Collegio Carlo Alberto

Game Theory
Problem Set 1

1. Consider the following single-person decision problem. The set of available actions is $\{a, b, c, d\}$. The set of states is $\{\omega_1, \omega_2, \omega_3\}$. The payoffs are given by:

	ω_1	ω_2	ω_3
a	4	1	5
b	5	0	6
c	3	4	3
d	2	9	2

   Find the actions that are strictly dominated. (Allow for mixed strategies when you check whether an action is strictly dominated.)

2. A decision maker has three actions (a, b, and c) and faces two states (ω_1 and ω_2). His payoffs are given by:

	ω_1	ω_2
a	8	1
b	6	4
c	2	7

   Compute the best response correspondence.

3. Consider two decision makers with the same set of actions A and the same set of states Ω. The payoff function of the decision maker $i = 1, 2$ is $u_i : A \times \Omega \to \mathbb{R}$. Suppose that for every $a \in A$ and every $\omega \in \Omega$

$$u_2(a, \omega) = ku_1(a, \omega) + b,$$

   where k is a positive number and b a real number.

   Suppose that the two decision makers have the same beliefs $q \in \Delta(\Omega)$. Show that action a is optimal for the first decision maker if and only if a is also optimal for the second decision maker.