Exercise 1  *Sealed-price Vickrey auction*

In a sealed-price auction, bidders are unaware of each other’s bids; they seal their bids and submit them to the auctioneer.

a) How can a group of bidders lie in this auction and benefit from it?

b) How can the auctioneer lie in this auction and benefit from it?

Exercise 2  *Dutch auction*

A Dutch auction is an open-cry descending auction, where the auctioneer calls out bids starting from a high value and going down. The first bidder to say ”Mine” gets the item and has to pay the last-called bid. Explain that there is no dominant strategy in this auction (what would you do in such an auction?).

Exercise 3  *Clarke’s pivot rule*

Show that a second-price auction is a VCG-mechanism with Clarke’s pivot rule.

**Remark:** We showed already in class that it is a VCG-mechanism.

Exercise 4  *Bilateral Trade*

In this problem a seller holds an item and values it at some value $w_s$ and a buyer wants the item and values it at some value $w_b$. Let $A = \{ ”trade”, ”no-trade” \}$ and define

\[
\begin{align*}
    v_s(\text{trade}) &= -w_s \\
    v_b(\text{trade}) &= w_b \\
    v_s(\text{no-trade}) = v_b(\text{no-trade}) &= 0.
\end{align*}
\]

Let $(f, p_s, p_b)$ be a VCG-mechanism.

a) What are the conditions for outcome “trade”?

b) Define the functions $h_s$ and $h_b$ such that $p_b = p_s = 0$ in the case of no-trade. What are $p_b$ and $p_s$ in the case of trade?