Some Answers for Chapter 7 homework

Problem 7.2 In mixed strategy equilibrium, the probability that the batter prepares for a fastball is $6/7$ and the probability that the pitcher throws a fastball is $4/7$.

Problem 7.4 $x \leq 4$

Problem 7.5 This one is kind of a trick question. There is no Nash equilibrium in which the kicker assigns zero probability to kicking in the center. If the kicker does not kick to the center, then the best response for the goalie is to always go either left or right. But if the goalie never goes center, the kicker’s best response is to kick to the center.

Problem 7.10 There are three pure strategy Nash equilibria. In each of these, one player plays stop and the other two play go. There are also three Nash equilibria in which one player plays go for sure and the other two play go with probability $1/4$. There is one symmetric mixed strategy Nash equilibria in which all three players play go with probability of about .71. To find this symmetric equilibrium, suppose that each player plays go with probability $p$. If the other two players are playing go with probability $p$, then the probability that neither of the others play go is $(1 - p)^2$. The probability that exactly one of them plays go is $2p(1 - p)$ and the probability that both of the others play go is $p^2$. Therefore a player’s expected payoff from playing go is

$$120 \times (1 - p)^2 + 60 \times 2p(1 - p) + 40p^2$$

and the expected payoff from playing stop is 55. The two strategies stop and go have equal payoffs if

$$120 \times (1 - p)^2 + 60 \times 2p(1 - p) + 40p^2 = 55.$$ 

Solve this quadratic equation for $p$. 