Math 111   **Homework #1**   **Fall 2018**

1. Suppose Andy is a shirker and Bob is a worker. What will each do?

Bob

	Work	Shirk
Work	(w, w)	(w, s)
Shirk	(s, w)	(s, s)

Andy (labels the left)

2. Andy and Bob own competing companies. Each must decide whether to advertise on the local radio station. If neither advertises, then their annual revenue will be $5,000,000. If Andy advertises and Bob does not, then Andy will get some of Bob's customers, as well as new customers, so his revenue will be $7,000,000 and Bob's will be $4,000,000, and similarly if Bob advertises and Andy does not. If they both advertise, then each will gain customers and their revenue will be $6,000,000 each.

   (a) List the four possible outcomes and rank them for each player.

   (b) Draw the game matrix, including the ranks.

   (c) Decide what each player will do.

Bob

	Adv	Not Adv
Adv		
Not Adv		

Andy (labels the left)

3. Andy and Bob are now congressmen. They must decide whether to vote themselves a raise. Assume that the bill to give them a raise needs only one more vote, so it will fail only if they both vote against it. If they vote for the raise, they will receive an additional $10,000 a year, but the voters will be upset with them. If Andy votes for the raise and Bob votes against it, they will both get the raise, but Bob will also get a boost in popularity which we will value at $10,000, and similarly if Bob votes for the raise and Andy votes against it. If they both vote against the raise, they receive nothing.

   (a) List the four possible outcomes and rank them for each player.

   (b) Draw the game matrix, including the ranks.

   (c) Decide what each player will do.

4. Andy choose a color, red or blue, and Bob guesses the color. The payoffs are as follows.

   (i) If Andy chooses red and Bob guesses red, then Bob wins $5.

   (ii) If Andy chooses blue and Bob guesses blue, then Andy wins $5.

   (iii) If Andy chooses red and Bob guesses blue, then Andy wins $2.

   (iv) If Andy guesses blue and Bob guesses red, then Andy wins $1.

   (a) List the four possible outcomes and rank them for each player.

   (b) Draw the game matrix, including the ranks.

   (c) Decide what each player will do.

5. Andy and Bob are playing a game where Andy picks a number from 1 to 3 and Bob tries to guess the number. The payoffs are as follows.

   i If Bob guesses correctly, then Bob wins the number guessed, in dollars ($1, $2, or $3).

   ii If Bob guesses a larger number than the one Andy chose, then Andy wins the sum of the two numbers, in dollar.

   iii If Bob guesses a smaller number than the one Andy chose, then Bob wins twice the sum of the two numbers.

   (a) List the nine possible outcomes and rank them for each player.

   (b) Draw the game matrix, including the ranks.

   (c) Decide what each player will do.