect or asymmetric information).
Let the production of one unit of quality q costs $c(q) = \frac{q^3}{3}$.
Find optimal contracts (q_1, p_1) and (q_2, p_2) for coarse and sophisticated consumers.