Answers to Problem Set 1: Static Game Theory

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1. Chicken

	lose face	fight
lose face	6,6	2*,7*
fight	7*,2*	0,0

No strategies are dominated weakly or strictly. The reaction functions are marked in the payoff matrix. There are two Nash equilibria: in each one one player fights and the other loses face.

2. First Price Auction

Seagull = row player, VandeCamp = column player

	0	500	1000	10000	20000	25000
0	10000,500*	0,500*	0,0	0,-9000	0*,-19000	0*,-24000
500	19500*,0	9750,250*	0,0	0,-9000	0*,-19000	0*,-24000
1000	19000,0*	19000*,0*	9500,0*	0,-9000	0*,-19000	0*,-24000
10000	10000,0*	10000,0*	10000*,0*	5000*,-4500	0*,-19000	0*,-24000
20000	0,0*	0,0*	0,0*	0,0*	0*,-9500	0*,-24000
25000	-5000,0*	-5000,0*	-5000,0*	-5000,0*	-5000,0*	-2500,-12000

row player: 25000 is strictly dominated; 0 and 20000 are weakly dominated

column player: -25000 is strictly dominated, 0, 20000, 10000 and 1000 are all weakly dominated game after elimination of weakly dominated strategies

	500
500	9750,250
1000	19000,0
10000	10000,0

for row player 500 and 10000 are strictly dominated, so we conclude that the column player bids 500, and the row player bids 1000. So the row player wins and gets 19000.

For best responses correspondences, see the payoff matrix: there are two Nash equilibria, one is the same solution derived by iterated weak dominance, the other is both players bid 1000, and each has a 50% chance of winning. The column player gets 0, the row player a 50% chance of 19000.

3. Duopoly

profits are

$$\pi_i = a + (b-c)x_i - e(x_i)^2 - fx_i x_{-i}$$

$$\frac{d\pi_i}{dx_i} = (b-c) - 2ex_i - fx_{-i} = 0$$

in the symmetric equilibrium $x_i = x_{-i}$

$$x_i = \frac{b-c}{2e+f}$$

As *f* increases the equilibrium level of film violence goes down.