**Quiz**

1) Suppose that two firms are in a patent race. They decide whether to undertake R&D investments in a new technology or not. The surplus from this particular new technology is $S=100.$ The cost of R&D is 10. The probability of successful R&D is $a=9/10.$ If both of them are successful in R&D, then they equally split$ S$.

a) Show that both of the firms invest in R&D in the equilibrium.

b) Show that the socially optimal case is a single firm investing in R&D.

c) Solve the same question assuming each firm gets zero (due to competition) if they both innovate the same technology.

2) Assume that the demand for a particular medicine is

$$Q=18-3P.$$

The cost of producing a single dose of medicine is 5. The medicine is initially produced by competitive firms. However, a scientist finds a new technology that reduces the cost of production to 1. Would a firm buy this new technology if the scientist sells its patent for 10?