Exercise 1

Two retailers compete in Cournot $P(Q) = a - q_1 - q_2$. The good is produced by a monopolist M at a cost $C(Q) = \frac{3Q^2}{2}$. Distribution costs are normalized to zero. The law forbids M to discriminate among its retailers.

1. Let w be the wholesale unit price set by M. Write the retailers' profits.
2. Determine the wholesale price w^M that maximises the profit of M.
3. M offers a contract (w, F) with F a franchise fee. The contract muts be the same for each retailers.
   - 3.1 w being set, what is the level $F(w)$ chosen by M?
   - 3.2 Determine w^* and F^* chosen by M.
   - 3.3 Compare with the profit of the vertically integrated structure.

Solution: Exercise 1

1. Cournot profits are $\pi_1 = \pi_2 = \frac{(a-w)^2}{9}$, with $Q^*(w) = q_1^* + q_2^* = \frac{2(a-w)}{3}$.
2. The profit of M is: $wQ^*(w) - C(Q^*(w))$. Soit $\frac{2w(a-w)}{3} - \frac{3}{2}(\frac{2(a-w)}{3})^2 = \frac{2}{3}(a-w)(2w-a)$ and thus $w^M = \frac{3a}{4}$.
3. Franchise contract
   - 3.1 For a given w retailers expect a profit $\frac{(a-w)^2}{9}$ and thus M sets $F(w) = \frac{(a-w)^2}{9}$.
   - 3.2 The profit of M is: $wQ^* - C(Q^*) + 2F = \frac{2}{3}(a-w)(2w-a) + \frac{2}{9}(a-w)^2 = \frac{2}{9}(a-w)(5w-2a)$ and so $w = w^* = \frac{7a}{10}$.
   - 3.3 F = the profit of a retailer $= P(Q)q_i - wq_i$, the profit of M is thus $wQ - C(Q) + P(Q)Q - wQ = P(Q)Q - C(Q)$. With franchises, M obtains the profit of the integrated structure.